ENVIRONMENTAL CHECKLIST

FOR THE

BIG BIRD INDUSTRIAL PROJECT

October 2020

Prepared for:

City of Tracy
Development Services Department
Planning Division
333 Civic Center Plaza
Tracy, CA 95376

Prepared by:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762
(916) 949-3231

De Novo Planning Group

A Land Use Planning, Design, and Environmental Firm

ENVIRONMENTAL CHECKLIST

FOR THE

BIG BIRD INDUSTRIAL PROJECT

October 2020

Prepared for:

City of Tracy
Development Services Department
Planning Division
333 Civic Center Plaza
Tracy, CA 95376

Prepared by:

De Novo Planning Group
1020 Suncast Lane, Suite 106
El Dorado Hills, CA 95762
(916) 949-3231

INTRODUCTION

The City of Tracy adopted the Northeast Industrial Concept Development Plan for an area comprised of approximately 870 gross acres in the northeastern portion of the city on May 8, 1996 (Resolution Number 96-146) and, pursuant to the California Environmental Quality Act (CEQA), certified an Environmental Impact Report (EIR) (SCH # 95102050) for the Northeast Industrial Concept Development Plan (Resolution Number 96-144).

On August 7, 2012, the Northeast Industrial Concept Development Plan was repealed and replaced by the adoption of the Northeast Industrial Specific Plan (Ordinance 1174). The Northeast Industrial Specific Plan was determined to be consistent with the EIR prepared for the Northeast Industrial Concept Development Plan in 1996 (SCH #95102050) (the “NEISP EIR”) and no further environmental analysis was found necessary to be prepared.

Since certification of the NEISP EIR and subsequent adoption of the Northeast Industrial Specific Plan that supersedes the Northeast Industrial Concept Development Plan, the project applicant for the Big Bird Industrial Project (project) has submitted plans to develop four parcels within the Northeast Industrial area. The proposed project’s consistency with the Northeast Industrial Specific Plan and a comparison of the potential impacts associated with the proposed project compared to the Northeast Industrial Concept Development Plan Draft EIR analysis, are addressed in this document.

Section 15168(c)(2) of CEQA’s implementing regulations (the “CEQA Guidelines”), which governs the use of subsequent activities covered under a previously-certified program EIR, states: “If the agency finds that pursuant to Section 15162, no new effects could occur or no new mitigation measures would be required, the agency can approve the activity as being within the scope of the project covered by the program EIR, and no new environmental document would be required.”

As demonstrated in the following analysis, the Northeast Industrial Concept Development Plan Draft EIR continues to serve as the appropriate document addressing the environmental impacts of development within the NEISP area, including the project, pursuant to CEQA. Specifically, the following analysis shows that development of the proposed project would not result in any new significant environmental effects that were not identified and addressed by the NEISP EIR and no new mitigation measures would be required. As such, no new environmental document is required for the proposed project. This document provides the supporting evidence for this conclusion by the City of Tracy.

PROJECT OVERVIEW

PROJECT LOCATION

The project site consists of approximately 86.0 acres located at the southwest corner of Grant Line Road and Chrisman Road in the northeast quadrant of the City of Tracy. The project site is located on Assessor Parcel Numbers (APNs) 250-020-93, 250-020-95, 250-020-81, and 250-020-80. The project’s location is shown in Figure 1.

PROJECT DESCRIPTION

The proposed project would include development of a multi-story warehouse facility which covers 823,522 square feet (SF) on the ground floor. Above the ground floor, four additional elevated building levels would be included. These elevated building levels would include a combination of occupied areas, and non-occupied areas consisting of robotic storage platforms.

Internally, the facility would include a ground-floor office (55,808 SF), ground-floor warehouse space (767,714 SF), and four elevated robotics-occupied sortation floors (133,024 SF per floor of occupied area per floor and 532,446 SF of non-occupied robotic storage platforms per floor), for a total occupied building totaling 1,355,618 SF and a non-occupied robotics area of 2,129,784 SF. The overall building height is proposed to be 98-feet, 8-inches at the tallest point.

Due to the proposed building height, the applicant is requesting a NEISP amendment to change the maximum building height from 60 feet to 125 feet for buildings located at the project location. No other changes to the NEISP are proposed with the project application.

The project would also include site access, parking, and circulation improvements. Six access points to the site would be provided: one along Chrisman Road, two along Skylark Way, and three along E. Grant Line Road. As part of the project, the private road located along the southern site boundary would be demolished and a new alignment of Paradise Road would be constructed. Once redeveloped, Paradise Road would be dedicated to the City as a public road. The project would also include development of 234 trailer parking spaces, 1,867 auto parking spaces, and 12 motorcycle parking spaces.

Storm drainage treatment facilities would be located throughout the site. Utility lines (water, sewer, and storm drain) located along the adjacent roadways would be extended into the site to serve the project. Construction of the project is expected to take approximately 16 months total, with project completion estimated for February 2022. The proposed site plan is shown on Figure 2.

EXISTING SITE USES

The project site is currently vacant and undeveloped. No structures are located on-site. The site was previously used for agricultural uses but is no longer irrigated or harvested. Figure 3 shows an aerial view of the project site.

SURROUNDING LAND USES

The project site is located in an area predominately containing industrial and agricultural uses. The surrounding area adjacent to the project site includes industrial and warehouse uses to the northwest, northeast, south, west, and east of the project site. Approximately six agricultural residences and two industrial warehouses are located north of the project site. The project site and the surrounding uses are designated Industrial by the City's General Plan.

GENERAL PLAN AND ZONING DESIGNATIONS

The Tracy General Plan land use designation for the project site is Industrial (consistent with the proposed project) and the site is within the NEISP area. Specific uses allowed in the Industrial land use designation category range from flex/office space to manufacturing to warehousing and distribution. According to the City's General Plan, Industrial parcels should have a maximum floor-area-ratio (FAR) of 0.5. The proposed project's anticipated FAR would be approximately 0.36. This FAR was calculated based on the total occupied area of the proposed building. Industrial uses are located to provide proper truck access, buffering from incompatible uses and proximity with rail corridors and transit links. Figure 4 displays the General Plan land use designation for the project site and surrounding area.

The project site is zoned NEISP. The NEISP addresses 870 acres in the northeast corner of the City. Anticipated land uses include a mixture of manufacturing, warehousing, and distribution uses including rail-dependent industries and "flex-tech" light industrial. Figure 4 also displays the zoning designation for the project site and surrounding area.

REQUESTED ENTITLEMENTS AND OTHER APPROVALS

The City of Tracy is the Lead Agency for the proposed project, pursuant to the State Guidelines for Implementation of CEQA (Guidelines Section 15050).

If the proposed project is approved by the City of Tracy, this document will be used to take the following actions:

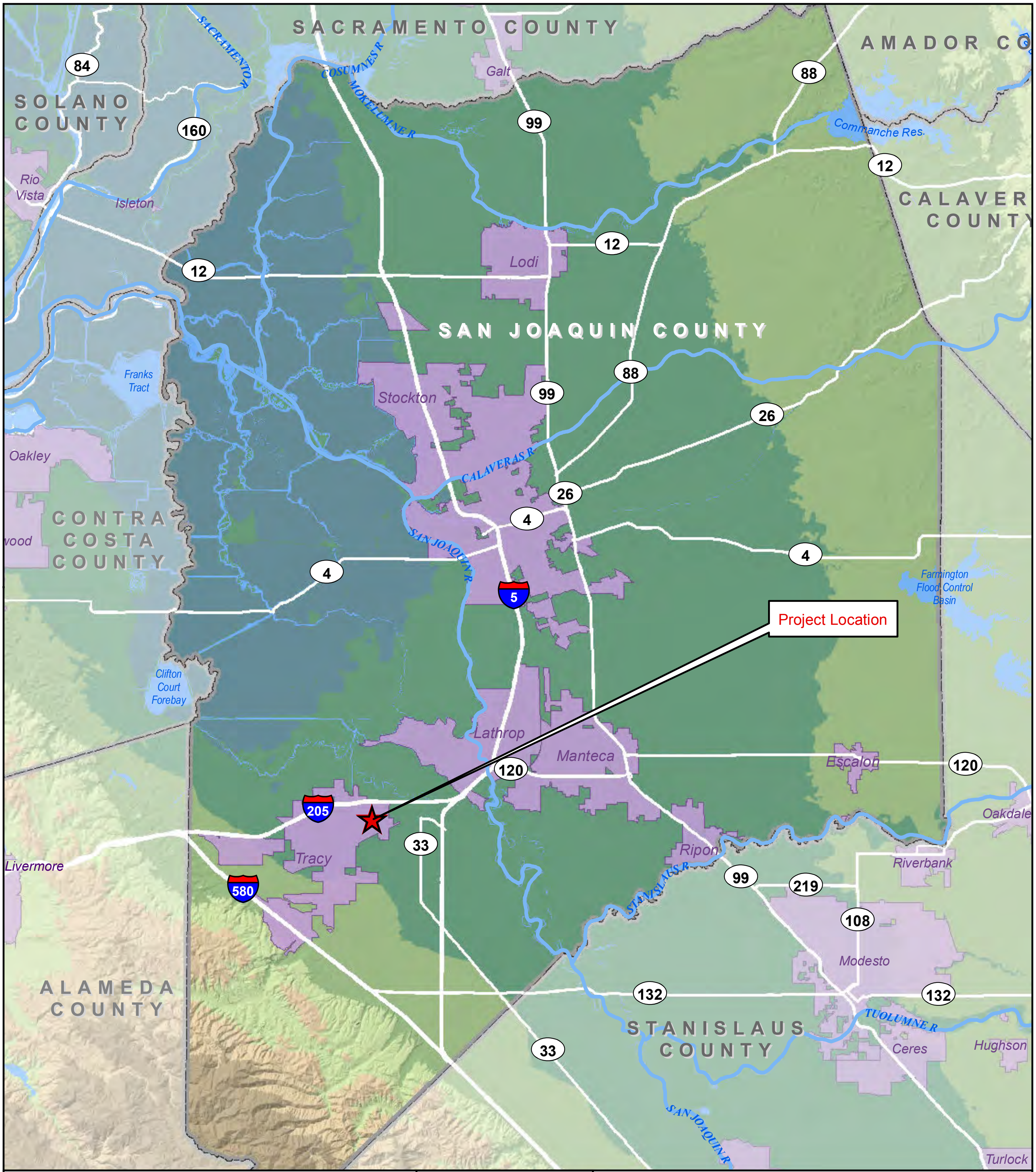
- Determine the appropriate form of CEQA compliance for the project.
- Support the approval of the NESIP amendment to change the maximum building height from 60 feet to 125 feet at the project site location.
- Support the approval of a Development Review Permit.
- Support the approval of grading and building permits.

The following agencies may be required to issue permits or approve certain aspects of the proposed project, and may rely on this document for such actions:

- Central Valley Regional Water Quality Control Board (CVRWQCB) - Storm Water Pollution Prevention Plan (SWPPP) approval prior to construction activities.
- San Joaquin Valley Air Pollution Control District (SJVAPCD) - Approval of construction-related air quality permits.
- San Joaquin Council of Governments (SJCOG) - Review of project application to determine consistency with the San Joaquin County Multi-Species Habitat, Conservation, and Open Space Plan (SJMSCP).

PROJECT-SPECIFIC ENVIRONMENTAL REVIEW

The attached Environmental Checklist includes a discussion and analysis of any peculiar or site-specific environmental impacts associated with construction and operation of the proposed project. The Environmental Checklist identifies the applicable mitigation measures from the Northeast Industrial Concept Development Plan EIR and applicable City of Tracy development standards and policies that would apply to the proposed project during both the construction and operational phases. This Environmental Checklist explains how the application of these relevant mitigation measures and uniformly applied standards and policies would ensure that no peculiar or site-specific environmental impacts would occur.



LEGEND

★ Project Location

County Boundary

▨ City Area

0 2½ 5

Miles

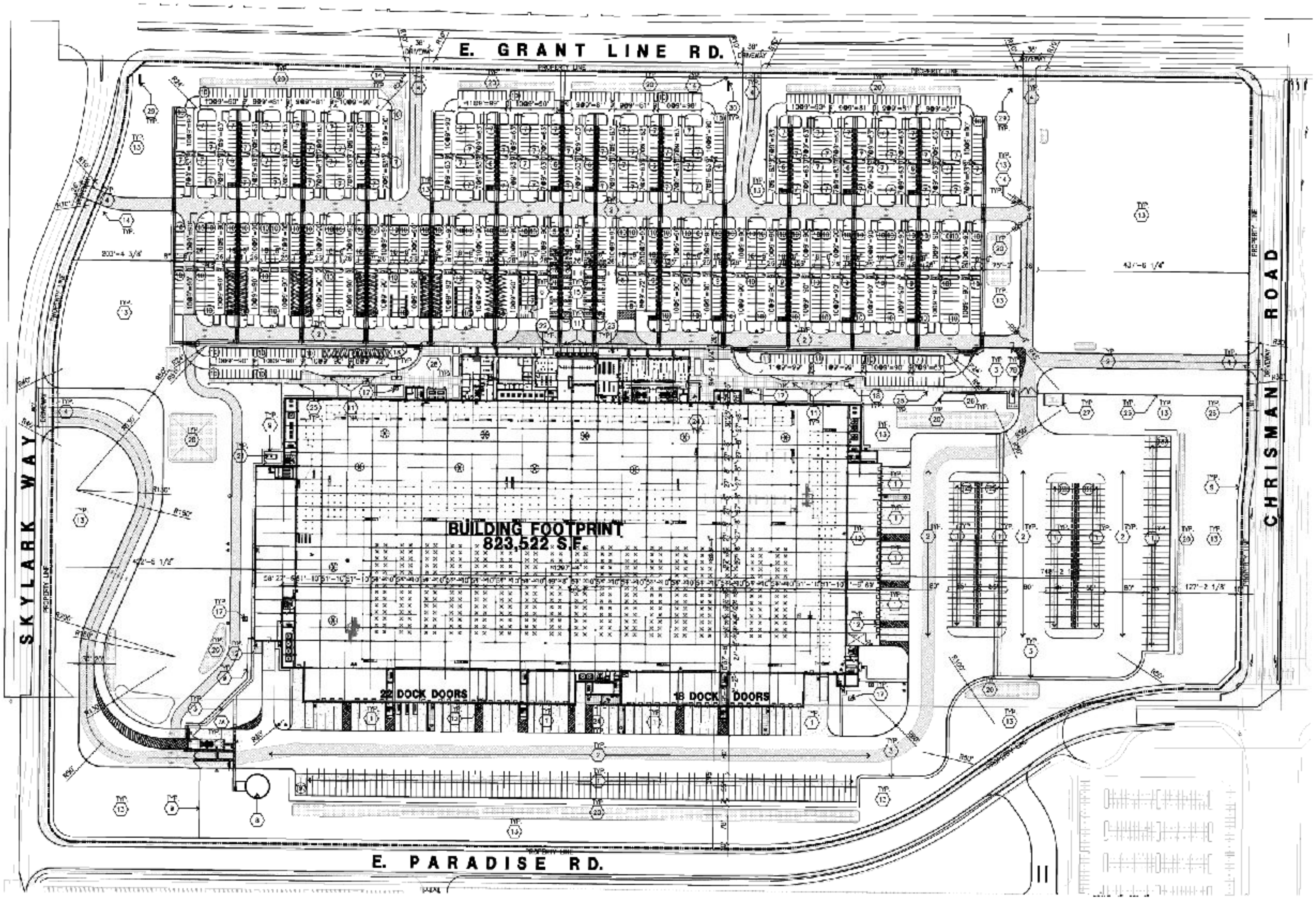
Sources: CalAtlas; California County GIS Departments.
Map date: September 2, 2020.

BIG BIRD INDUSTRIAL
CITY OF TRACY

Figure 1. Regional Location Map

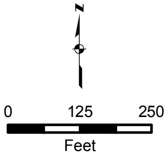
De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



BIG BIRD INDUSTRIAL
CITY OF TRACY

Figure 2. Site Plan



De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

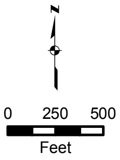
Data sources: HPA Architecture. Map date: September 2, 2020.

This page left intentionally blank.

LEGEND

▭ Project Big Bird Boundary

Data sources: San Joaquin County; ArcGIS Online World Imagery Map Service. Map date: September 2, 2020. Revised October 13, 2020.

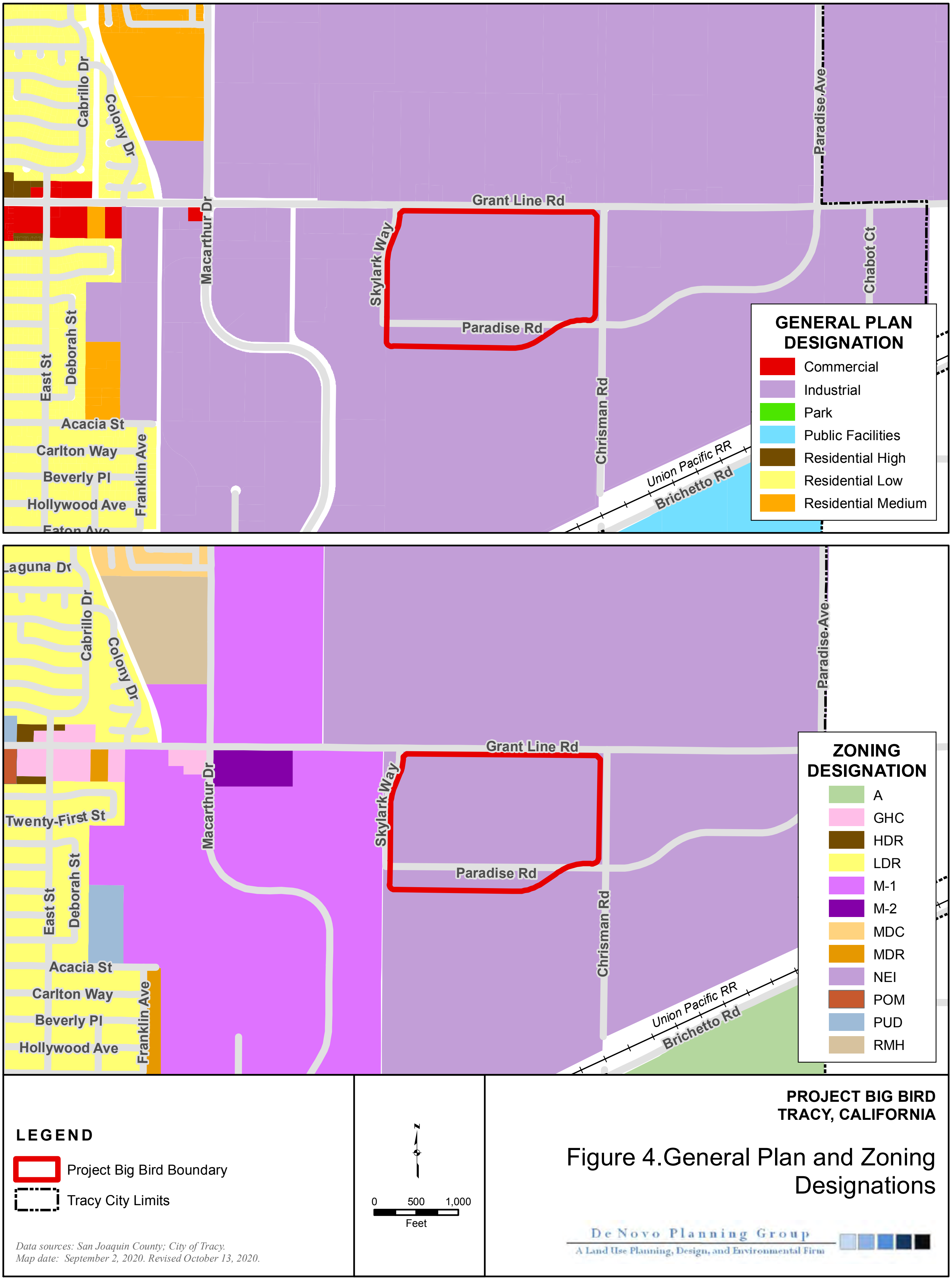


PROJECT BIG BIRD
TRACY, CALIFORNIA

Figure 3. Aerial View of Project

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.



Data sources: San Joaquin County; City of Tracy.
Map date: September 2, 2020. Revised October 13, 2020.

PROJECT BIG BIRD
TRACY, CALIFORNIA

Figure 4.General Plan and Zoning Designations

De Novo Planning Group
A Land Use Planning, Design, and Environmental Firm

This page left intentionally blank.

ENVIRONMENTAL EVALUATION

This section evaluates the potential environmental effects of the proposed Project using a modified form of the environmental checklist from Appendix G of the State CEQA Guidelines. The definitions of the response column headings include:

A. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant after the implementation of feasible mitigation measures. The impact may warrant additional analysis within a Subsequent or Supplemental EIR or the Impact would be within the scope of analysis in the NEISP EIR and require no additional analysis to identify additional mitigation measures.

B. “Less than Significant With Mitigation Incorporated” applies where the incorporation of mitigation measure has reduced an effect from “Potentially Significant Impact” to a “Less Than Significant Impact.” Mitigation measures from the NEISP EIR will be cross-referenced when applicable.

C. “Less Than Significant Impact” applies where the project creates no significant impacts, only Less than Significant Impacts. These impacts are within the scope of Less Than Significant Impacts identified and evaluated within the NEISP EIR and below thresholds considered significant.

D. “No Impact” applies where the project does not create an impact in that category.

E. “Reviewed Under Previous Document” indicates the impact created by the proposed Project would be the same as that identified in the NEISP EIR for the corresponding threshold. Where this finding is made, both are so noted herein and the corresponding boxes are checked in the Environmental Checklist.

This analysis has been prepared to evaluate the proposed Big Bird Industrial Project for consistency with the previously certified NEISP EIR (SCH #95102050). Relevant mitigation measures from the previously certified NEISP EIR have been incorporated into the document, as applicable. It is the intent of this document to apply the adopted mitigation measures, as listed in the Mitigation Monitoring and Reporting Program.

I. LAND USE -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Reviewed Under Previous Document*
a) Substantially alter or conflict with the existing or planned use of an area?					*X*
b) Substantially disrupt or divide the physical arrangement of an established community?					*X*
c) Substantially interfere with agricultural production?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) -- Would the Project substantially alter or conflict with the existing or planned use of an area?

The Project site is a vacant, 86-acre site located within the Northeast Industrial Specific Plan (NEISP). The NEISP was created to facilitate the buildout of high-quality industrial and commercial area located in the northeast area of Tracy, consisting of 789.9 acres for industrial development and 45.5 acres for commercial development. Since adoption of the NEISP, the NEISP Area has been built out with commercial, industrial, and business park industrial uses. The proposed Project site is currently surrounded by several large, multi-story industrial/warehouse style buildings to the northwest, northeast, south, west, and east. In addition, approximately six agricultural residences and two industrial warehouses are located north of the project site. Implementation of the proposed Project would provide for additional industrial development on a project site that is designated for Industrial land uses in the General Plan and bordered by similar industrial developments.

The NEISP EIR found that buildout of the industrial development proposed by the NEISP was consistent with the 1993 Tracy Urban Management Plan/General Plan (UMP) and would result in a less than significant impact relating to altering or conflicting with the planned use for the area. Because the proposed Project would include development of industrial uses consistent with the NEISP, the proposed Project's impact relative altering or conflicting with the existing or planned use of an area would be similar to those identified in the NEISP EIR. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. The proposed Project's impact on altering or conflicting with existing or planned uses of an area remains less than significant for industrial uses consistent with the effects of implementation of the NEISP. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Threshold (b) -- Would the Project substantially disrupt or divide the physical arrangement of an established community?

The proposed Project involves the conversion of a vacant, undeveloped site into an industrial development, consisting of a multi-story warehouse and associated parking facilities. Impacts in the NEISP EIR found that the specific plan area does not contain an established community; therefore, development of the NEISP would not disrupt or divide the physical arrangement of an established community. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant under the proposed Project. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (c) -- Would the Project substantially interfere with agricultural production?

The Project site was previously utilized for agricultural production; however, currently, the project site is not irrigated and is vacant and undeveloped. The proposed Project is identified for urban land uses in the NEISP and General Plan, and the Project is consistent with the uses established by both plans. Impacts related to interference with agricultural production were considered less than significant in the previously certified NEISP EIR. The NEISP EIR noted that the conversion of agricultural land in this area was acknowledged by the UMP EIR and recognized as necessary by the adoption of the Statement of Overriding Considerations (Resolution No. 93-226) for the direct impacts to farmland resulting from adoption of the UMP and UMP EIR. Additionally, the City’s Right-to-Farm ordinance was designed to protect the existing agricultural operations and reduce impacts to associated with urban and agricultural interference. Moreover, the NEISP Design Guidelines requires development applications to provide information demonstrating provisions of adequate buffers between proposed development and adjacent existing dairy uses.

No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant under the proposed Project. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to land use across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the proposed Project involves the conversion of vacant agricultural land to an industrial land use, so long as the proposed Project abides by the NEISP guidelines, no cumulatively considerable impacts related to land use would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

II. PUBLIC HEALTH AND SAFETY -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Reviewed Under Previous Document*
a) Result in a significant exposure of people to potential health hazards?					*X*
b) Involve the use, production, or disposal of hazardous materials?					*X*
c) Result in a significant interference of an emergency plan?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) -- Would the project result in a significant exposure of people to potential health hazards?

The proposed Project involves the conversion of land previously used for agricultural production, and in proximity to existing agricultural production, to a multi-story industrial warehouse. The proposed Project is located on a site that is entirely within the original project area of the previously certified NEISP EIR, and the NEISP EIR specifically assumed that the proposed Project site would be fully developed with industrial uses. In other words, no land will be disturbed or otherwise be impacted by the proposed Project that the NEISP EIR did not already assume would occur as a result of buildout of the specific plan area. Additionally, the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to exposure of people to potential health hazards would be similar to that identified in the previously certified NEISP EIR.

As noted in the NEISP EIR, a substantial portion of the specific plan area was (and, in some areas, still is) in agricultural production. The NEISP EIR found that past agricultural practices on-site may have included the use or storage of chemicals that may still be present today. Additionally, the extent of agricultural-related residue remaining on properties in the NEISP area is unknown. For these reasons, impacts related to exposure of people to potential health hazards were considered potentially significant in the previously certified NEISP EIR. The NEISP EIR imposed the following mitigation measure relative to this topic (which was imposed by the UMP EIR):

> ***Mitigation Measure PHS-1:*** *Project applicants will be required to comply with the San Joaquin County Hazardous Waste Plan. The plan mitigates the potential impacts of known hazardous waste sites on new development [This is Mitigation Measure M 53.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure PHS-2:*** *Project applicants shall be required to prepare an environmental assessment for all subdivisions where surface or subsurface contamination may be a concern. The assessment shall include but not be limited to:*

- *Identification of potential sources of contamination caused by past or current land uses; and*
- *Evaluation of non-point sources of hazardous materials, including agricultural chemical residues, fuel storage tanks, septic systems, or chemical storage areas. [This is Mitigation Measure M 53.3 of the UMP EIR in the NEISP EIR].*

Following the implementation of the foregoing mitigation measure, the NEISP EIR concluded that the impacts of the development of the specific plan area would be less than significant relative to this topic. Because the impact of the proposed Project relative to exposure of people to potential health hazards would be similar to that identified in the previously certified NEISP EIR, the proposed Project would be required to impose the same mitigation measure set forth above, as applicable. Therefore, all impacts from the proposed Project will also be less than significant after mitigation. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Threshold (b) -- Would the project involve the use, production, or disposal of hazardous materials?

The proposed Project includes development of a multi-story warehouse facility in an area of the City that currently contains predominantly industrial and agricultural uses. The proposed industrial land use does not routinely transport, use, or dispose of hazardous materials, or present a reasonably foreseeable release of hazardous materials, with the exception of common residential grade hazardous materials such as household cleaners, paint, etc. The operational phase of the proposed Project does not pose a significant hazard to the public or the environment. The Project would be required to comply with applicable federal, state, and local statutes and regulations, including the use restrictions and hazardous waste requirements included in the NEISP.

Impacts related to the use, production, or disposal of hazardous materials were found to be less than significant in the previously certified NEISP EIR. Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact relative to the use, production, or disposal of hazardous materials would be similar to those identified in the NEISP EIR. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant under the proposed Project. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (c) -- Would the project result in a significant interference of an emergency plan?

The proposed Project does not include any actions that would impair or physically interfere with an adopted emergency response plan or emergency evacuation plan. The Project involves the development of industrial land uses within an urbanized environment and would not interfere with any emergency response or evacuation plans. Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact would be similar to those identified in the NEISP EIR. Impacts related to interference with an emergency plan were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant under the proposed Project. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR

Cumulative Impacts

Through implementation of mitigation measures, impacts related to public health and safety across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the proposed Project involves the construction of an industrial warehouse on a vacant site, so long as the proposed Project abides by the NEISP guidelines, no cumulatively considerable impacts related to public health and safety would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

III. GEOLOGY -- WOULD THE PROJECT:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Result in the exposure of people or property to seismic or other geologic hazards?					*X*
b) Require or restrict access to significant mineral resources?					*X*
c) Result in significant disruptions, displacements, compaction, and over-covering of the soil?					*X*
d) Result in the creation of unstable conditions, require changes in geological substructures, or changes to unique physical features?					*X*
e) Result in significant changes to sedimentation, deposition, or erosion?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) -- Would the project result in the exposure of people or property to seismic or other geologic hazards?

Ground Shaking

Ground shaking is a geological hazard directly related to earthquake activity. The project site is located in an area of moderate to high seismicity. However, no known active faults cross the project site, and the site is not located within an Alquist-Priolo Earthquake Fault Zone. Nevertheless, relatively large earthquakes have historically occurred in the Bay Area and along the margins of the Central Valley. Many earthquakes of low magnitude occur every year in California. The nearest earthquake fault zoned as active by the State of California Geological Survey is the Greenville Fault, located approximately 17 miles to the west of the site.

Other active faults capable of producing significant ground shaking at the site include the Calaveras, 26 miles southwest; the Hayward fault, 28 miles west; the Ortigalita fault, 31 miles southwest; and the San Andreas Fault, 49 miles southwest of the site. Any one of these faults could generate an earthquake capable of causing strong ground shaking at the subject site. Earthquakes of Moment Magnitude (Mw) 7 and larger have historically occurred in the region and numerous small magnitude earthquakes occur every year. A ground shaking event of this magnitude could potentially place people and property at risk; therefore, the previously certified NEISP EIR considered this to be a potentially significant impact.

Liquefication

Liquefaction normally occurs when sites underlain by saturated, loose to medium dense, granular soils are subjected to relatively high ground shaking. During an earthquake, ground shaking may cause certain types of soil deposits to lose shear strength, resulting in ground settlement, oscillation, loss of bearing capacity, landsliding, and the buoyant rise of buried structures. The majority of liquefaction hazards are associated with sandy soils, some silty soils of low plasticity, and some gravelly soils. Cohesive soils are generally not considered to be susceptible to liquefaction. In general, liquefaction hazards are most severe within the upper 50 feet of the surface, except where slope faces or deep foundations are present. Soils that underlay the project site consist of predominantly clay soil particle sizes. Clay-type soils are generally not subject to liquefaction.

According to the previously certified NEISP EIR, the Project site is located in an area identified with a low to moderate liquefication potential; therefore, this is considered a potentially significant impact.

Seismic Settlement

Where the groundwater table is deep, seismic settlement may occur instead of liquefication. Seismic settlement is the compaction or densification of sub-soils as a result of seismically induced ground shaking. Loose sandy and/or silty soils are typically most susceptible to this phenomenon. The previously certified NEISP EIR noted that there is relatively no danger of seismic settlement within Tracy, except within the ephemeral stream channels near Interstate 580 (I-580).

Conclusion

The NEISP EIR identified a number of potentially significant impacts that buildout of the NEISP would have relating to geologic hazards, including impacts relating to ground shaking and liquefaction. Accordingly, the NEISP EIR imposed the following mitigation measures, most of which were also imposed by the UMP EIR:

> ***Mitigation Measure GEO-1:*** *Prior to issuance of an occupancy permit, the applicant shall design all structures according to the Uniform Building Code, Seismic Zone 3 [This is Mitigation Measure M 44.2 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure GEO-****2: Any site grading plans shall be received by a registered engineer specializing in geotechnical assessments, to ensure that the soils can support the load [This is Mitigation Measure M 49.2 of the UMP EIR in the NEISP EIR].*

Following the imposition of the foregoing mitigation measures and relevant goals, policies, and actions of the UMP, the NEISP EIR concluded that buildout of the NEISP area would result in less than significant impacts related to geologic hazards. Because the proposed Project would include development of an industrial use consistent with the NEISP, the proposed Project's impact relative to the exposure of people or property to seismic or other geologic hazards would be similar to those identified in the NEISP EIR. Impacts related to geological hazards were found to be less than significant through implementation of mitigation measures and project consistency with General Plan goals, policies, and actions; therefore, the impact would remain less than significant for the proposed Project through implementation of mitigation measures identified above, as applicable, and consistency with the goals, policies, and actions of the General Plan.

Additionally, state Building Codes and other applicable regulatory requirements that the Project must comply with have been strengthened to be more protective against earthquakes and other seismic activity since the time the NEISP EIR was certified in 1996, which indicate that impacts related to geology will actually be reduced when compared to the impacts of the NEISP EIR.

Thus, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the previously certified NEISP EIR.

Threshold (b) -- Would the project require or restrict access to significant mineral resources?

As described in the Tracy General Plan EIR, the main mineral resources found in San Joaquin County, and the Tracy Planning Area, are sand and gravel (aggregate), which are primarily used for construction materials like asphalt and concrete. According to the California Geological Survey (CGS) evaluation of the quality and quantity of these resources, the most marketable aggregate materials in San Joaquin County are found in three main areas:

- In the Corral Hollow alluvial fan deposits south of Tracy
- Along the channel and floodplain deposits of the Mokelumne River
- Along the San Joaquin River near Lathrop

The proposed Project site is not located in any of the aforementioned areas. Impacts relative to mineral resources were found to be less than significant in the previously certified NEISP EIR. Because the proposed Project would include development of an industrial use consistent with the NEISP, the proposed Project's impact relative to mineral resources would be similar to those identified in the NEISP EIR. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (c) -- Would the project result in significant disruptions, displacements, compaction, and over-covering of the soil?

The proposed Project involves the construction of a multi-story industrial warehouse, parking lot, and associated infrastructure on a site that is entirely within the NEISP area originally analyzed in the previously certified NEISP EIR. The NEISP EIR specifically assumed that the site would be developed with industrial uses and the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP. Therefore, the impact relative to significant changes disruptions, displacements, compaction, and over-covering of the soil would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR found that buildout of the specific plan area would result in the disruption, displacement, compaction, and over-covering of soils necessary for the construction of the multi-story warehouse and associated infrastructure, resulting in a potentially significant impact. Accordingly, the NEISP EIR imposed the following mitigation measures relevant to this impact, which were also imposed by the UMP EIR:

***Mitigation Measure GEO**-2: See above*

Mitigation Measure HYD-1: See Section VI (Hydrology and Water Quality)

Impacts related to disruptions, displacements, compaction, and over-covering of the soil were found to be less than significant with implementation of the above mitigation measures. Because the proposed Project's impact relative to this topic would be similar to those identified in the previously certified NEISP EIR, the mitigation measures identified above would also be imposed on the proposed Project, as applicable. Therefore, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the previously certified NEISP EIR

Threshold (d) -- Would the project in the creation of unstable conditions, require changes in geological substructures, or changes to unique physical features?

The Project site is relatively flat and vacant land previously used for agriculture. Development of the Project site will not require extensive grading or excavation. Therefore, the Project will not substantially cut or fill slopes, create unstable earth conditions, change the geological structure of the site, or alter any unique physical features. However, according to the NEISP EIR, the specific plan area lies within a region of moderate to high expansive soils. The majority of the Project site has soils with moderate expansive potential. A small portion of the Project site along the southern boundary has soils with high to very high expansive potential[1]. Structures placed on expansive soils are subject to the effects of shrink/swell, where water absorbed into the clay components may result in damages to substructures, foundations and roadways as foundations rise each wet season and fall each dry season. The previously certified NEISP EIR concluded that buildout of the specific plan area may result in the placement of structures on expansive soils, which would be a potentially significant impact. Accordingly, the NEISP EIR imposed the following mitigation measure, which was also imposed by the UMP EIR:

***Mitigation Measure GEO-1:** See above*

***Mitigation Measure GEO**-2: See above*

---

[1] U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). Available at: http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

> ***Mitigation Measure GEO-3:*** *Prior to approval of a tentative map, the applicant shall retain a qualified geologist to conduct soil samples throughout the project area to identify expansive soils and those areas shall be identified on a map for the Tracy Public Works Department [This is Mitigation Measure M 49.1 of the UMP EIR in the NEISP EIR].*

Following the implementation of the above mitigation measure and relevant goals, policies, and actions of the UMP, the NEISP EIR concluded that buildout of the NEISP area would result in less than significant impacts relative to this topic. Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact relative to the creation of unstable conditions would be similar to those identified in the NEISP EIR. Therefore, the mitigation identified in the NEISP EIR relevant to this topic would be required as part of the proposed Project, as applicable. Additionally, state Building Codes and other applicable regulatory requirements that the Project must comply with have been strengthened to be more protective against earthquakes and other seismic activity since the time the NEISP EIR was certified in 1996, which indicate that impacts related to geology will actually be reduced when compared to the impacts of the NEISP EIR.

For the reasons stated above, impacts relative to this topic are less than significant. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the land use types, densities, and intensities within the NEISP and EIR. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (e) -- Would the project result in significant changes to sedimentation, deposition, or erosion?

During the construction preparation process, exposed surfaces could be susceptible to erosion from wind and water. Effects from erosion include impacts on water quality and air quality. Exposed soils that are not properly contained or capped increase the potential for increased airborne dust and increased discharge of sediment and other pollutants into nearby stormwater drainage facilities. Risks associated with erosive surface soils can be reduced by using appropriate controls during construction and properly re-vegetating exposed areas. Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact relative to sedimentation, deposition, or erosion would be similar to those identified in the NEISP EIR.

The previously certified NEISP EIR found impacts relative to this topic to be potentially significant due to exposed earth surfaces during construction being susceptible to both wind and water erosion creating problems associated with drainage, water quality, and air quality. Accordingly, the NEISP EIR imposed the following mitigation measure, which was also imposed by the UMP EIR:

> ***Mitigation Measure GEO-4:*** *Prior to approval of final facilities design, the City Public Works Department shall review plans for drainage and storm water runoff control*

systems and their component facilities to ensure that these systems are non-erosive in design. [This is Mitigation Measure of the UMP EIR M 10.1 in the NEISP EIR].

Mitigation Measure GEO-5: *Upon completion of construction, applicants for subsequent projects shall revegetate all exposed soil surfaces within 30 days, or as otherwise approved by the City Department of Public Works, to minimize the potential topsoil erosion and maximize aesthetic appeal. Reasonable alternatives to revegetation may be employed, especially during peak high temperatures periods, provided the same goals are accomplished and subject to the approval by City of Public Works [This is Mitigation Measure M 10.2 of the UMP EIR in the NEISP EIR].*

Mitigation Measure GEO-6: *Projects under review shall be required to submit temporary erosion control plans for construction activities [This is Mitigation Measure M 10.3 of the UMP EIR in the NEISP EIR].*

The NEISP EIR concludes that after mitigation, impacts would less than significant. Because the proposed Project's impact relative to this topic would be similar to those identified in the previously certified NEISP EIR, the mitigation measures identified above would also be imposed on the proposed Project, as applicable. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP with the implementation of the above mitigation measures; therefore, impacts would remain less than significant with the implementation of the above mitigation measures, as applicable. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to geology and soils across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the proposed Project would include the development of a multi-story industrial warehouse on a vacant site, so long as the proposed Project abides by the NEISP guidelines, no cumulatively considerable impacts related to geology would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

IV. BIOTIC RESOURCES -- Would the project:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Result in significant change to the habitat, diversity or number of plant species, including unique, rare, or endangered plants?					*X*
b) Result in a significant change to the habitat, diversity or number of animal species, including unique, rare, or endangered animals?					*X*

EXISTING SETTING

The following describes the existing setting of the San Joaquin County region noting the special-status species known to occur within the region.

Special-Status Plant Species. Numerous special-status plant species are known to occur in the region. Many of these special status plant species require specialized habitats such as serpentine soils, rocky outcrops, slopes, vernal pools, marshes, swamps, riparian habitat, alkali soils, and chaparral, which are not present on the project site. The project site is located in an area that was likely valley grassland prior to human settlement, and there are several plant species that are found in valley and foothills grasslands areas. These species include large-flowered fiddleneck, bent-flowered fiddleneck, big-balsamroot, big tarplant, round-leaved filaree, Lemmon's jewelflower, and showy golden madia. Human settlement has involved a high frequency of ground disturbance associated with the historical farming activities in the region, including the project site.

Special-Status Invertebrates. Special-status invertebrates that occur within the region include: longhorn fairy shrimp, vernal pool fairy shrimp, and midvalley fairy shrimp, which requires vernal pools and swale areas within grasslands; and the valley elderberry longhorn beetle, which is an insect that is only associated with blue elderberry plants, oftentimes in riparian areas and sometimes on land in the vicinity of riparian areas.

Special-Status Reptiles and Amphibians. Special-status reptiles and amphibians that occur within the region include: the western pond turtle, which requires aquatic environments located along ponds, marshes, rivers, and ditches; the California tiger salamander, which is found is grassland habitats where there are nearby seasonal wetlands for breeding; the silvery legless lizard, which is found in sandy or loose loamy soils under sparse vegetation with high moisture content; San Joaquin whipsnake, which requires open, dry habitats with little or no tree cover with mammal burrows for refuge; the Alameda whipsnake, which is restricted to valley-foothill hardwood habitat on south-facing slopes; the California horned lizard, which occurs in a variety of habitats including, woodland, forest, riparian, and annual grasslands, usually in open sandy areas; the foothill yellow-legged frog, which occurs in partly shaded and shallow streams with rocky soils; the California red legged frog, which occurs in stream pools and ponds with riparian or emergent marsh vegetation; and the western spadefoot toad, which requires grassland habitats associated with vernal pools.

Special-Status Bird Species. Special-status birds that occur within the region include: tricolored blackbird, Swainson's hawk, northern harrier, and bald eagle, which are associated with streams, rivers, lakes, wetlands, marshes, and other wet environments; loggerhead shrike, and burrowing owl, which lives in open areas, usually grasslands, with scattered trees and brush; and raptors that are present in varying habitats throughout the region.

> **Swainson's Hawk.** The Swainson's hawk is threatened in California and is protected by the California Department of Fish and Wildlife (CDFW) and the Migratory Bird Treaty Act (MBTA). Additionally, Swainson's hawk foraging habitat is protected by the CDFW. Swainson's hawks forage in open grasslands and agricultural fields and commonly nest in solitary trees and riparian areas in close proximity to foraging habitat. The foraging range for Swainson's hawk is ten miles from its nesting location. The project site contains suitable foraging habitat for Swainson's hawk, but does not contain suitable nesting habitat.
>
> **Burrowing Owl.** Burrowing owls are a California Species of Special Concern and are protected by the CDFW and the MBTA. Burrowing owls forage in open grasslands and shrublands and typically nest in old ground squirrel burrows. The project site contains suitable, but not high-quality habitat for burrowing owls.

RESPONSES TO CHECKLIST QUESTIONS

Potential impacts to biological resources for the proposed Project are based primarily on data contained within the previously certified EIR prepared for the NEISP, and the General Plan and General Plan EIR.

Threshold (a) -- Would the project result in significant change to the habitat, diversity or number of plant species, including unique, rare, or endangered plants?

The 86-acre Project site is currently vacant and appears disked. The majority of the Project site was previously utilized for alfalfa production involving a high frequency of ground disturbance resulting in the destruction of suitable on-site habitat for unique, rare, or endangered plant species. As shown on Figure 8 of the previously certified NEISP EIR, the NEISP area was largely used for agricultural production with nearly 600 acres for alfalfa and 187 acres for winter-growing oat and barley stands. On nearly all of the agriculture land in the NEISP area, native grass, forb, shrub and tree species were replaced with agricultural plant varieties and introduced weed.

The previously certified NEISP EIR found that the specific plan area is composed entirely of crop fields, farmsteads, and several ranchettes that are not likely to support any unique, rare, or endangered plant species; therefore, development of the NEISP would not result in impacts to plant species. The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to plant species would be similar to that identified in the NEISP EIR. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (b) -- Would the project result in a significant change to the habitat, diversity or number of animal species, including unique, rare, or endangered animals?

As described above, the 86-acre Project site was previously utilized for alfalfa production involving a high frequency of ground disturbance. The proposed Project involves the construction of a multi-story industrial warehouse in a highly urbanized area of Tracy currently built out with similarly scaled warehouses. The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to animal species would be similar to that identified in the previously certified NEISP EIR.

The previously certified NEISP EIR found that buildout of the specific plan area would result in a loss of fallow and productive agricultural land that may serve a forage habitat for certain animal species; therefore, development of the NEISP would result in potentially significant impacts to a number of special-status animal species, including, the San Joaquin kit fox, Swainson's hawk, and Burrowing Owl. The San Joaquin kit fox is known to den and forage in the southeastern portion of the City in the moderately hilly grassland; however, the San Joaquin kit fox is known to explore outside of its home range for new foraging areas. Thus, there is a remote possibility that a kit fox, while moving outside its home range, could enter the site during construction and risk injury and death. With respect to Swainson's hawks, because of the numerous documented occurrences within ten miles of the project site and the site's suitable foraging habitat for Swainson's hawk, development of the proposed Project could impact Swainson's hawk. With respect to burrowing owls, impacts are considered unlikely, due to the presence of urban development surrounding the site to the east, west, and south. However, the land to the north of the project site contains agricultural land which offers moderate foraging and roosting habitat for wintering or breeding owls.

Accordingly, the NEISP EIR imposed the following mitigation measures to reduce potentially significant impacts to the San Joaquin kit fox, Swainson's hawk, and Burrowing Owl:

> ***Mitigation Measure BIO-1:*** *If Burrowing Owls are found to inhabit a proposed project site, the project applicant shall identify Project-related potential impacts to Burrowing Owls and consult with the CDFG to determine currently accepted avoidance or mitigation criteria. The resulting mitigation plan shall be incorporated, as directed by CDFG, into the development process [This is Mitigation Measure M 21.8 of the UMP EIR in the NEISP EIR].*

Mitigation Measure BIO-2: *The City of Tracy shall attempt to formalize the agreement with San Joaquin County and all of its incorporated cities to fully participate in the development and implementation of the San Joaquin County Swainson's hawk conservation plan. Until such time as the plan is implemented, or in the event the plan is implemented, or the City of Tracy does not participate in the plan, impacts to Swainson's hawk and Swainson's hawk habitat shall be mitigated in consultation with CDFG. Current draft mitigation guidelines for the species are reprinted for informational purposes in technical appendix "N" [This is Mitigation Measure M 21.9 of the UMP EIR in the NEISP EIR].*

Mitigation Measure BIO-3: *The Tracy Community Development Department shall authorize a kit fox pre-construction survey prior to the issuance of grading permits. The survey shall be paid by the Project applicant and involve walking the site at approximately 30-100 foot wide increments searching for potential kit fox den sites. A qualified biologist shall conduct the site survey. If kit fox den sites are discovered, the City shall contact the US Fish and Wildlife Service in consideration of UMP EIR mitigation measures for kit fox [This is Mitigation Measure M 4.4-1 in the NEISP EIR].*

Mitigation Measure BIO-4: *The Project applicant shall make a good faith attempt to implement the following construction practices to minimize the potential for injury or death of a kit fox during construction [This is Mitigation Measure M 4.4-2 in the NEISP EIR].*

- *Limit construction vehicle speeds to 15 mph.*
- *Provide covers or include ramps for all Project-related excavated steep-walled holes or trenches at the end of each day.*
- *Cover the ends of Project-related stored pipes at the end of each work day.*
- *Remove all Project-related food waste at the end of each work day.*

Mitigation Measure BIO-5: *Prior to approval of a Final Map, the Project applicant will either provide a mitigation fee appropriate and consistent with the I-205 Specific Plan, develop a Habitat Management Plan for the Swainson's hawk in consultation with the CDFG, or enter a county-wide HCP, if available [This is Mitigation Measure M 4.4-3 in the NEISP EIR].*

Mitigation Measure BIO-6 *The Tracy Community Development Department shall authorize a Burrowing Owls pre-construction survey prior to the issuance of grading permits. The survey shall be paid by the Project applicant and conducted by a qualified ornithologist. If no owls are located during these surveys, no additional action is warranted. However, if breeding owls are located on or adjacent to the site, then an ornithologist shall determine the extent of a construction buffer zone around the active nesting Burrowing Owl. No construction activities shall proceed which would disturb breeding owls. The CDFG shall also be immediately contacted to determine if any additional mitigation measures are necessary. [This is Mitigation Measure M 4.4-3 in the NEISP EIR].*

The previously certified NEISP EIR determined that through implementation of the above mitigation measures impacts to special-status animal species would be reduced to less than significant. Because the proposed Project's impact relative to animal species would be similar to that identified in the previously certified NEISP EIR, mitigation identified in the NEISP EIR would be required, as applicable, to reduce impacts to animal species to a less than significant level consistent with the findings of the EIR.

Additionally, the project site is located within the jurisdiction of the San Joaquin County Multi-Species Habitat Conservation and Open Space Plan ("Plan" or "SJMSCP"), which was adopted in November 2001 approximately 5 years after the adoption of the NEISP EIR. The key purpose of the SJMSCP is to "provide a strategy for balancing the need to conserve open space and the need to convert open space to non-open space uses, while protecting the region's agricultural economy; preserving landowner property rights; providing for the long-term management of plant, fish and wildlife species, especially those that are currently listed, or may be listed in the future, under the Federal Endangered Species Act (ESA) or the California Endangered Species Act (CESA); providing and maintaining multiple use Open Spaces which contribute to the quality of life of the residents of San Joaquin County; and, accommodating a growing population while minimizing costs to project proponents and society at large."

The project site is located in the Category C/Pay Zone B. The Category C/Pay Zone B includes parcels containing habitat types classified as Agricultural Habitat Lands which are not otherwise exempt. Applicants pay mitigation fees on a per-acre basis, as established by the JPA, according to the measures needed to mitigate impacts to the various habitat and biological resources. The Project applicant would be required to seek coverage under the SJMSCP and would be subject to the Category C/Pay Zone B fees in order to mitigate for any habitat impacts. Coverage involves compensation for habitat impacts on covered species through payment of development fees for conversion of lands that may provide habitat for covered special status species. These fees are used to preserve and/or create habitat in preserves to be managed in perpetuity. In addition, coverage includes incidental take avoidance and minimization measures for species that could be affected as a result of the proposed project. Participation in the SJMSCP and payment of the SJMSCP coverage fee is required, as shown in Mitigation Measure BIO-5 above.

Therefore, consistency with the mitigation measures identified in the NEISP EIR, as well as the SJMSCP, would ensure that impacts relative to this topic are less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

The proposed Project is consistent with the land use and zoning designations contained in the NEISP. Impacts related to biological resources across the NEISP Area were considered cumulatively significant and unavoidable in the previously certified NEISP EIR. Specifically, the NEISP EIR found that the buildout of the specific plan has the potential to eliminate foraging habitat for the Swainson's hawk. Mitigation previously discussed in this section would be implemented by the proposed Project that would reduce the severity of significant and unavoidable cumulative effects. For example, the Project will be required to pay the SJMSCP coverage fee to compensation for habitat impacts on covered species through payment of development fees for conversion of lands that may provide habitat for covered special status species. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed. No further evaluation is required.

V. CULTURAL RESOURCES -- *WOULD THE PROJECT:*

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Reviewed Under Previous Document*
a) Require the alteration or the destruction of a prehistoric or historic archaeological site, historic building, structure, or object?					*X*
b) Require a physical change which will affect unique ethnic cultural values or restrict religious or sacred uses?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) -- Would the project require the alteration or the destruction of a prehistoric or historic archaeological site, historic building, structure, or object?

The 86-acre Project site is currently vacant and appears disked. The majority of the Project site was previously utilized for alfalfa production involving a high frequency of ground disturbance. The proposed Project involves the construction of a multi-story industrial warehouse in a highly urbanized area of Tracy currently built out with similarly scaled warehouses. The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to destruction of a prehistoric or historic resource would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR does not identify the proposed Project site as having prehistoric period, or cultural resources. Additionally, there are no known unique cultural, historical, paleontological or archeological resources known to occur on, or within the immediate vicinity of the project site. However, the previously certified NEISP EIR found that the potential still exists for the discovery of buried deposits or features of an archaeological past. Therefore, the NEISP EIR found this to be a potentially significant impact, which would be mitigated to less than significant through implementation of the following mitigation measures:

> ***Mitigation Measure CUL-1:*** *On-site preservation of the resource is the preferred alternative. Preserving a cultural deposit maintains the artifacts in context and essentially "banks" the sites for future, at which time more sophisticated research methods and tools may be available. Additionally, preservation of a cultural deposit may prevent inadvertent discovery of, or damage to, human burials. Preservation can be accomplished through a number of means such as capping or covering the site with a layer of soil, fencing the site area, and/or incorporation of the resource into a greenbelt or park area. [This is Mitigation Measure M 24.2 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure CUL-2:*** *If preservation of the resource is not feasible, additional studies, such as archival research or scientific, controlled excavation of prehistoric cultural resources may be required. The Native American community should be notified of any proposed excavation of prehistoric cultural resources as there is a high*

probability that burial sites may occur in the TPA [This is Mitigation Measure M 24.3 of the UMP EIR in the NEISP EIR].

Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact relative to the destruction of a prehistoric or historic archaeological sites would be similar to those identified in the NEISP EIR. Therefore, the mitigation identified in the NEISP EIR relevant to this topic would be required as part of the proposed Project, as applicable. The proposed Project would also be required to implement relevant General Plan policies and actions relevant to this topic. Consistency with the General Plan and mitigation measures identified in the NEISP EIR would ensure that impacts relative to this topic are less than significant, consistent with the finding of the previously certified EIR for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed; therefore, no additional environmental review is required.

Threshold (b) -- Would the project require a physical change which will affect unique ethnic cultural values or restrict religious or sacred uses?

The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to affecting unique ethnic cultural values or restricting religious or sacred uses would be similar to that identified in the previously certified NEISP EIR. Impacts relative to this topic in the previously certified NEISP EIR were found to be less than significant from buildout of the specific plan; therefore, impacts would remain less than significant. As described above, the Project site is currently vacant and appears disked. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. The Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to cultural resources across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the potential still exists for the discovery of buried deposits or features of an archaeological past during development of the proposed Project, so long as the proposed Project abides by the NEISP guidelines, no cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

VI. HYDROLOGY AND WATER QUALITY-- WOULD THE PROJECT:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Result in significant changes to the absorption rates, drainage patterns, the rate and amounts of surface runoff, and the exposure of people and property to water-related hazards?					*X*
b) Result in significant changes to the amount or quality of surface water in any water body?					*X*
c) Result in significant changes to ground water resources?					*X*

Responses to Checklist Questions

Threshold (a) -- Would the project result in significant changes to the absorption rates, drainage patterns, the rate and amounts of surface runoff, and the exposure of people and property to water-related hazards?

When land is in a natural or undeveloped condition, soils, mulch, vegetation, and plant roots absorb rainwater. This absorption process is called infiltration or percolation. Much of the rainwater that falls on natural or undeveloped land slowly infiltrates the soil and is stored either temporarily or permanently in underground layers of soil. When the soil becomes completely soaked or saturated with water or the rate of rainfall exceeds the infiltration capacity of the soil, the rainwater begins to flow on the surface of land to low lying areas, ditches, channels, streams, and rivers. Rainwater that flows off of a site is defined as storm water runoff. When a site is in a natural condition or is undeveloped, a larger percentage of rainwater infiltrates into the soil and a smaller percentage flows off the site as storm water runoff.

The infiltration and runoff process is altered when a site is developed with urban uses. Houses, buildings, roads, and parking lots introduce asphalt, concrete, and roofing materials to the landscape. These materials are relatively impervious, which means that they absorb less rainwater. As impervious surfaces are added to the ground conditions, the natural infiltration process is reduced. As a result, the volume and rate of storm water runoff increases. The increased volumes and rates of storm water runoff may result in flooding if adequate storm drainage facilities are not provided.

The proposed Project involves the construction of a multi-story industrial warehouse, parking lot, and associated infrastructure on a site that is entirely within the NEISP area originally analyzed in the previously certified NEISP EIR. The NEISP EIR specifically assumed that the site would be developed with industrial uses and the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP. Therefore, the impact relative to significant changes to the absorption rates, drainage patterns, the rate and amounts of surface runoff, and the exposure of people and property to water-related hazards would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR found that although the Project would not result in any changes to surface water bodies, the development of the Project would result in the increase of impervious areas relative to the existing conditions. This would alter the existing drainage patterns and increase the amount of stormwater runoff on- and off-site and could result in the exposure of people and property to localized flooding. Therefore, the previously certified NEISP EIR found this to be a potentially significant impact that would be mitigated to less than significant through implementation of the following mitigation measures:

> ***Mitigation Measure HYD-1:*** *Prior to the approval of the first Site Plan, Parcel and or Tentative Map for the Northeast Industrial project area, the applicant(s) will be required to demonstrate compliance with the approved Storm Drainage Master Plan or to provide an alternative plan to provide facilities acceptable to the City. Prior to the approval of each Site Plan, Parcel and Tentative Map, the City shall review the Project application to ensure that existing and/or proposed facilities are adequate to meet project service demands, and are consistent with the City's Master Plan or an alternative acceptable to the City. In order to provide adequate facilities to serve individual developments within the Project area, each applicant shall participate in any applicable City-wide or area program, or establish the appropriate funding toward these facilities prior to the recordation of the corresponding Final Map [This is Mitigation Measure 4.11-5 in the NEISP EIR].*

Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measure set forth above, as applicable. Further, mandatory regulations relating to hydrology and water quality, particularly stormwater regulations, have become significantly stricter and more protective of the environment since the NEISP EIR was certified in 1996, and the proposed Project will be required to comply with those current local, State, and Federal regulations. Accordingly, the proposed Project would not result in any new or increased significant impacts relative to this topic that were not already analyzed in, and fully covered by, the previously certified EIR.

Threshold (b) -- Would the project result in significant changes to the amount or quality of surface water in any water body?

The proposed Project involves the construction of a multi-story industrial warehouse, parking lot, and associated infrastructure on a site that is entirely within the NEISP area originally analyzed in the previously certified NEISP EIR. During construction activities associated with the buildout of the NEISP area, soil is exposed and more susceptible to water erosion and has the potential to increase the turbidity of the Old River through introduction of suspended solids. These sediments may also behave as carriers for other pollutants such as organic components, metals, phosphates, and other toxic material. Construction of the proposed Project would result soil erosion, which if not properly controlled could carry to nearby storm drains. Additionally, during operation of the proposed Project, the pavement and controlled runoff from impervious surfaces may also contribute to an increase in surface water pollution. The NEISP EIR specifically assumed that the site would be developed with industrial uses and the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP. Therefore, the impact relative to changes to the amount or quality of surface water would be similar to that identified in the previously certified NEISP EIR.

The previously certified NEISP EIR found that buildout of the specific plan area would result in potentially significant impacts to changes to the amount or quality of surface waters, and accordingly, imposed the following mitigation measures:

> ***Mitigation Measure HYD-2:*** *The City shall monitor water quality regulations for storm water runoff. If changes in the standards occur, more controls on sources of pollutants in storm water or removal of pollutants from storm water may be necessary, either through structural controls or implementation of best management practices [This is Mitigation Measure M 64.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure HYD-3:*** *The City shall require temporary erosion control measures during new Project construction and shall require the implementation of permanent Best Management Practices in new developments to minimize discharge of urban pollutants into local waterways [This is Mitigation Measure M 64.2 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure HYD-4:*** *Subject to review and approval by the Public Works Department, a comprehensive plan to prevent erosion, siltation, and contamination of storm water during construction shall be required for the Project prior to Final Map approval. Such a plan must be prepared and implemented in accordance with permit conditions and requirements of the State Water Resources Control Board. At a minimum, this plan shall include the following [This is Mitigation Measure 4.6-1 in the NEISP EIR]:*
>
>> *-phasing of construction to ensure that grading operations are targeted for the dry months of the year as directed by the City;*
>>
>> *-methods to reduce erosion in the event of a storm during construction such as the use of sediment traps, barriers, covers, or other methods approved by the City; and,*
>>
>> *-a description of temporary mulching, seeding, or other suitable erosion stabilization measures approved by the City to protect exposed areas during construction activities.*
>
> ***Mitigation Measure HYD-5:*** *Prior to recordation of Final Maps, the applicant shall coordinate with the City for review and approval a plan to provide regular cleaning of streets and parking lots (where applicable) to limit the accumulation of "first flush" contaminants during construction [This is Mitigation Measure 4.6-2 in the NEISP EIR].*

Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above, as applicable. Further, mandatory regulations relating to hydrology and water quality, particularly stormwater regulations, have become significantly stricter and more protective of the environment since the NEISP EIR was certified in 1996, and the proposed Project will be required to comply with those local, State, and Federal regulations. Accordingly, the proposed Project would not result in any new or increased significant impacts relative to this topic that were not already analyzed in, and fully covered by, the previously certified EIR.

Threshold (c) -- Would the project result in significant changes to ground water resources?

The Project site is currently vacant and does not contain any waterways. Development of the Project would result in paving the majority of the Project site. As such, water absorption is currently unrestricted, but would be altered after the site is developed with the industrial use. The proposed Project is located on a site that is entirely within the original project area of the previously certified NEISP EIR, and the NEISP EIR specifically assumed that the proposed Project site would be fully developed with industrial uses. In other words, no land will be disturbed or otherwise be impacted by the proposed Project that the NEISP EIR did not already assume would occur as a result of buildout of the specific plan area. Additionally, the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to changes to ground water resources would be similar to that identified in the previously certified NEISP EIR.

Although water absorption at the site is currently unrestricted due to the absence of substantial structures or pavement and porous soils, groundwater recharge occurs mostly in the upland valley areas of the County adjacent to rivers and larger streams. As such, impacts relative to this topic in the previously certified NEISP EIR were found to be less than significant from buildout of the specific plan; therefore, impacts would remain less than significant under the proposed Project. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to hydrology and water quality across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the proposed Project would change the site's existing drainage patterns and potentially impact water quality, so long as the proposed Project abides by the NEISP guidelines, no cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed

Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

VII. TRANSPORTATION AND CIRCULATION -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Reviewed Under Previous Document*
a) Substantially impact the existing transportation system or parking facilities?					*X*
b) Result in substantial traffic hazards to motor vehicles, bicyclists, or pedestrians?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Thresholds (a,b) -- Would the project substantially impact the existing transportation system or parking facilities or result in substantial traffic hazards to motor vehicles, bicyclists, or pedestrians?

The proposed Project involves the development of a multi-story industrial warehouse in a highly urbanized area of Tracy built out with similar uses. The proposed Project is located on a site that is entirely within the original project area of the previously certified NEISP EIR, and the NEISP EIR specifically assumed that the proposed Project site would be fully developed with industrial uses. In other words, no land will be disturbed or otherwise be impacted by the proposed Project that the NEISP EIR did not already assume would occur as a result of buildout of the specific plan area. Additionally, the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to transportation and circulation would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR assumed that the buildout of the specific plan would result in the development 45.5 acres of net commercial development and 799 acres of net industrial development, which would have generated 9,142 new jobs. (NEISP EIR, p. 4.52.) Specifically, for industrial uses, the NEISP EIR assumed certain uses would require 8 employees per acre, and others would result in 11 employees per acre. (Id.) The NEISP EIR assumed that total trip generation from employees, customers and truck traffic from the buildout and operation of the Original Project would be 58,573 daily trips, 3,000 AM peak hour trips, and 5,241 PM peak hour trips.

The NEISP EIR identified a number of potentially significant impacts relating to traffic and transportation, specifically including impacts to roadways, interchanges, surface streets and freeway segments (NEISP EIR, pp. 4.59 through 4.61.). Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure TRA-1:*** *The Northeast Industrial Concept Development Plan should be modified as illustrated in Figure 21 [This is Mitigation Measure 4.7-1 in the NEISP EIR].*
>
> *As defined in the City of Tracy Roadway Master Plan and the UMP Finance Plan (pending), developers of the Northeast Industrial area will be responsible for:*

-Right-of-way dedication and construction relating to fronting property owner responsibilities (including curb lanes, bike lanes, curb, sidewalk and landscape buffers) along major arterials and expressways (Grant Line and Chrisman), and

-Contributions to a finance plan to fund construction of arterial and expressway general-use lanes and medians, freeway interchanges, and major rail and canal crossing structures, and

-Right-of-way dedication and construction of all needed minor arterials, collectors and industrial streets within the Plan.

-Future roadway alignments shall recognize existing property lines, structures, and other physical features (such as dairy operations) so as to preserve their continued uses (unless otherwise provided for).

Mitigation Measure TRA-2: *Contribute, along with other cumulative development, to the following modifications to the interchange: 1) extension of the eastbound on-ramp by a length sufficient to allow trucks safe merge speeds relative to mainline traffic (estimated by Caltrans to be roughly 1000 feet), and 2) construct a loop on-ramp in the northeast quadrant of the interchange to lengthen the ramp and reduce its slope [This is Mitigation Measure 4.7-2 in the NEISP EIR].*

Mitigation Measure TRA-3: *Widen MacArthur from Pescadero Avenue through the interchange as illustrated in Figure 20 [This is Mitigation Measure 4.7-3 in the NEISP EIR].*

Mitigation Measure TRA-4: *Preserve right-of-way for an additional interchange between Paradise Road and the Yellow Freight property and for access roads extending south from the interchange to meet existing Chrisman road at Grant Line Road and north to or beyond Arbor Avenue. Develop a funding plan for the interchange involving the Cities of Tracy and Lathrop. Upon completion of the specified improvements to the MacArthur interchange, begin Caltrans project development studies and engineering for new interchange. Begin construction in time to prevent LOS at MacArthur interchange from deteriorating into the LOS E range [This is Mitigation Measure 4.7-4 in the NEISP EIR].*

Mitigation Measure TRA-5: *As development proceeds, monitor LOS at these six locations, and implement the mitigation measures depicted in Figures 1 9 and 20 in time to prevent unacceptable conditions [This is Mitigation Measure 4.7-5 in the NEISP EIR].*

Mitigation Measure TRA-6: *A potential mitigation measure for cumulative post-2015 development in the area, including Gold Rush City (now known as River Islands) and Mountain House would be to proceed with planning of the northern Tracy expressway corridor identified in the City's Roadway Master Plan. In its ultimate form, this expressway would connect on the east with Gold Rush City's Golden Valley Expressway and would extend to Mountain House on the west. Its benefits are not expected to be*

> *significant prior to 2015, but plan lining and right-of-way preservation should proceed so that construction can be coordinated beyond 2015 with the Golden Valley Expressway connection from Lathrop. In 2015, the new expressway would reduce p. m. peak traffic volumes by about 500 vehicles (-7 %) in the eastbound direction and 250 (-5 %) in the westbound direction on 1-205 between Tracy Boulevard and MacArthur Drive, more than off-setting the net increases attributable to the Northeast Industrial Plan [This is Mitigation Measure 4.7-6 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that the impacts of the development of the specific plan area would be less than significant. However, the NEISP EIR also noted that the UMP EIR recognized that future development and buildout of the NEISP area, including the Project site, with all the other areas analyzed therein, would result in cumulative and unavoidable impacts on traffic and circulation, and the City adopted a Statement of Overriding Considerations (#93-226), which is incorporated herein by reference (NEISP EIR, p. 4.63.).

A Traffic Analysis (dated October 16, 2020) was prepared by Kimley-Horn and Associates (Kimley-Horn) for the proposed Project, which can be found in *Attachment A*. The Traffic Analysis was conducted to determine whether the proposed Project's potential traffic and circulation impacts were adequately addressed in the previously certified NEISP EIR, and to determine whether any new circulation system improvements would be required to ensure that the Project complies with applicable General Plan policies and City requirements.

The trip generation for projects are typically calculated using trip generation rates contained in the Institute of Transportation Engineers (ITE) *Trip Generation Manual,* 10th Edition. However, according to the Traffic Analysis, a custom trip generation was developed for the proposed Project based on employee shift data provided by the Project applicant to more accurately reflect the trips generated by the development. The Project is anticipated to generate 3,573 daily trips, 593 AM peak hour trips (560 in / 33 out), and 995 PM peak hour trips (494 in / 501 out) for both passenger cars and truck trips.

The proposed Project would result in the development of only a portion of the NEISP area, and the traffic generated by such development is well within the levels of traffic generation that the NEISP EIR assumed would be generated by the development of the Site with industrial uses. According to the Traffic Analysis, the NEISP area can be broken into 11 transportation analysis zones (TAZs), and Table 1 on the following page provides the current NEISP development status in net acres organized by TAZ.

Table 1: NEI Specific Plan Development Status per TAZ

TAZ	Project Type (Gross Acres)					
	Vacant	Basin	Built	Approved	Pending	Project
514	10.48	0	86.49	0	0	0
628	52.2	0	0	0	0	0
629	0	0	0	78.33	0	0
631	20.52	0	48.06	29.27	0	0
633	5.35	0	63.49	21.4	4.73	0
648	0	0	0	0	0	94.14
649	0	0	90.43	0	0	0
677	14.66	35.07	25.15	0	0	0
678	23.83	0	28.53	0	0	0
679	2.18	0	51.33	0	0	0
680	9.18	0	44.97	0	0	0
Total	138.4	35.07	438.45	129	4.73	94.14
Percentage of Specific Plan	17%	4%	52%	15%	1%	11%
Specific Plan Area (Net Acres)[1]						845

[1] The total above excludes the existing or proposed roadways (25.9 acres).

Source: Kimley-Horn, 2020

As shown in Table 1, the NEISP has currently developed 52 percent of available land with 15 percent more approved and one percent further pending approval. With the inclusion of the future basin and the proposed Project, the NEISP will have developed 83 percent of available land. Therefore, only 17 percent will remain either vacant or currently occupied by a single-family dwelling unit. Trip generation estimates were calculated for the existing uses, planned uses (approved and pending), and vacant land to determine whether the proposed Project's trips fall within the NEISP EIR buildout estimates. Trip generation for built, approved and pending building were analyzed using the Citywide Roadway and Transportation Management Plan (TMP) employment densities and peak hour trip rates, as shown in Table 2.

Table 2: Employment and Trip Rate Assumptions

Type	Employment Density	AM Trip Rate per ksf	PM Trip Rate per ksf
High-cube Warehouse	1 employee per ksf	0.12	0.14
Warehouse	1 employee per ksf	0.17	0.33
Office	3 employees per ksf	0.66	1.26
NEISP EIR	0.5 employee per ksf	0.16	0.16

Source: Kimley-Horn, 2020

Utilizing the peak hour trip rates identified above, Kimley-Horn calculated the total trip generation for the NEISP area with the proposed Project and compared the total trip generation to the total trip generation within the previously certified NEISP EIR to determine whether the proposed Project is consistent with the transportation analysis assumptions for buildout of the NEISP area (Table 3).

Table 3: Trip Generation with TMP Assumption

TAZ	Projects	Project Size	AM Peak Hour	PM Peak Hour
Built/Approved/Pending Projects Trip Generation				
514	Built – Kellogg's, Katerra, Pacific Medical	1,383 KSF	199	262
628	Vacant			
629	Approved – Seefried	1,028 KSF	124	144
631	Built – FEMA, IPT2 Approved – IPT 4	1,415 KSF	247	276
633	Built – Home Depot, Ridgeline Approved – Central Plastics, Home Depot Parking Pending – Interstate Truck Center	1,133 KSF	134	180
648	Proposed Project			
649	Built – Crate & Barrel, Amazon Fulfillment Center	1,921 KSF	231	269
677	Built – Hollingsworth	537 KSF	91	177
678	Built – Animal Shelter, Barbosa Cabinets, Top Shelf	416 KSF	76	147
679	Built – Boassard, Best Buy, SSA	993 KSF	119	139
680	Built – Crate & Barrel, WSID, Amazon Parking	400 KSF	48	56
	Built/Approved/Pending Subtotal		1,269	1,650
Proposed Project Trip Generation				
	Proposed Project Subtotal		593	995
Future Development[1]				
	Future Development Subtotal	2,767 KSF	443	443
Trip Generation Totals				
Built/Approved/Pending Net Total			**1,269**	**1,650**
Built/Approved/Pending + Proposed Project			**1,862**	**2,645**
Built/Approved/Pending + Proposed Project + Future			**2,305**	**3,088**
Previously Certified NEISP EIR Trip Generation				
			3,000	5,241
Trip Generation Totals compared to NEISP EIR Trip Generation				
(Approved + Proposed Project) – NEISP Trip Generation[2]			**-1,138**	**-2,596**

(Built/Approved/Pending + Proposed Project + Future) – NEISP Trip Generation²	**-695**	**-2,153**

1. It was assumed that all current and future developments were industrial since no commercial land uses are shown in the City's General Plan (2011, 2016 update).

Source: Kimley-Horn, 2020

As shown in Table 3, the built/approved/pending trip generation of projects within the NEISP area is 1,269 trips in the AM peak hour and 1,650 in the PM peak hour while the estimated future trip generation for the vacant parcels in the NEISP area is 443 trips for both AM and PM peak hours. The Project is anticipated to add 593 AM peak hour trips and 995 PM peak hour trips, resulting in a total estimated trip generation of 2,305 AM peak hour trips and 3,088 PM peak hour trips for the NEISP area. With the addition of the proposed Project trips, NEISP trip generation remains well below the previously certified EIR buildout estimates. In fact, the existing and future uses that have and will be developed in the NEISP area since the 1996 certification of the EIR are anticipated to result in 695 fewer AM peak hour trips and 2,153 fewer PM peak hour trips as compared to the total trips assumed in the NEISP EIR, above. Therefore, the proposed Project is consistent with the NEISP traffic circulation analysis assumptions within the previously certified NEISP EIR.

For the reasons set forth above, all of the proposed Project's transportation impacts – which would be subject to the same mitigation measures as the previously certified NEISP EIR, as applicable – would be less than significant after mitigation. Accordingly, the proposed Project would not result in any new or increased significant impacts relating transportation that were not already analyzed in, and fully covered by, the previously certified EIR.

Cumulative Impacts

The proposed Project is consistent with the land use and zoning designations contained in the NEISP. Impacts related to transportation and circulation across the NEISP Area were considered cumulatively significant and unavoidable in the previously certified NEISP EIR. Specifically, these cumulatively significant and unavoidable transportation and circulation impacts were related to inconsistencies with the Tracy Roadway Master Plan, interchange impacts, and freeway impacts. The proposed Project would not cause a new impact to occur that was not previously disclosed. Mitigation previously discussed in this section would be implemented by the proposed Project that would reduce the severity of significant and unavoidable cumulative effects. No further evaluation is required.

VIII. AIR QUALITY – WOULD THE PROJECT:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Exceed regional air quality emissions standards?					*X*
b) Exceed local air quality emission standards?					*X*
c) Result in significant construction related to air quality impacts?					*X*
d) Result in the creation of objectionable odors?					*X*

EXISTING SETTING

The project site is located within the boundaries of the San Joaquin Valley Air Pollution Control District (SJVAPCD). This agency is responsible for monitoring air pollution levels and ensuring compliance with federal and state air quality regulations within the San Joaquin Valley Air Basin (SJVAB) and has jurisdiction over most air quality matters within its borders.

This region has had chronic non-attainment of federal and state clean air standards for ozone/oxidants and particulate matter due to a combination of topography and climate. The San Joaquin Valley (Valley) is hemmed in on three sides by mountain ranges, with prevailing winds carrying pollutants and pollutant precursors from urbanized areas to the north (and in turn contributing pollutants and precursors to downwind air basins). The Mediterranean climate of this region, with a high number of sunny days and little or no measurable precipitation for several months of the year, fosters photochemical reactions in the atmosphere, creating ozone and particulate matter. Regional factors affect the accumulation and dispersion of air pollutants within the SJVAB.

Air pollutant emissions overall are fairly constant throughout the year, yet the concentrations of pollutants in the air vary from day to day and even hour to hour. This variability is due to complex interactions of weather, climate, and topography. These factors affect the ability of the atmosphere to disperse pollutants. Conditions that move and mix the atmosphere help disperse pollutants, while conditions that cause the atmosphere to stagnate allow pollutants to concentrate. Local climatological effects, including topography, wind speed and direction, temperature, inversion layers, precipitation, and fog can exacerbate the air quality problem in the SJVAB.

The SJVAB is approximately 250 miles long and averages 35 miles wide, and is the second largest air basin in the state. The SJVAB is defined by the Sierra Nevada in the east (8,000 to 14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi mountains in the south (6,000 to 8,000 feet in elevation). The Valley is basically flat with a slight downward gradient to the northwest. The Valley opens to the sea at the Carquinez Straits where the San Joaquin-Sacramento Delta empties into San Francisco Bay. The Valley, thus, could be considered a "bowl" open only to the north.

During the summer, wind speed and direction data indicate that summer wind usually originates at the north end of the Valley and flows in a south-southeasterly direction through the Valley, through Tehachapi pass, into the Southeast Desert Air Basin. In addition, the Altamont Pass also serves as a funnel for pollutant transport from the San Francisco Bay Area Air Basin into the region.

During the winter, wind speed and direction data indicate that wind occasionally originates from the south end of the Valley and flows in a north-northwesterly direction. Also, during the winter months, the Valley generally experiences light, variable winds (less than 10 mph). Low wind speeds, combined with low inversion layers in the winter, create a climate conducive to high carbon monoxide (CO) and particulate matter (PM10 and PM2.5) concentrations. The SJVAB has an "Inland Mediterranean" climate averaging over 260 sunny days per year. The Valley floor is characterized by warm, dry summers and cooler winters. For the entire Valley, high daily temperature readings in summer average 95ºF. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45ºF.

The vertical dispersion of air pollutants in the Valley is limited by the presence of persistent temperature inversions. Solar energy heats up the Earth's surface, which in turn radiates heat and warms the lower atmosphere. Therefore, as altitude increases, the air temperature usually decreases due to increasing distance from the source of heat. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Inversions can exist at the surface or at any height above the ground, and tend to act as a lid on the Valley, holding in the pollutants that are generated here.

RESPONSES TO CHECKLIST QUESTIONS

Thresholds (a,b,c) -- Would the project exceed regional or local air quality emissions standards, or result in significant construction-related air quality impacts?

As described above, the proposed Project lies within the central portion of the SJVAB and the SJVAPCD has jurisdiction over most air quality matters in the Basin and is tasked with implementing programs and regulations required by the Federal and State Clean Air Acts. If a project is found to interfere with the region's ability to comply with Federal and State air quality standards, local governments then need to consider project modifications or provide mitigation measures to eliminate the inconsistency of the project plans. In order for a project to be considered "consistent" with the latest Air Quality Plan (AQP), the project must be consistent with the goals, objectives, and assumptions in the respective plan to achieve Federal and State air quality standards. Additionally, both construction related and long-term emissions are required to be quantified and compared to the SJVAPCD significance thresholds.

The previously certified NESIP EIR included a project air quality impact assessment to determine the regional air quality impacts from buildout conditions of the entire NEISP area, including the proposed Project site. The short-term construction emissions from development of the total Plan Area were estimated using construction and buildout assumptions for each land use (i.e., Light Industrial and General Commercial) and methodology established in the South Coast Air Quality Management District's CEQA Handbook, at the suggestion of the SJVUAPCD, while the long-term mobile source emission from operation of the NEISP at future buildout were calculated using the future year peak hour traffic volumes and trip assignments from the Transportation Analysis prepared by Fehr & Peers for the NEISP EIR. The NEISP EIR identified a number of impacts on air quality that would result from the construction and operation of NEISP at full buildout. Specifically, the NEISP EIR concluded that operation of the NEISP area (including mobile source emissions) would result in significant and unavailable cumulative impacts as a result of ROG, NOx and CO hotspot emissions above applicable thresholds (NEISP EIR, pp. 4.67 through 4.70.) The NEISP EIR also identified potentially significant impacts from PM10 emissions during construction (Id., pp. 4.70, 4.71.). Accordingly, the EIR imposed the following mitigation measures:

> ***Mitigation Measure AIR-1****: All active portions of construction sites, earthen access roads, and material excavated or graded shall be sufficiently watered to prevent excessive amounts of dust. Watering shall occur at least twice a day with complete coverage, preferably in the late morning and after work is done for the day. Where feasible, reclaimed water shall be used [This is Mitigation Measure 36.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure AIR-2:*** *All clearing, grading, earth moving, or excavation activities shall cease during periods of winds greater than 20 miles per hour average over one hour [This is Mitigation Measure 36.2 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure AIR-3:*** *All material transported off site shall be either sufficiently watered or securely covered to prevent excessive amounts of dust [This is Mitigation Measure 36.3 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure AIR-4:*** *The area disturbed by clearing, earth moving, or excavation activities shall be minimized at all times. This can be accomplished by mowing instead of disking for weed control and seeding and watering inactive portions of the construction site until grass growth is evident [This is Mitigation Measure 36.4 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure AIR-5:*** *Construction site vehicle speeds shall be limited to 15 miles per hour [This is Mitigation Measure 36.5 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure AIR-6****: If used, petroleum-based dust palliatives shall meet the road oil requirements of the San Joaquin Valley Unified Air Pollution Control District's rule regarding Cutback Asphalt Paving Materials [This is Mitigation Measure 36.6 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR 7: *Streets adjacent to the Project site shall be swept as needed to remove silt which may have accumulated from construction activities [This is Mitigation Measure 36.7 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR 8: *All internal combustion engine driven equipment shall be properly maintained and well tuned according to the manufacturer's specifications [This is Mitigation Measure 36.8 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-9: *During the smog season (May through October), the construction period shall be lengthened to minimize the number of vehicles and equipment operating at the same time [This is Mitigation Measure 36.9 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-10: *When available, diesel powered or electric equipment shall be utilized in lieu of gasoline powered engines [This is Mitigation Measure 36.10 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-11: *Construction activities shall minimize obstruction of through traffic lanes adjacent to the site and a flag person shall be retained to maintain safety adjacent to existing roadways [This is Mitigation Measure 36.11 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-11: *The use of energy efficient street lighting and parking lot lighting shall be considered throughout the TPA to reduce emissions at the power plant [This is Mitigation Measure 37.1 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-12: *Low polluting and high efficiency appliances shall be encouraged for development plans wherever possible [This is Mitigation Measure 37.2 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-13: *Landscaping shall include water efficient plant species and irrigation to reduce water consumption and provide passive solar benefits [This is Mitigation Measure 37.3 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-14: *Design guidelines for Project developments shall consider innovative solutions to encourage transit ridership and other alternative transportation modes [This is Mitigation Measure 37.4 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-15: *Ingress and egress points in new development shall be designed to minimize idling vehicle emissions [This is Mitigation Measure 37.5 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-16: *Use of alternative fuel vehicles shall be encouraged in vehicle fleets and new facilities shall be designed to set aside space for refueling or electrical recharging of vehicles [This is Mitigation Measure 37.6 of the UMP EIR in the NEISP EIR].*

Mitigation Measure AIR-17: *In accordance with Goal 4 of the Air Quality Element, Tracy should coordinate with San Joaquin County and the San Joaquin Valley Unified Air Pollution Control District to implement consistent policies. The following policies from the Draft EIR on the San Joaquin County Comprehensive Planning Program (December 1991) should be implemented in Tracy as part of a citywide air quality mitigation plan that includes monitoring and enforcement provisions [This is Mitigation Measure 39.2 of the UMP EIR in the NEISP EIR].*

The City should promote the use of signal synchronization, one way streets, computerized traffic controls, removal of unnecessary signals, and other engineering techniques to decrease idling time and maximize the speed of traffic on congested surface streets.

Mitigation Measure AIR-18: *Implementation of planned street and highway, transit, and bikeway improvements (as may be specified in the Transportation Impact Assessment) adjacent to the Project site necessary to relieve congestion and reduce idling [This is Mitigation Measure 4.8-1 in the NEISP EIR].*

Mitigation Measure AIR-19: *Use of HVAC equipment with a SEER of 12 or greater [This is Mitigation Measure 4.8-2 in the NEISP EIR].*

Mitigation Measure AIR-20: *Prior to approval of the Final Map, the applicant shall coordinate with the SJVUAPCD and demonstrate to the City the incorporation of UMP EIR air quality mitigation measures and others that may be applicable into the design of the Project [This is Mitigation Measure 4.8-3 in the NEISP EIR].*

Mitigation Measure AIR-21: *Prior to approval of the Final Map, the applicant shall coordinate with the SJVUAPCD and demonstrate to the City the incorporation of UMP EIR methods and others to be applicable to reduce dust emissions during construction [This is Mitigation Measure 4.8-4 in the NEISP EIR].*

While all other impacts on air quality could be reduced to a less than significant level, the NEISP EIR concluded that impacts relating to ROG, NOx and CO operational emissions, including mobile, would remain significant and unavoidable (NEISP EIR, p. 4.75.).

The proposed Project would result in the development of a portion of the NEISP (and all entirely within the NEISP area), involves the same types of industrial uses permitted by the NEISP, and is within the FAR that the NEISP EIR assumed would be developed on the Project site. While the proposed Project would not include any uses or activities that are known to generate excessive volumes of stationary air quality emissions, the proposed Project could potentially generate excessive mobile source emissions associated with the volume of traffic to and from the site during operation. However, as discussed in the transportation and circulation section, the traffic that will be generated by the buildout of the entire NEISP area, including the Project site with the proposed Project, will result in much less traffic than assumed in the NEISP EIR, resulting in reduced air quality emissions from mobile sources when compared to the development program anticipated in the previously certified NEISP EIR. As a result, the emissions and other air quality impacts that would result from the construction and operation of the proposed Project on the site is well within the levels of air quality emissions that the NEISP EIR assumed would be generated by the development of the Project site with industrial uses.

Additionally, since the certification of the NEISP EIR in 1996, applicable regulatory requirements protecting human health, including standards for truck emissions, have become significantly more strict over the past 25 years (e.g., 2010 truck restrictions take effect in 2023 thereby greatly reducing the operational emissions of truck fleets), which also reduces emissions when compared to the emissions that the NEISP EIR assumed would result from buildout of the NEISP area under then-existing regulations, even if the proposed Project was to generate the exact same amount of traffic as originally assumed in the NEISP EIR. Further, the SJVAPCD has implemented more stringent air quality regulation since the certification of the NEISP EIR in 1996, which the proposed Project would be required to comply with further reducing operational air quality emissions. For example, the proposed Project is subject to the SJVAPCD Rule 9510 (Indirect Source Rule, or ISR), which could result in substantial reduction of emissions beyond what is reflected in the NEISP EIR modeling outputs. District Rule 9510 requires developers of residential, commercial, and industrial projects to reduce smog-forming (NO_X) and particulate (PM_{10} and $PM_{2.5}$) emissions generated by their projects. The Rule applies to projects which, upon full build-out, will include 2,000 sf of commercial space or more. Project developers are required to reduce:

- 20 percent of construction-exhaust nitrogen oxides;
- 45 percent of construction-exhaust PM_{10};
- 33 percent of operational nitrogen oxides over 10 years; and
- 50 percent of operational PM_{10} over 10 years.

Developers are encouraged to meet these reduction requirements through the implementation of on-site mitigation; however, if the on-site mitigation does not achieve the required baseline emission reductions, the developer must pay an off-site fee to the District. Such fees help reduce overall regional emissions by helping to fund clean-air projects in the District. For the reasons set forth above, the proposed Project's air quality impacts, which would be subject to the same mitigation measures as the previously certified NEISP EIR, as applicable, and new local, State, and Federal regulations, would not result in any new or increased significant impacts relating air quality that were not already analyzed in, and fully covered by, the previously certified EIR.

Threshold (d) -- Would the project result in the creation of objectionable odors?

SJVAPCD has identified a list of common types of facilities that have been known to produce odors in the SJVAB along with a reasonable distance from the source within which, the degree of odors could be significant. These land uses include the following: wastewater treatment facilities, sanitary landfills, transfer stations, composting facilities, petroleum refinery, asphalt batch plant, chemical manufacturing, fiberglass manufacturing, painting/coating operations, food processing facilities, feed lot/dairies and rendering plants. The proposed Project would include the development of a multi-story industrial warehouse and office and does not propose to include any odor inducing uses on the site. Because the proposed Project is for industrial uses consistent with the NEISP, the proposed Project's impact relative creation of objectionable odors would be similar to those identified in the NEISP EIR.

The previously certified NEISP EIR found that development of the specific plan area would not result in the generation of objectional odors because the Environmental Performance Standards within the NEISP restricts the uses that "emit dust, sweepings, dirt, cinders, fumes, odors, radiation, gases and vapors, or discharges of liquid or solid waste or other harmful matter into the atmosphere or any body of water." Impacts relative to this topic in the previously certified NEISP EIR were found to be less than significant from buildout of the specific plan; therefore, impacts would remain less than significant for the proposed Project. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

A project that has a significant impact on air quality with regard to emissions of CO, NO_X and/or ROGs as determined above would have a significant cumulative effect. In the event direct impacts from a project are less than significant, a project may still have a cumulatively considerable impact on air quality if the emissions from the project, in combination with the emissions from other proposed, or reasonably foreseeable future projects are in excess of screening levels identified above, and the project's contribution accounts for more than an insignificant proportion of the cumulative total emissions. With regard to past and present projects, the background ambient air quality, as measured at the monitoring stations maintained and operated by the SJVAPCD, measures the concentrations of pollutants from existing sources. Past and present project impacts are therefore included in the background ambient air quality data.

The proposed Project would contribute to cumulative impacts from construction and operational emissions since regional thresholds are exceeded for build-out of the NEISP. The potential for cumulative impacts caused by the proposed Project are consistent with impacts identified in the NEISP EIR. The proposed Project would not cause a new impact to occur that was not previously disclosed. Mitigation previously discussed in this section would be implemented by the proposed Project that would reduce the severity of significant and unavoidable cumulative effects. No further evaluation is required.

IX. NOISE -- WOULD THE PROJECT:

	Potentially Significant Impact	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*	*Reviewed Under Previous Document*
a) Result in project-generated vehicular noise levels incompatible with the nearby existing land uses?					*X*
b) Result in project-generated industrial and commercial noise levels incompatible with the nearby existing land uses?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a, b) -- Would the project result in project-generated vehicular noise levels or industrial and commercial noise levels incompatible with the nearby existing land uses?

The proposed Project would generate vehicular noise from employee automobile trips and stationary operational noise associated with the industrial operations. The Project site is a vacant, 86-acre area located within the NEISP, which was created to facilitate the buildout of high-quality industrial and commercial area located in the northeast area of Tracy. Since adoption of the NEISP, the NEISP Area has been built out with commercial, industrial, and business park industrial uses. The proposed project would include the development of a multi-story warehouse facility, parking lot, and necessary transportation and utility infrastructure. The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to noise would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR assumed that buildout of the specific plan would result in the development 45.5 net acres of commercial development and 799 net acres of industrial development, which would have generated 9,142 new jobs (NEISP EIR, p. 4.52.). The NEISP EIR identified potential significant impacts related to noise, including impacts on the NEISP itself from nearby freeway noise, noise generated by the operation of the NEISP's industrial uses, and noise from traffic generated by the operation of the built out NEISP. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure NOI-1:*** *Since the noise sensitivity of the industrial use is presently unknown, the City, with the help of an acoustical consultant, could evaluate the acceptability of the noise environment once the type of use is specified. If it is determined that a DNL of 75 dB should be met, then a 1 2-foot sound wall should be constructed along the northern property line. If this is not feasible, then a building facade setback of 464 feet from the I-205 roadway centerline could be considered as shown in Table 21 [This is Mitigation Measure 4.9-1 in the NEISP EIR].*

> *Although sound-rated windows will not improve the exterior noise environment, sound-rated windows may be recommended to improve the interior work environment for facilities located along the freeway corridor.*
>
> ***Mitigation Measure NOI-2:*** *Since the noise sensitivity of the commercial uses are presently unknown, the City, with the assistance of an acoustical consultant, could evaluate the acceptability of the noise environments when the exact uses are specified. If it is determined that a DNL of 70 dB should be met, then the minimum noise barrier heights listed in the last column of Table 20 should be considered. If this is not feasible, setback may be provided to meet the noise requirements as described in Table 21 [This is Mitigation Measure 4.9-2 in the NEISP EIR].*
>
> ***Mitigation Measure NOI-3:*** *The applicant shall construct a six-foot noise barrier along the roadways to reduce future noise levels at existing residential properties to an acceptable level [This is Mitigation Measure 4.9-3 in the NEISP EIR].*
>
> ***Mitigation Measure NOI-4:*** *Since the type of industrial use is currently unknown, the City with the help of an acoustical consultant shall evaluate the potential impact on existing homes when the industrial uses are determined. The City shall direct this study with funding provided by the applicant. Appropriate mitigation measures will be implemented which could include either noise barriers, noise control for fixed equipment, limited hours of operations or deliveries, distance setbacks, building orientation or access locations depending upon the type and location of the source [This is Mitigation Measure 4.9-4 in the NEISP EIR].*

The NEISP EIR concludes that after mitigation, noise impacts would be less than significant, except that impacts from roadway/freeway noise levels on the future users within the NEISP would be significant and unavoidable, particularly with respect to the commercial area of the NEISP, which does not include the Project site (NEISP EIR, pp. 4.80 through 4.85.). The NEISP EIR notes that the UMP EIR recognized that future development and buildout of the Project site, along with all the other areas analyzed therein, would result in cumulative and unavoidable impacts on noise, and the City adopted a Statement of Overriding Considerations (#93-226), which is incorporated herein by reference.

The proposed Project involves the same type of industrial uses permitted by the NEISP, and is within the FAR that the NEISP EIR assumed would be developed on the Site, meaning that noise that will be generated by both the operation of the proposed Project, and traffic generated by the proposed Project, is consistent with the noise levels that the NEISP EIR assumed would be developed on the Project site. Specifically, the proposed Project would generate 3,573 daily trips, 593 AM peak hour trips (560 in / 33 out), and 995 PM peak hour trips (494 in / 501 out) for both passenger cars and truck trips, which is consistent with the previously certified NEISP EIR, as discussed in *Section VII Transportation and Circulation*. Further, because buildout of the entire NEISP area will result in significantly less total square footage than assumed in the NEISP EIR, overall noise impacts would be reduced when compared to the previously certified NEISP EIR.

Additionally, the proposed Project would be required to implement the same mitigation measures imposed on the NEISP EIR, as applicable, in addition to being subject to more strict regulatory requirements than existed when the NEISP EIR was certified in 1996. Finally, the proposed Project would not expose its users to excessive roadway/freeway noise, and therefore the significant and unavoidable noise impacts identified by the NEISP EIR – which was specific to future commercial uses – would not apply to the proposed Project. Instead, all of the proposed Project's impacts potential impacts relating to noise would be less than significant. Accordingly, the proposed Project would not result in any new or increased significant impacts relating to noise that were not already analyzed in, and fully covered by, the previously certified NEISP EIR.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to noise across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, the project-generated vehicular noise levels and industrial noise levels that would be generated by the operation of the proposed Project is consistent with the level the NEISP EIR assumed would be generated from eventual development of the Project site with industrial uses pursuant to the NEISP. Therefore, as long as the proposed Project complies with the Specific Plan guidelines, no cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

X. AESTHETICS -- *WOULD THE PROJECT:*

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Result in the significant production of new light and glare?					*X*
b) Result in the significant obstruction of any scenic vista or view open to the public, or the creation of any aesthetically offensive site?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) -- Would the project result in the significant production of new light and glare?

There are no existing sources of light or glare located on the Project site. The Project site is a vacant, 86-acre area located within the NEISP, which was created to facilitate the buildout of high-quality industrial and commercial area located in the northeast area of Tracy. Since adoption of the NEISP, the NEISP Area has been built out with commercial, industrial, and business park industrial uses. The proposed project would include the development of a multi-story warehouse facility, parking lot, and necessary transportation and utility infrastructure. The proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to light and glare would be similar to that identified in the previously certified NEISP EIR.

The NEISP EIR explained that the development of the specific plan would result in new sources of light and glare, as the NEISP area was largely agricultural, but such impacts were consistent with the UMP and UMP EIR, as the entire NEISP area generally, and the Project site specifically, have long been designated for redevelopment with industrial uses (NEISP EIR, p. 4.89.). As a result, the previously certified NEISP EIR concluded that the impacts would be less than significant. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Threshold (b) -- Would the project result in the significant obstruction of any scenic vista or view open to the public, or the creation of any aesthetically offensive site?

There are no scenic vistas located on or adjacent to the Project site. The proposed Project uses are consistent and compatible with the surrounding land use designations. Lands surrounding the Project site consist of industrial, agricultural, and agricultural residential uses.

Implementation of the proposed Project would provide for additional industrial development on a site that is bordered by similar industrial development to the north, east, west, and south. The Project site is not topographically elevated from the surrounding lands and is not highly visible from areas beyond the immediate vicinity of the site. There are no prominent features on the site, such as trees, rock outcroppings, or other visually distinctive features that contribute to the scenic quality of the site. The project site is not designated as a scenic vista by the City of Tracy General Plan.

As described above, the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP. However, the Project would be 98-feet, 8-inches at the tallest point, which is inconsistent with the maximum building height allowed for uses within the NEISP. As such, the proposed Project requests an amendment to the NEISP to revise the maximum height from 60 feet to 125 feet for buildings located at the Project site. While the overall height of the building may be eye-catching from a number of vantage points in the NEISP and surrounding areas, it would not obstruct any scenic vistas or public views open to the public. Views of the Project site from the nearest freeways (i.e., Interstate-250, Interstate-5, and State Route-205) are currently limited due to the existing, large-scale industrial developments shielding the site. Multiple large-scale industrial warehouses neighboring the Project site to the north, west, east, and south are already obstructing views open to the public. The previously certified NEISP EIR noted that, consistent with the analysis of the UMP and UMP EIR, buildout of the NEISP Area would cumulatively and unavoidably change the visual character of Tracy and reduce the open views of the surrounding area due to the conversion of open farmland to urban industrial developments. Though the proposed Project would be noticeably taller than the neighboring developments, the impact relative to the obstruction of views or creation of an aesthetically offensive site would be similar to that identified in the previously certified NEISP EIR. The NEISP EIR concluded that compliance with the Specific Plan's design guidelines would minimize any aesthetic impact, including any impacts on views open to the public, and ensure such impacts are less than significant. (Id., pp. 4.89 through 4.90.)

The proposed Project would develop the Project site with an industrial use, as was assumed and analyzed in the NEISP EIR. While, with the proposed amendment to the NEISP, the proposed Project would be significantly taller than what was assumed under the previously certified NEISP EIR, it will still be required to comply with all of the Specific Plan's design guidelines, which as stated in the NEISP EIR, will minimize aesthetic impacts and ensure that such impacts will be less than significant. As shown in Attachment B, the applicant is proposing to shield large portions of the building with tall, vibrant landscaping consistent with the NEISP and Tracy General Plan. Additionally, the increased height would not materially change the nature of the Project site as compared to the NEISP – it is not within a scenic vista or other protected view area, and instead is located in a low-lying area surrounded by mostly industrial development, and the remainder of the agricultural uses in the area are all slated for redevelopment with industrial uses in the future, pursuant to the UMP and NEISP (*See,* NEISP EIR, pp. 4.86 through 4.90). Further, the buildout of the NEISP will result in the development of millions less square footage than originally assumed in the NEISP EIR, thereby further reducing aesthetic impacts. Accordingly, the proposed Project would not result in any new or increased significant impacts on aesthetics that were not already analyzed in, and fully covered by, the previously certified NEISP EIR; therefore, additional environmental review is not required.

Cumulative Impacts

The potential aesthetic impacts related to views, aesthetics, and light and glare are site specific. Development of the NEISP Area, including the project site, has been envisioned by the General Plan EIR, and, as described in the previously certified NEISP EIR, no new impact, nor the severity of an impact previously disclosed would occur from buildout of the NEISP area. Therefore, the NEISP EIR found the future development and buildout of the NEISP area, along with all the Project site, would result in less than cumulatively considerable impacts on aesthetics. As discussed above, the proposed Project would also cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP. Thus, while the proposed Project would change the appearance of the site and surrounding area, so long as the proposed Project abides by the Specific Plan guidelines, no new cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

XI. PUBLIC SERVICES AND FACILITIES - Would the project:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Require a significant need for new, expanded or altered governmental facilities?					*X*
b) Result in the significant need for new systems, or substantial alterations to public facilities?					*X*
c) Require the extension of facilities with the capacity to serve new development?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Thresholds (a, b, c) -- Would the project require a significant need for new, expanded or altered governmental facilities, result in the significant need for new systems, or substantial alterations to public facilities, or require the extension of facilities with the capacity to serve new development?

The Project site is a vacant, 86-acre site located within the NEISP, which was created to facilitate the buildout of high-quality industrial and commercial area located in the northeast area of Tracy. Since adoption of the NEISP, the NEISP Area has been built out with commercial, industrial, and business park industrial uses. The proposed project would include the development of a multi-story warehouse facility, parking lot, and necessary transportation and utility infrastructure. The proposed Project involves the same type of industrial uses permitted by the NEISP, and is within the FAR that the NEISP EIR assumed would be developed on the Project site, meaning that need for public services that would be generated by the operation of the proposed Project is consistent with the level of need that the NEISP EIR assumed would be generated from eventual development of the Project site with industrial uses pursuant to the NEISP. Therefore, the impacts relative to public services and facilities discussed below would be similar to that identified in the previously certified NEISP EIR.

Fire Impacts

The NEISP proposed to develop 799 net acres of general commercial and light industrial uses in an area, which at the time was, just east of the City limits and south of I-205. Impacts in the previously certified NEISP EIR relative to fire protection were found to be potentially significant, which would be reduced through implementation of UMP goals, policies, and actions, as well as by imposing the following mitigation measure:

> ***Mitigation Measure PUB-1:*** *Individual development applications within the UMP area shall be reviewed by the City of Tracy for adequate fire prevention measures including: street widths, water supply, and public access [This is Mitigation Measure M 70.1 of the UMP EIR in the NEISP EIR].*

Following the implementation of the above mitigation measure, the previously certified NEISP EIR concluded that impacts to fire protection would be less than significant (NEISP EIR, pp. 4.101 through 4.108). Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts would remain less than significant with the above mitigation measure incorporated. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed

Police Impacts

As discussed above in the analysis of fire protection impacts, the NEISP proposed the addition of 799 net acres of general commercial and light industrial development. Although the UMP EIR does not consider this additional development to be a significant cumulative impact on the provision of police services and facilities, the previously certified NEISP EIR found that individual development project proposed under the NEISP may individually impact police staff, equipment, and facilities. Therefore, this impact was found to be potentially significant in the NEISP EIR; however, by implementing the goals, policies, and actions within the UMP (General Plan), the NEISP EIR found the impact would be less than significant.

The proposed Project will be required to be consistent with the General Plan, which ensures the City maintains adequate police staffing, performance levels and facilities to serve Tracy's existing population as well as any future growth (Goal PF-2, policy P.1). Impact fees from new developments are collected based upon projected impacts from each development by the City as COAs prior to project approval. The adequacy of impact fees is reviewed on an annual basis to ensure that the fee is commensurate with the service. Payment of the applicable impact fees by the project applicant, and ongoing revenues that would come from property taxes, and other revenues generated by the project, would fund capital and labor costs associated with police services. Accordingly, the proposed Project would not result in any new or increased significant impacts relating to police impacts that were not already analyzed in, and fully covered, by the previously certified NEISP EIR.

School Impacts

The previously certified NEISP EIR concluded that impacts relative to school facilities and staffing would be less than significant because the project proposes only commercial and industrial development and no residential dwelling units. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. Additionally, since adoption of the NEISP EIR in 1996, State regulations (i.e., SB 50) have gone into effect requiring new developments to pay impact fees to local school districts to fund improvements associated with school services ensuring impacts to school services are less than significant. Therefore, compliance with current local and State regulations would further reduce impacts to schools. Accordingly, the proposed Project would not result in any new or increased significant impacts relating to police impacts that were not already analyzed in, and fully covered, by the previously certified NEISP EIR.

Park Impacts

At the time of the NEISP EIR adoption, the UMP EIR and City park ordinance required that new development set aside four acres of parkland per 1,000 people. The previously certified NEISP EIR concluded that impacts relative to park facilities would be less than significant because the NEISP did not propose residential development, and therefore, was not required to provide park acreage. The proposed Project would also not include any residential uses, and would not increase the use of existing parks. However, the City of Tracy requires the payment of the project's fair share in-lieu parks fees, as required by the City's General Plan. The collection of fees and determined fair share fee amounts are adopted by the City as COAs for all new development projects prior to project approval. Fees paid aid in the development of new park-space and maintenance as required, to ensure continued high-quality park facilities for all City residents. As such, payment of in-lieu park fees would reduce park impacts further than what was concluded in the NEISP EIR. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. The proposed Project be required to would not result in any new or increased significant impacts relating to parks that were not already analyzed in, and fully covered by, the previously certified EIR.

Gas and Electrical Service Impacts

Impacts relative to gas and electrical service were found to be potentially significant in the previously certified NEISP EIR due to increased energy uses associated with buildout and operation of the specific plan. Accordingly, the NEI EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-2:*** *Applicants for future development Projects shall practice energy efficient building design by including such features as: orientation of structures to summer and winter sunlight to absorb winter solar heat and reflect or avoid summer solar heat, thermal insulation of the wall and attic which meets or exceeds local standards, weather stripping of windows and doors to decreases heat loss, solar assisted domestic hot water and pool heating, tinted or solar reflective double glazing, overhangs on southern elevations , and vegetation on western elevations to provide shading from summer sun [This is Mitigation Measure M 28.4 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure PUB-3:*** *The use of energy efficient street lighting and parking lot lighting shall be considered throughout the TPA to reduce emissions at the power plant [This is Mitigation Measure M 37.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure PUB-4:*** *Low polluting and high efficiency appliances shall be encouraged for development plans whenever possible [This is Mitigation Measure M 37.2 of the UMP EIR in the NEISP EIR].*

Mitigation Measure PUB-5: *As a condition of approval, development applicants shall meet with PG&E to determine optimum energy conservation measures which are still economically feasible that can be implemented with the project [This is Mitigation Measure M 69.1 of the UMP EIR in the NEISP EIR].*

Mitigation Measure PUB-6: *The City of Tracy should work cooperatively in the near-term with PG&E to identify areas suitable for electric and gas facilities needed to accommodate the growth proposed in the UMP [This is Mitigation Measure M 69.2 of the UMP EIR in the NEISP EIR].*

Mitigation Measure PUB-7: *The project applicant shall implement the measures provided within the UMP and UMP EIR to the City's satisfaction prior to the first Site Plan, Parcel Map and or Tentative Map approval [This is Mitigation Measure M 4.11-1 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that the impacts on gas and electrical services would be less than significant (NEISP EIR, pp. 4.101 through 4.108.) Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts would remain less than significant with the above mitigation measure incorporated.

Further, the Project would be subject to significantly more strict regulations regarding energy usage than existed when the NEISP project was approved and the EIR was certified in 1996. For example, the Project design and materials would be required to comply with the 2019 Building Energy Efficiency Standards, which took effect on January 1, 2020. The Project would also be required to adhere to the provisions of CALGreen, which establishes planning and design standards for sustainable site development, energy efficiency (in excess of the California Energy Code requirements), water conservation, material conservation, internal air contaminants, and appliance efficiency regulations.

Accordingly, the proposed Project would not result in any new or increased significant impacts on gas or electrical service that were not already analyzed in, and fully covered by, the previously certified EIR. Instead, given the changes in regulations over the last 25 years, the proposed Project would likely reduce impacts. Therefore, additional environmental review is not required.

Municipal Water Impacts

Impacts relative to municipal water service were found to be potentially significant in the previously certified NEISP EIR due to available water supplies in the City not being adequate to accommodate the growth demands from buildout of the NEISP. Accordingly, the NEI EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-8****: The City shall require maximum use of water conservation measures such as low flow shower-heads, drought tolerant landscaping, and minimal flush toilets in all new development [This is Mitigation Measure M 60.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure PUB-9****: The City shall review all development on a Project by Project basis to ensure that water facilities are adequate to meet Project water service demands [This is Mitigation Measure M 60.3 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure PUB-10:*** *Prior to the approval of the first Site Plan, Parcel and or Tentative Map for the Northeast Industrial project area, the applicant(s) will be required to demonstrate compliance with the approved Water Master Plan or to provide an alternative plan to provide facilities acceptable to the City. Prior to the approval of each Site Plan, Parcel and Tentative Map, the City shall review the Project application to ensure that existing and/or proposed facilities are adequate to meet project service demands, and are consistent with the City's Master Plan or an alternative acceptable to the City. In order to provide adequate facilities to serve individual developments within the Project area, each applicant shall participate in any applicable City-wide or area program, or establish the appropriate funding toward these facilities prior to the recordation of the corresponding Final Map [This is Mitigation Measure 4.11-2 in the NEISP EIR].*
>
> ***Mitigation Measure PUB-11:*** *In order to provide adequate water supplies to the Project, the Project applicants shall participate in any applicable City-wide program to secure the necessary water rights [This is Mitigation Measure 4.11-3 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to municipal water service. Because proposed Project’s impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated.

Additionally, a Hydraulic Evaluation was prepared by West Yost Associates (dated August 12, 2020) to analyze the ability of Tracy’s existing potable water distribution system to meet the required minimum pressures and flows for the proposed Project (see Attachment C for the complete study). The proposed Project would use approximately 174.3 acre feet per year of potable water. According to the Hydraulic Evaluation, the City’s water system can provide adequate flows and pressure, and the City otherwise has capacity to serve the Project’s water demands.

Accordingly, the proposed Project would not result in any new or increased significant impacts relating to municipal water service that were not already analyzed in, and fully covered by, the previously certified EIR. Therefore, additional environmental review is not required.

Wastewater Impacts

Impacts relative to wastewater were found to be potentially significant in the previously certified NEISP EIR due to a lack of detailed information regarding potential impacts to City's wastewater facilities and the possible need for additional services. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-12****: Prior to the approval of the first Site Plan, Parcel and or Tentative Map for the Northeast Industrial project area, the applicant(s) will be required to demonstrate compliance with the approved Wastewater Master Plan or to provide an alternative plan to provide facilities acceptable to the City. Prior to the approval of each Site Plan, Parcel and Tentative Map, the City shall review the Project application to ensure that existing and/or proposed facilities are adequate to meet project service demands, and are consistent with the City's Master Plan or an alternative acceptable to the City. In order to provide adequate facilities to serve individual developments within the Project area, each applicant shall participate in any applicable City-wide or area program, or establish the appropriate funding toward these facilities prior to the recordation of the corresponding Final Map [This is Mitigation Measure 4.11-4 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to wastewater service. Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated.

Additionally, a Sewer Collection System Hydraulic Capacity Analysis was prepared by Black Water Consulting Engineers (dated October 15, 2020) to analyze the ability of Tracy's existing sewer collection system to adequately serve the development of the proposed Project (see Attachment D for the complete study). The proposed Project is part of the MacArthur Sewer System, which collects and conveys sewer flows by the existing sewer pipeline along West Pescadero Avenue and the existing MacArthur Pump Station to the Wastewater Treatment Plant (WWTP). The proposed Project is estimated to generate average dry weather flows (ADWF) of approximately 167,481 gallons per day (gpd) and peak wet weather flows (PWWF) of approximately 458,551 gpd. According to the Sewer Collection System Hydraulic Capacity Analysis, the City's MacArthur Sewer System has sufficient capacity to accommodate sewer flows generated by the Project for the current buildout conditions of the service area and no off-site improvements are necessary to serve the proposed Project.

Accordingly, the proposed Project's impact on wastewater would be less than significant following implementation of Mitigation Measure PUB-12, consistent with the effects of implementation of the NEISP. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Storm Drainage Impacts

Impacts relative to wastewater were found to be potentially significant in the previously certified NEISP EIR due to the conversion of rural land to general commercial and light industrial uses, resulting in a substantial increase in impervious surfaces. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-13:*** *Prior to the approval of the first Site Plan, Parcel and or Tentative Map for the Northeast Industrial project area, the applicant(s) will be required to demonstrate compliance with the approved Storm Drainage Master Plan or to provide an alternative plan to provide facilities acceptable to the City. Prior to the approval of each Site Plan, Parcel and Tentative Map, the City shall review the Project application to ensure that existing and/or proposed facilities are adequate to meet project service demands, and are consistent with the City's Master Plan or an alternative acceptable to the City. In order to provide adequate facilities to serve individual developments within the Project area, each applicant shall participate in any applicable City-wide or area program, or establish the appropriate funding toward these facilities prior to the recordation of the corresponding Final Map [This is Mitigation Measure 4.11-4 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to storm drainage facilities. Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated.

Accordingly, the proposed Project's impact on storm drainage facilities would be less than significant following implementation of Mitigation Measure PUB-13, consistent with the effects of implementation of the NEISP EIR. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Solid Waste Impacts

Impacts relative to solid waste were found to be potentially significant in the previously certified NEISP EIR, as it related to long-term capacity of the Foothill Landfill. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-14:*** *Approval of the Project shall be conditioned on the ability of regional or City solid waste facilities to accommodate waste generated by the Project [This is Mitigation Measure 4.11-6 in the NEISP EIR].*

> ***Mitigation Measure PUB-15:*** *Prior to approval of the first Site Plan, Parcel and or Tentative Map, the Project shall incorporate and participate in the City-wide efforts for recycle and solid waste reduction pursuant to AB 93 9 [This is Mitigation Measure 4.11-7 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to solid waste facilities. Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated.

Accordingly, the proposed Project's impact on solid waste facilities would be less than significant following implementation of Mitigation Measures PUB-14 and -15, consistent with the effects of implementation of the NEISP EIR. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Telephone Service Impacts

Impacts relative to telephone service were found to be potentially significant in the previously certified NEISP EIR. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure PUB-16:*** *Development of the Project shall be contingent upon the availability of the necessary communications services and infrastructure, and the ability of service providers to accommodate development of the site without service interruptions to existing customers. The Project applicant shall demonstrate to the City that they have coordinated with the affected providers for delivery of communications and telephone systems [This is Mitigation Measure 4.11-8 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to solid waste facilities. Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated.

Accordingly, the proposed Project's impact on solid waste facilities would be less than significant following implementation of Mitigation Measure PUB-16, consistent with the effects of implementation of the NEISP EIR. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Library and Other Community Service Impacts

The previously certified NEISP EIR found that impacts to library and other community services would be less than significant since buildout of the NEISP area would not result in a large increase in population. No change to the disposition of impacts associated with the build-out of the NEISP would result from the proposed Project. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. The proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to public services across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, the need for public services that would be generated by the operation of the proposed Project is consistent with the level of need that the NEISP EIR assumed would be generated from eventual development of the Project site with industrial uses pursuant to the NEISP. Therefore, as long as the proposed Project abides by the Specific Plan guidelines, no additional cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

XII. SOCIOECONOMICS -- Would the project:

	Potentially Significant Impact	***Less Than Significant with Mitigation Incorporation***	***Less Than Significant Impact***	***No Impact***	***Reviewed Under Previous Document***
a) Significantly alter the location, distribution density, growth rate of the human population or displace a large number of people?					*X*
b) Significantly affect existing housing?					*X*

RESPONSES TO CHECKLIST QUESTIONS

Threshold (a) Would the project significantly alter the location, distribution density, growth rate of the human population or displace a large number of people?

There are no housing units located on the Project site, and the Project does not propose any housing. The Project site is a vacant, 86-acre site located within the NEISP, which was created to facilitate the buildout of high-quality industrial and commercial area located in the northeast area of Tracy. Since adoption of the NEISP, the NEISP Area has been built out with commercial, industrial, and business park industrial uses. The proposed project would include the development of a multi-story warehouse facility, parking lot, and necessary transportation and utility infrastructure.

The NEISP EIR concluded that buildout of the specific plan area would result in less than significant impact relative to this topic because the growth resulting from additional employment in the area has been long planned for, and included in the UMP and UMP EIR. Further, buildout of the NEISP area would not displace any existing people/residents, or result in any new residential development. The proposed Project involves the same type of industrial uses permitted by the NEISP, and is within the FAR that the NEISP EIR assumed would be developed on the Project site. The Project site does not contain any residential uses, and the approximately 1,900 jobs created by the proposed Project is consistent with the assumptions made in the previously certified NEISP EIR and UMP EIR about the generation of new jobs from the development of the Project site pursuant to the NEISP. Therefore, the proposed Project's impacts relative to this topic would also be less than significant.

Accordingly, the proposed Project would not result in any new or increased significant impacts relative to this topic that were not already analyzed in, and fully covered by, the previously certified NEI EIR. Impacts were considered less than significant for build-out of the NEISP; therefore, impacts would remain less than significant. This finding is supported by the previously certified EIR prepared for the NEISP. Additional environmental review is not required.

Threshold (b) Would the project significantly affect existing housing?

The proposed Project involves the development of a multi-story industrial warehouse in a highly urbanized area of Tracy built out with similar uses. Housing is not proposed. The proposed

Project is located on a site that is entirely within the original project area of the previously certified NEISP EIR, and the NEISP EIR specifically assumed that the proposed Project site would be fully developed with industrial uses. In other words, no land will be disturbed or otherwise be impacted by the proposed Project that the NEISP EIR did not already assume would occur as a result of buildout of the specific plan area. Additionally, the proposed Project is consistent with the land use designations, land use intensity, and building density identified in the NEISP; thus, the impact relative to existing housing would be similar to that identified in the previously certified NEISP EIR.

Impacts relative to this topic were found to be potentially significant in the previously certified NEISP EIR due to existing residential uses in the NEISP area experiencing a dramatic change from a rural to an industrial setting. Accordingly, the NEISP EIR imposed the following mitigation measures:

> ***Mitigation Measure SOC-1:*** *Tracy shall, either as a part of the development review process or as a separate ordinance, require new developments to provide tree shading or other landscape screening of light and glare producing structures or improvements with the exception of permitted signage. Development plans should be reviewed to ensure that trees shade 40 percent of parking areas, that nonreflective building materials are used for all non-signage related structures, and that landscaping screens residential and other sensitive uses from negative effects of glare producing uses such as streets and industrial and commercial areas. Commercial and Industrial projects shall also be reviewed to implement a five-foot perimeter landscaping area adjacent to property lines. [This is Mitigation Measure M 19.1 of the UMP EIR in the NEISP EIR].*
>
> ***Mitigation Measure SOC-2:*** *Prior to approval of Site Plans, Parcel and or Tentative Maps for industrial or commercial properties adjacent to existing residential development, the applicant shall prepare and submit to the Tracy Community Development Department for review and approval a detailed plan to adequately buffer existing residential homes from future industrial or commercial development. This plan shall detail the setback requirements, specific landscaping information (plant species, spacing), noise buffers (please see M 4.9-4), and lighting restrictions and identify the appropriate implementation schedule as acceptable to the City [This is Mitigation Measure 4.12-1 in the NEISP EIR].*

Following the implementation of the foregoing mitigation measures, the NEISP EIR concluded that buildout of the NEISP would result in less than significant impacts to existing housing. Because proposed Project's impact relative to this topic would be similar to those identified in the NEISP EIR, the Project will be required to impose the same mitigation measures set forth above, as applicable. Impacts were considered less than significant with mitigation incorporated for build-out of the NEISP; therefore, impacts for the proposed Project would remain less than significant with the above mitigation measure incorporated. No greater impacts and no change to the disposition of impacts on the build-out of the Project site would occur as a result of the proposed Project. Additional environmental review is not required since this impact was addressed and is consistent with the development density analyzed in the NEISP EIR.

Cumulative Impacts

Through implementation of mitigation measures, impacts related to socioeconomics across the NEISP area were considered less than cumulatively considerable in the previously certified NEISP EIR. As discussed above, the proposed Project would cause neither a new impact to occur, nor an increase in the severity of an impact previously disclosed. Proposed Project-related impacts are consistent with the environmental effects previously identified certified NEISP EIR. The proposed Project would also be consistent with the land use and development regulations contained in the NEISP EIR. Thus, while the proposed Project would change the rural appearance of the site and surrounding area to industrial, so long as the proposed Project abides by the Specific Plan guidelines, no new cumulatively considerable impacts related to the proposed Project would occur. This finding is supported by the previously certified EIR prepared for the NEISP because the proposed Project is consistent with the NEISP. Therefore, the proposed Project would not cause either a new impact to occur, nor an increase in the severity of an impact previously disclosed.

REFERENCES

- Black Water Consulting Engineers, Inc. October 15, 2020. Prologis Big Bird Tracy – NEI Phase 3 G4 +5 Project Sewer Collection System Hydraulic Capacity Analysis.
- City of Tracy. 1993. Tracy Urban Management Plan/General Plan (UMP) and EIR.
- City of Tracy. May 1996. Northeast Industrial Concept Development Plan and Draft EIR.
- City of Tracy. February 2011. City of Tracy General Plan and EIR.
- City of Tracy. June 2018. Majestic Environmental Checklist.
- City of Tracy. May 1996. Northeast Industrial Concept Development Plan and Draft EIR.
- Kimley-Horn and Associates. October 16, 2020. RE: Tracy NEI Phase 3 Traffic Analysis.
- San Joaquin Council of Governments, San Joaquin Multi-Species Habitat Conservation and Open Space Plan. November 14, 2000.
- San Joaquin Valley Air Pollution Control District. Current District Rules and Regulations. Available At: http://valleyair.org/rules/1ruleslist.htm.
- San Joaquin Valley Air Pollution Control District. March 19, 2015. Guide for Assessing and Mitigating Air Quality Impacts (GAMAQI).
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). Available at: http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm
- West Yost Associates. August 12, 2020. RE: Hydraulic Evaluation of Project Big Bird.

ATTACHMENT A

MEMORANDUM

From: Frederik Venter, PE and Colin Ogilvie, Kimley-Horn and Associates

To: Robert Armijo, PE**,** City of Tracy

Date: October 16, 2020

Re: **Tracy NEI Phase 3 Traffic Analysis**

Executive Summary

This memorandum presents a traffic analysis for the proposed NEI Phase 3 project (the "Project"), which proposes to construct a 3,485,401 square-foot warehouse consisting of 1,355,618 square feet of occupied space and 2,129,784 square feet of non-occupied robotic area in the City of Tracy, CA. The project site is located south of Grant Line Road between Skylark Way and Chrisman Road. The project is accessible by following six (6) driveways, with two (2) driveways along Skylark Way, three (3) driveways along Grant Line Road, and one (1) driveway along Chrisman Road.

Based on an employee shift data provided by the project applicant, the project is anticipated to generate 3,573 daily trips, 593 AM peak hour trips (560 In / 33 Out), and 995 PM peak hour trips (494 In / 501 Out) for both passenger cars and truck trips.

The intersection level of service (LOS) was evaluated at sixteen study intersection (6 of which are project driveways) under Existing Conditions, Existing Plus Background Conditions (with and without project), and Cumulative Conditions (with and without project). Under baseline conditions all study intersections operate within acceptable LOS with the exception of the following:

- #3 – MacArthur Drive / Grant Line Road
    - Existing Plus Background Conditions – PM Peak Hour. This baseline deficiency is caused by cut-through traffic.
- #7 – Chrisman Road / Paradise Road
    - Existing Conditions – PM Peak Hour
    - Existing Plus Background Conditions – PM Peak Hour
- #8 – Chrisman Road / Eleventh Street
    - Cumulative Conditions – PM Peak Hour

With the addition of the Project, all study intersections operate within acceptable LOS with the exception of the following for **Existing Plus Background Plus Project** and **Cumulative Plus Project conditions**:

- #3 – MacArthur Drive / Grant Line Road
    - Existing Plus Background Conditions – AM and PM Peak Hours **(Deficiency)**
    - Cumulative Conditions – AM and PM Peak Hours **(Deficiency)**

- #5 – Skylark Way & Grant Line Road
    - Cumulative Conditions – PM Peak Hour **(Deficiency)**
- #6 – Chrisman Road & Grant Line Road
    - Cumulative Conditions – PM Peak Hour **(Deficiency)**
- #7 – Chrisman Road / Paradise Road
    - Existing Plus Background Conditions – PM Peak Hour (Not a Deficiency)
- #8 – Chrisman Road & Eleventh Street
    - Cumulative Conditions – AM and PM Peak Hours **(Deficiency)**

Under **Existing Plus Background Plus Project Conditions**, the following improvements are recommended to address the deficiencies at each intersection:

- #3 – MacArthur Drive / Grant Line Road – Construct a westbound right-turn lane with an overlap and optimize the cycle length. With the improvement, the intersection will operate at an acceptable LOS D in the AM peak hour and will operate at a LOS E, better than without project conditions, in the PM peak hour.

Under **Cumulative Plus Project Conditions**, the following improvements are recommended to address the deficiencies at each intersection:

- #3 – MacArthur Drive / Grant Line Road – Optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS C and LOS D in the AM and PM peak hour, respectively.
- #5 – Skylark Way & Grant Line Road – Optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS D in the PM peak hour.
- #6 – Chrisman Road & Grant Line Road – Optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS D in the PM peak hour.
- #8 – Chrisman Road & Eleventh Street – Additional second westbound left turn lane to be constructed and the signal timing be modified to allow lagging phase for the eastbound left turn and northbound left turn. With the improvement, the intersection will operate at an acceptable LOS D in the AM and PM peak hours.

This analysis also evaluated whether the Project trip addition to the overall NEI Specific Plan (SP) still falls with the NEI SP EIR assumptions for overall trip generation, especially since the trip generation for the project is high. The analysis determines that based on an assessment of the trip generation for the existing development, and vacant land that could still develop, and with the addition of the project, the overall trip generation would be less than was assumed in the NEI SP EIR.

1. Introduction

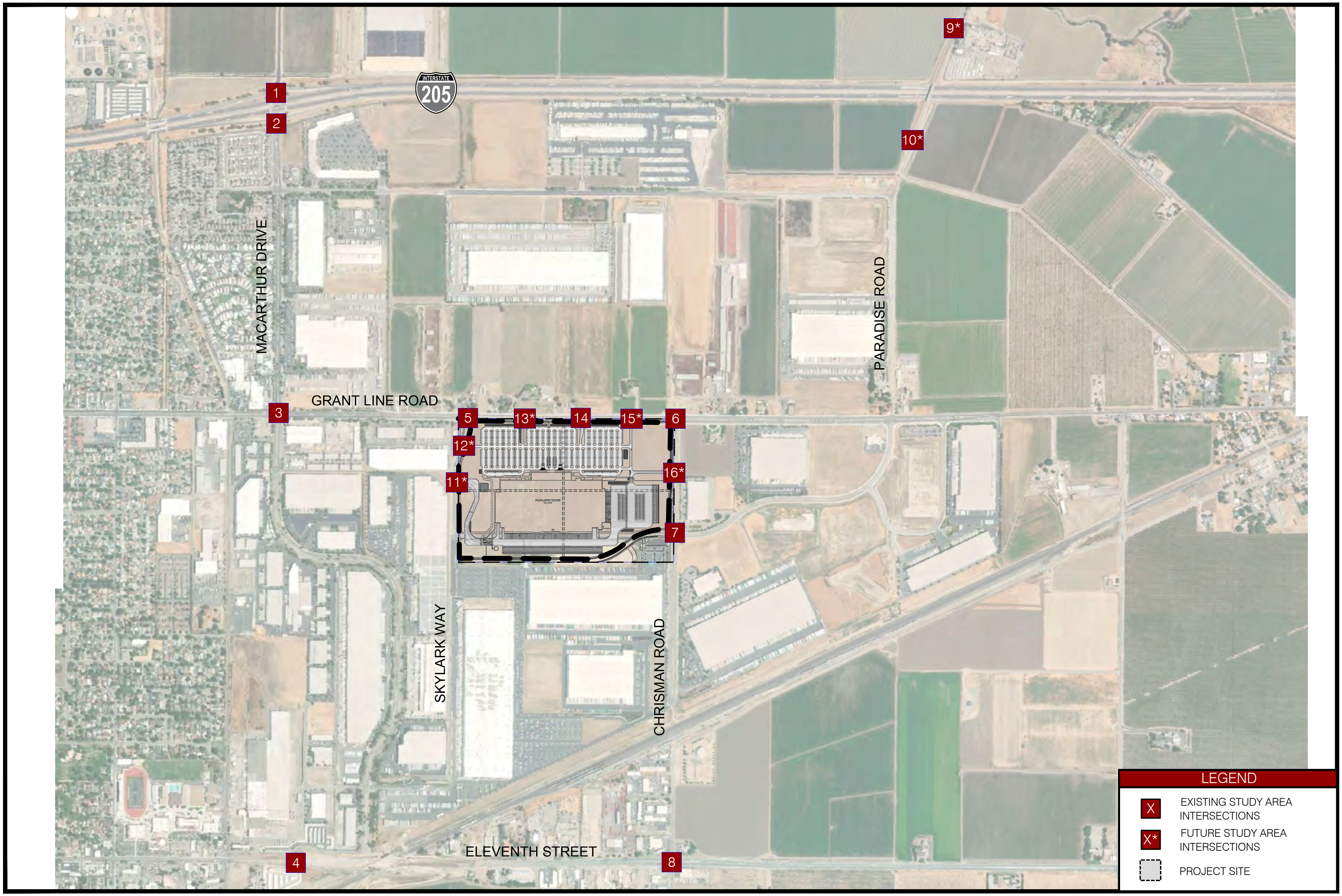
This memorandum presents a traffic analysis of the proposed Northeast Industrial Specific Plan area (NEI) Phase 3 development in the City of Tracy, CA and is located on the vacant lot bounded by Grant Line Road to the north, Paradise Road to the south, Skylark Way to the west, and Chrisman Road to the east. The proposed project ("Project") would develop a five-story warehouse for a total of 3,485,402 square feet, consisting of 1,355,618 square feet of occupied space and 2,129,784 square feet of non-occupied robotic area. **Figure 1** illustrates the location of the project site and study intersections in relation to the adjacent roadway network.

Figure 2 illustrates the project site plan, as provided by Kier+Wright. The site would be accessed by the following six (6) driveways, with two (2) driveways along Skylark Way, three (3) driveways along Grant Line Road, and one (1) driveway along Chrisman Road.

- Driveway #1 at Skylark Way – Full access
- Driveway #2 at Skylark Way – Full access
- Driveway #3 at Grant Line Road – Limited to a right-in and right out movement
- Driveway #4 at Grant Line Road – Full access
- Driveway #5 at Grant Line Road – Limited to a right-in and right out movement
- Driveway #6 at Chrisman Road – Limited to a right-in and right out movement

Driveway #1 is for truck and trailer access only while the remaining driveways are for passenger car access only. In the case of emergencies, trucks and trailers are able to enter and exit using Driveway #6 on Chrisman Road.

This traffic study was conducted to determine the potential intersection and queuing deficiencies related to the project based on standards and methodologies set forth by the City of Tracy ("City"). This memorandum discusses the methodology, analysis, and results of the study. It should be noted that recent changes under the California Environmental Quality Act (CEQA), vehicle miles traveled (VMT) is now recognized as the primary review for project impacts and no longer intersection level of service (LOS).



Kimley»Horn

N

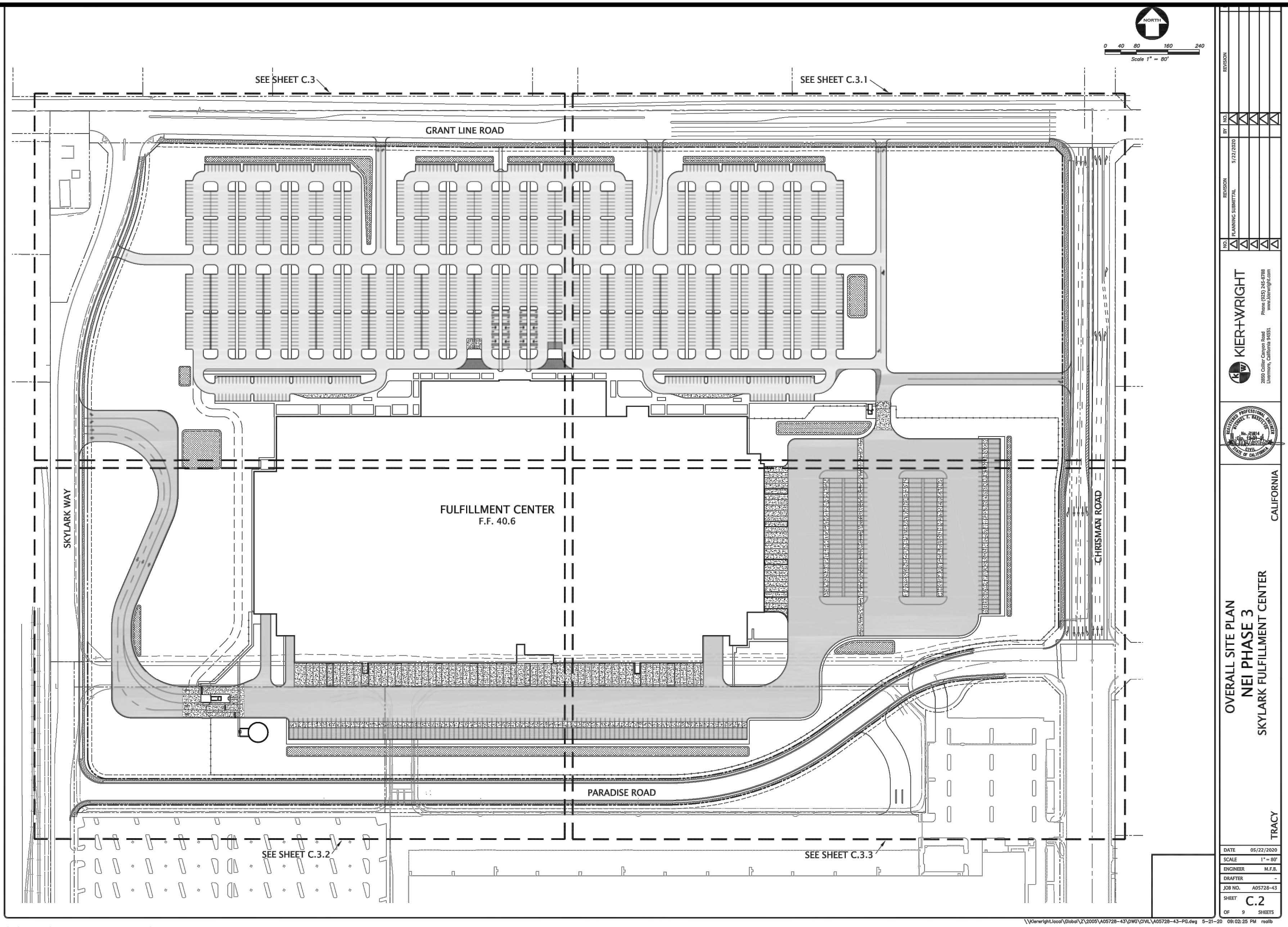
NOT TO SCALE

FIGURE 1

PROJECT LOCATION AND STUDY INTERSECTIONS

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



SOURCE: KEIR+WRIGHT

Kimley»Horn

N

NOT TO SCALE

FIGURE 2

SITE PLAN

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

2. Study Methodology

2.1 Development Conditions

This traffic study is based upon the following development conditions:

- **Existing (2020) Conditions** represents current traffic count data collected using Streetlight Data and previous 2018 and 2019 traffic counts as well as existing roadway geometry and traffic control.
- **Existing Plus Background Conditions** represents current traffic count data collected using Streetlight Data and previous 2018 and 2019 traffic counts with the addition of approved (but not yet completed) developments assumed to occur at the time the Project is constructed. These projects include Tracy Alliance (excluding the Zuriakat and Suvik buildings because they are expected to develop after the next 5 years), IPT Pescadero Building 2, Central Plastics, Seefried Properties, California Highway Patrol (CHP) Office, Home Depot Parking Lot, and Interstate Truck Center. This scenario includes roadway improvements anticipated to be in place at the same time the Project is to be completed, as assumed for the Background projects.
- **Existing Plus Background Plus Project Conditions** represents Existing Plus Background traffic conditions and traffic generated by the project. This scenario includes roadway improvements anticipated to be in place at the same time the Project is to be completed.
- **Cumulative (2035) Conditions** represents future year traffic volumes based on the City of Tracy Citywide Roadway and Transportation Master Plan (TMP) dated November 2012. This scenario includes roadway improvements anticipated to be in place under Cumulative Conditions.
- **Cumulative (2035) Plus Project Conditions re**presents future year traffic volumes based on the City of Tracy Citywide Roadway and Transportation Master Plan (TMP) and traffic generated by the Project. This scenario includes roadway improvements anticipated to be in place under Cumulative Conditions.

2.2 Level of Service Standards

Analysis of the study intersection was based on the concept of level of service (LOS) and is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Levels of service for this study were determined using methods defined in Synchro analysis software, using the Highway Capacity 6th Edition (HCM 6th) methodology.

The HCM includes procedures for analyzing side street stop controlled (SSSC), all-way stop controlled (AWSC), and signalized intersections. The SSSC procedure defines LOS as a function of average control delay for the worst minor street movement or major street left-turn. Conversely, the AWSC and signalized intersection procedures define LOS as a function of average control delay for the intersection as a whole. **Table 1** relates the operational characteristics associated with each LOS category for signalized and unsignalized intersections.

Table 1 - Intersection Level of Service Definitions

Level of Service	Description	Signalized (Avg. control delay per vehicle sec/veh.)	Unsignalized (Avg. control delay per vehicle sec/veh.)
A	Free flow with no delays. Users are virtually unaffected by others in the traffic stream	≤ 10	≤ 10
B	Stable traffic. Traffic flows smoothly with few delays.	> 10 – 20	> 10 – 15
C	Stable flow but the operation of individual users becomes affected by other vehicles. Modest delays.	> 20 – 35	> 15 – 25
D	Approaching unstable flow. Operation of individual users becomes significantly affected by other vehicles. Delays may be more than one cycle during peak hours.	> 35 – 55	> 25 – 35
E	Unstable flow with operating conditions at or near the capacity level. Long delays and vehicle queuing.	> 55 – 80	> 35 – 50
F	Forced or breakdown flow that causes reduced capacity. Stop and go traffic conditions. Excessive long delays and vehicle queuing.	> 80	> 50

Sources: Transportation Research Board, *Highway Capacity Manual 6th*, National Research Council 2016.

As noted above, intersection delay and LOS is no longer used as the analysis methodology to determine impacts. Therefore, project related intersection LOS impacts will be referred to as deficiencies. Project deficiencies are determined by comparing conditions without the Project to those with the Project. Deficiencies for intersections are created when traffic from the Project causes the LOS to fall below the maintaining agency's LOS threshold or causes intersections to deteriorate further per the criteria indicated below.

City of Tracy

The City of Tracy General Plan has established a LOS D, where feasible, as the minimum acceptable LOS for roadways and overall intersection operations. However, there are certain locations where this standard does not apply. The following provides a list and description of exceptions to the LOS D standard:

- LOS E or lower shall be allowed on streets and at intersections within ¼ mile of any freeway, to discourage inter-regional traffic from using City streets.
- In the Downtown and Bowtie area of the City of Tracy, LOS E shall be allowed in order to create a pedestrian-friendly urban design character and densities necessary to support transit, bicycling, and walking.
- The City may allow individual locations to fall below the City's LOS D standard at intersections where construction of improvements is not feasible, prohibitively expensive, significantly impact adjacent properties or the environment, or have a significant adverse impact on the character of the community, including pedestrian mobility, crossing times, and comfort/convenience.

Intersections may be permitted to fall below their adopted LOS standard on a temporary basis when the improvements necessary to preserve the LOS standard are in the process of construction or have been designed and funded but not yet constructed.

Deficiency Criteria - Signalized Intersections

- Signalized intersections operating at an acceptable level of service (LOS D or better if located more than ¼ mile from a freeway) degrade to an unacceptable LOS E or F.
- Addition of project trips causes a delay increase of more than four seconds to an intersection already operating at an unacceptable level of service.

Deficiency Criteria - Unsignalized Intersections

- Unsignalized intersections, outside ¼ mile of a freeway, operating at LOS D or better degrade to an unacceptable LOS E or worse with the proposed project and a traffic signal warrant is met. Or if the intersection is within ¼ mile of a freeway operating at LOS E or better and degrades to an unacceptable LOS F with the proposed project and a traffic signal warrant is met.
- Addition of Project trips causes a volume increase of more than 10 percent at an intersection operating at an unacceptable level of service and meets a traffic signal warrant.

Caltrans

For the Caltrans facilities, the previous Guide for the *Preparation of Traffic Impact Study (2002)*, was used for operational analysis. Caltrans identifies a level of service threshold of C/D as the acceptable service level on state highway facilities. However, Caltrans acknowledges that this may not always be feasible and recommends that the lead local agency consult with Caltrans to determine the appropriate target LOS. For the purpose of this analysis, the LOS criteria for LOS D will be established for Caltrans intersections based on the *Transportation Concept Report for Urban Interchanges* for Interstate 205. This analysis of the Caltrans facilities is consistent with the City General Plan policies and guidelines.

2.4 Study Intersections

The proposed project would generate new vehicular trips that would increase traffic volumes on the nearby street network. To assess changes in traffic conditions associated with the proposed project, the following intersections in **Table 2** were evaluated. These study intersections were selected because the project would contribute a significant number of vehicle trips to the intersections. The list of study intersections was approved by the City.

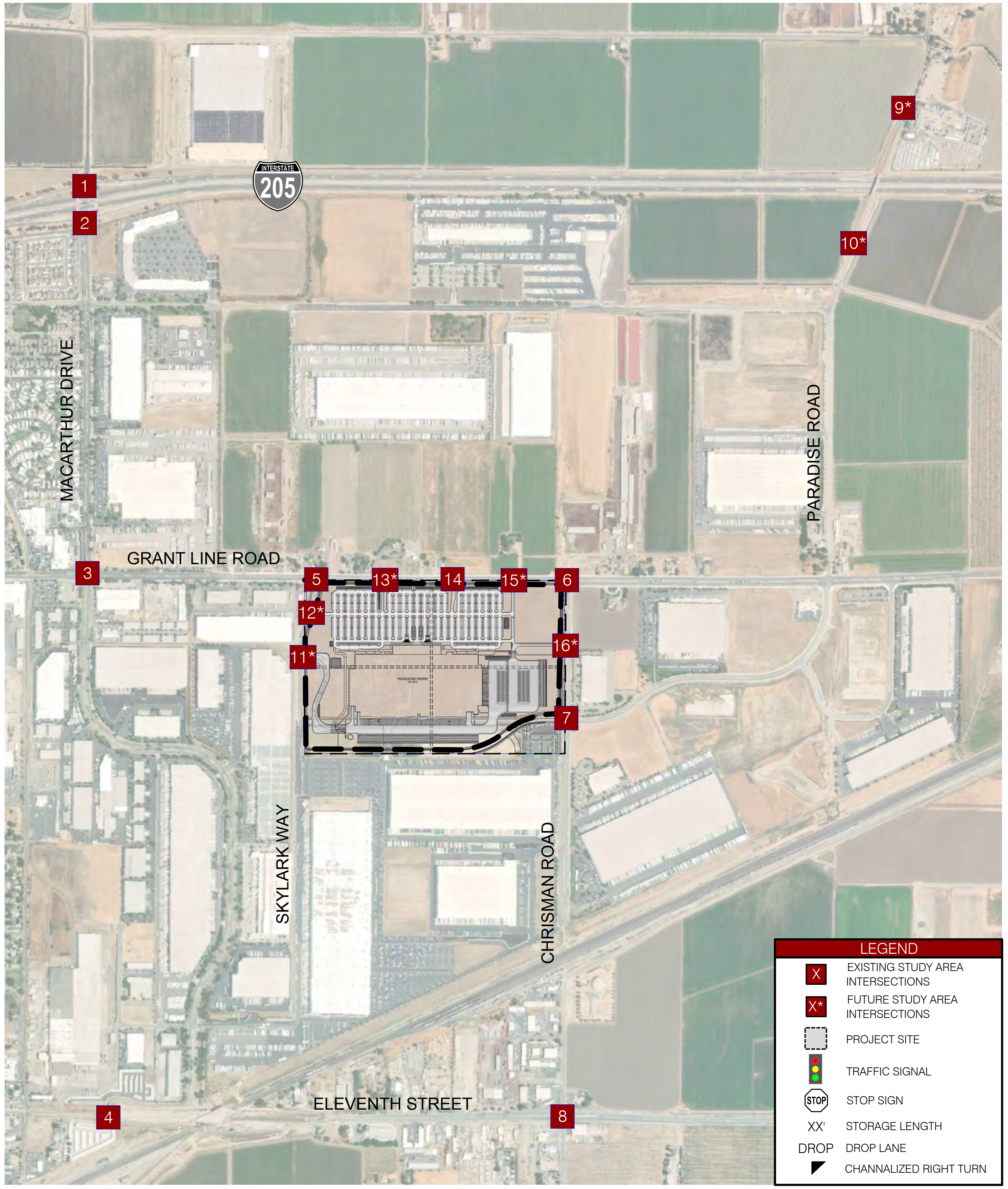
Table 2 - Study Intersections

#	Intersection	Existing or Future Intersection
1	MacArthur Drive & I-205 Westbound Ramps	Existing
2	MacArthur Drive & I-205 Eastbound Ramps	Existing
3	MacArthur Drive & Grant Line Road	Existing
4	MacArthur Drive & Eleventh Street	Existing
5	Skylark Way & Grant Line Road	Existing
6	Chrisman Road & Grant Line Road	Existing
7	Chrisman Road & Paradise Road	Existing
8	Chrisman Road & Eleventh Street	Existing
9	Paradise Rd/Chrisman Rd & I-205 Westbound Ramps	Future Intersection
10	Paradise Rd/Chrisman Rd & I-205 Eastbound Ramps	Future Intersection
11	Driveway #1 & Skylark Way	Future Project Driveway
12	Driveway #2 & Skylark Way	Future Project Driveway
13	Driveway #3 & Grant Line Road	Future Project Driveway
14	Driveway #4 & Grant Line Road	Future Project Driveway
15	Driveway #5 & Grant Line Road	Future Project Driveway
16	Driveway #6 & Chrisman Road	Future Project Driveway

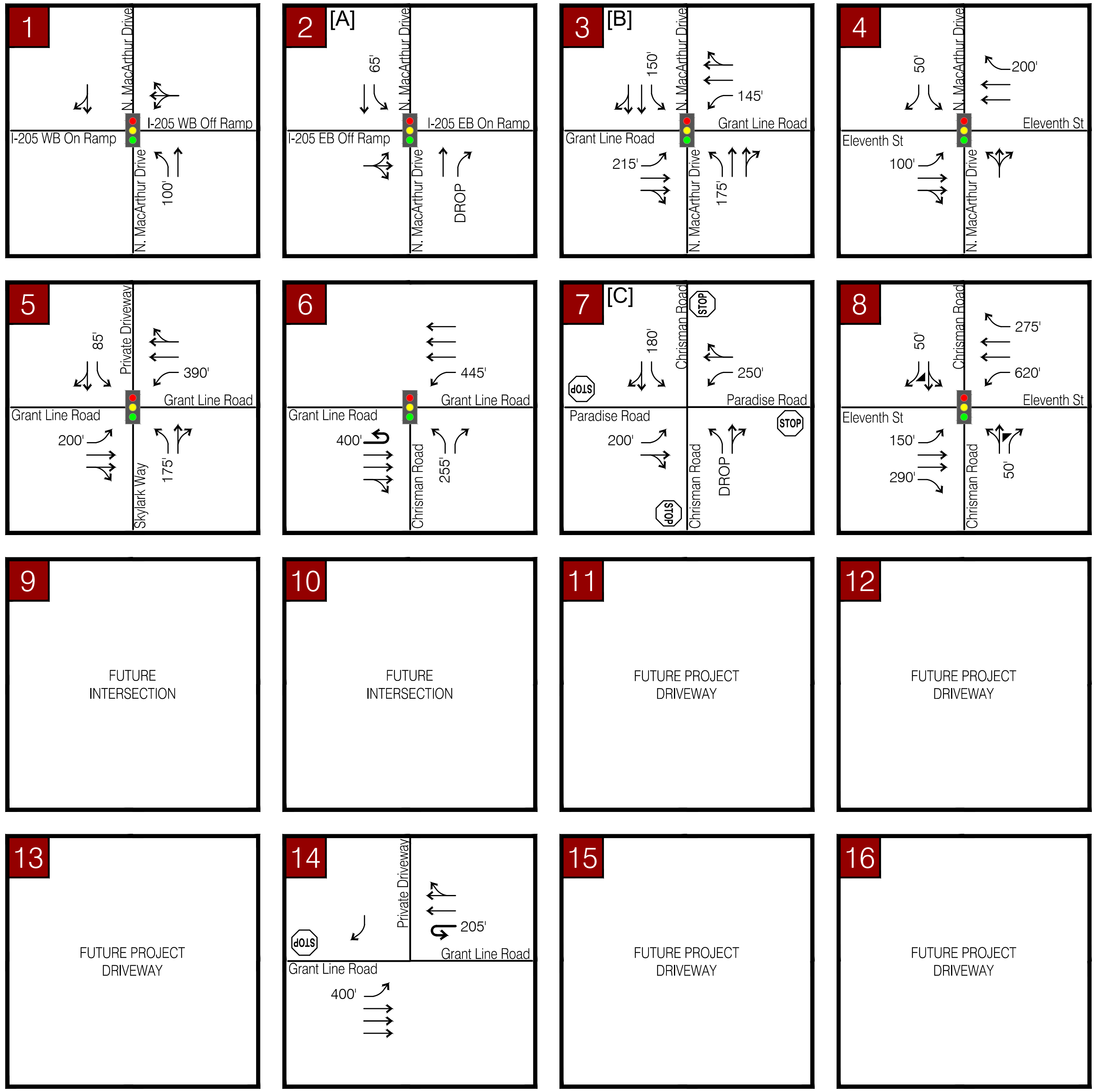
3. Existing (2020) Conditions

Weekday intersection turning movement volumes were not collected since current traffic patterns do not reflect typical conditions due to the COVID-19 shelter-in-place restrictions. Therefore, Streetlight Data and historical traffic counts were utilized for Existing traffic volumes. Streetlight data was collected at all study intersections with the exception of Chrisman Road/Grant Line Road and Chrisman Road/Paradise Road where peak hour turning movement volumes were collected in February 2019 and February 2018, respectively. It should be noted that the FEMA Distribution Center, located just north of the proposed project, is currently inhabited and is reflected in the existing traffic counts. However, since existing traffic counts were not collected at Intersection #14 (Future Project Driveway), where the FEMA Distribution Center driveway is located on the north leg, anticipated traffic generated by the FEMA Distribution Center was added to the study intersection. All other project driveways are currently not in use and therefore will be analyzed in the plus project scenario.

Existing traffic control and lane geometry are shown in **Figure 3,** while the existing AM and PM peak hour turning movement volumes are shown in **Figure 4**. Traffic volume data sheets are provided in the **Appendix**.



[A]The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.



[A]The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

[B]The northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) movement is analyzed as one left turn, two through, and one right turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure..

[C]The northbound (NB) approach is analyzed as one NBL, one NBT, and one NBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

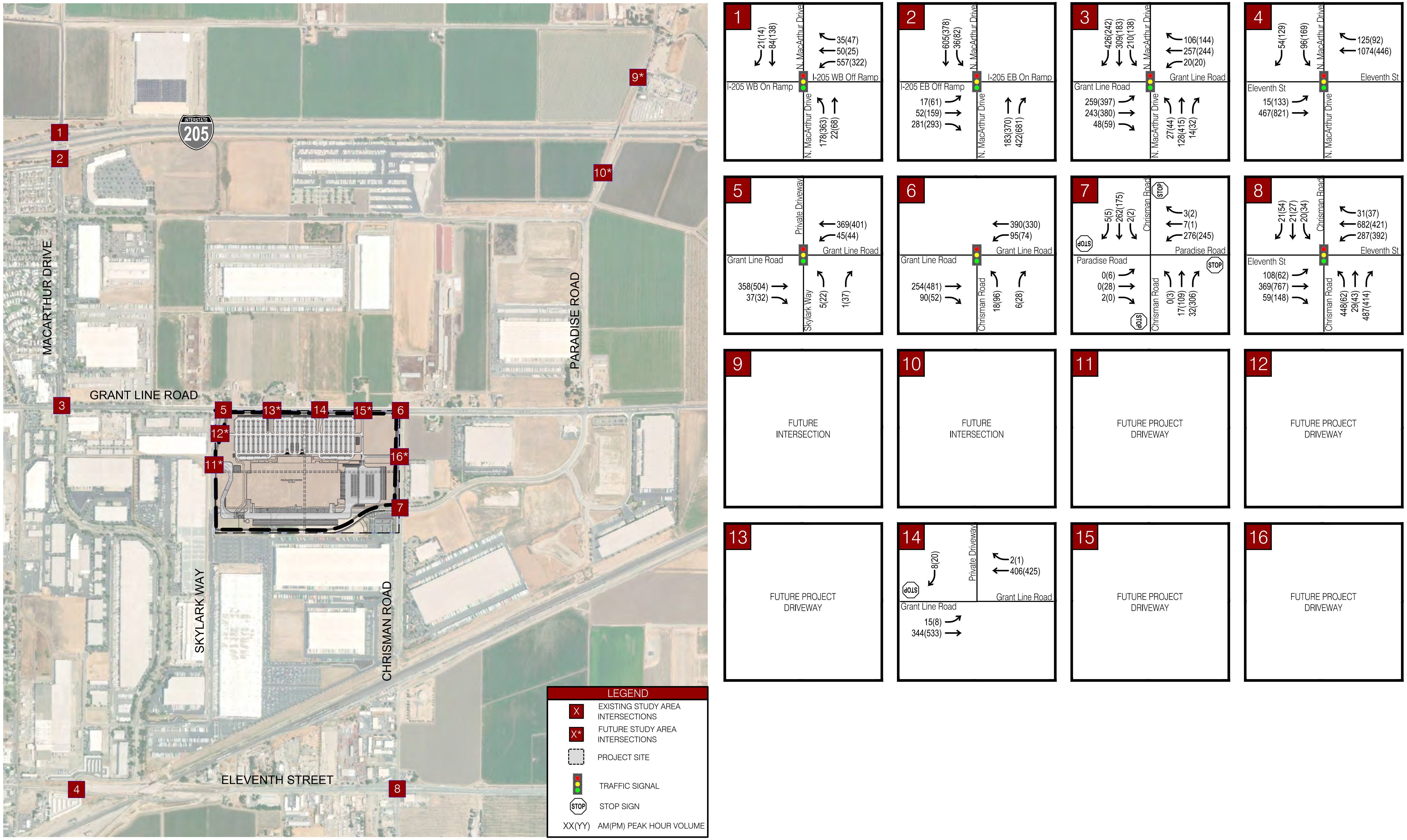
Kimley»Horn

N
NOT TO SCALE

FIGURE 3
EXISTING LANE GEOMETRY AND TRAFFIC CONTROL

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

097008270 SEPTEMBER 2020

FIGURE 4
EXISTING PEAK HOUR TURNING MOVEMENT VOLUMES

TRACY NEI PHASE 3

Existing Conditions traffic operations were evaluated at the study intersections using existing lane geometry, traffic control, and peak hour traffic volumes. **Table 3** illustrates the Level of Service (LOS) and delay under existing conditions and locations operating unacceptably are bolded. As shown in **Table 3**, all study intersection function within acceptable LOS standards under this analysis scenario, except for the following intersection:

- #7 – Chrisman Road / Paradise Road (PM Peak Hour)

Analysis sheets are provided in the **Appendix**.

Table 3 – Existing Conditions Level of Service

#	Intersection[1]	LOS Standard[2]	Jurisdiction	Control Type[3]	Existing (2020) Conditions			
					AM Peak Hour		PM Peak Hour	
					LOS	Delay[4]	LOS	Delay[4]
1	MacArthur Drive & I-205 WB Ramps	D	Caltrans	Signal	C	20.8	B	19.2
2	MacArthur Drive & I-205 EB Ramps	D	Caltrans	Signal	B	12.3	C	26.8
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	C	29.5	D	39.8
4	MacArthur Drive & Eleventh Street	D	Tracy	Signal	A	8.7	B	14.8
5	Skylark Way & Grant Line Road	D	Tracy	Signal	A	4.7	A	7.2
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	A	8.7	B	10.5
7	Chrisman Road & Paradise Road	D	Tracy	AWSC	B	15.0	**E**	**45.9**
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	37.4	C	28.7
9	Chrisman Rd & I-205 WB Ramps	D	Caltrans	-	Future Intersection			
10	Chrisman Rd & I-205 EB Ramps	D	Caltrans	-	Future Intersection			
11	Driveway #1 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
12	Driveway #2 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
13	Driveway #3 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
14	Driveway #4 & Grant Line Road	D	Tracy	SSSC	A	0.3	A	0.3
	Worst Approach (SB)				A	9.8	B	10.0
15	Driveway #5 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
16	Driveway #6 & Chrisman Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

1. Analysis performed using HCM 6th edition methodology with the exception of Intersection #6 which was analyzed in HCM 2000.
2. Overall level of service (LOS) standard for City of Tracy and Caltrans intersections is LOS D.
3. SSSC - Side Street Stop Control and AWSC – All-Way Stop Control.
4. Delay indicated in seconds/vehicle. In addition to average control delay, which is reported for signalized, AWSC, and SSSC intersections, the delay for the worst movement is also reported for SSSC intersections.

4. Existing Plus Background Conditions

In the Existing Plus Background Conditions, the following approved (but not yet developed) projects within the study area were included as part of the Background projects since these projects will contribute to traffic volumes at the study intersections:

- Tracy Alliance (Excluding the Zuriakat and Suvik Buildings)
- IPT Pescadero Building 2
- Central Plastics
- Seefried Properties
- California Highway Patrol (CHP) Office
- Home Depot Parking Lot
- Interstate Truck Center

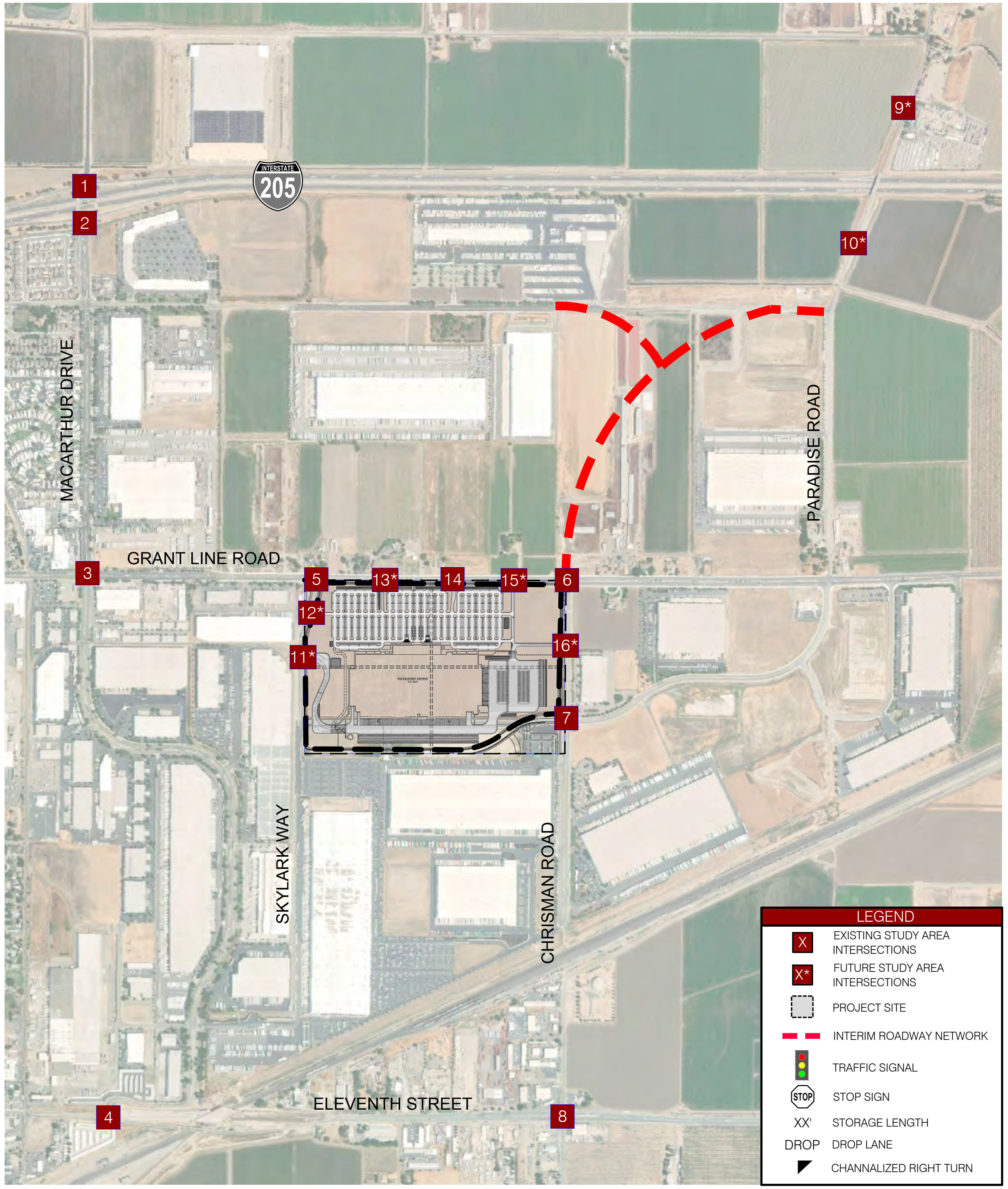
In the Existing Plus Background Conditions, Chrisman Road at Grant Line Road will extend to the north connecting to the intersection of Pescadero Avenue and Paradise Road. As a result, the intersection of Chrisman Road and Grant Line Road (Intersection #6) will be restriped to convert the eastbound U-turn to an eastbound left turn, the northbound right turn to a shared northbound through/right turn, construct an additional westbound right-turn, and a new north leg will be constructed consisting of a shared southbound through/left turn and a southbound right turn. The extension of Chrisman Road will result in a shift in Existing volumes which were reassigned to the street network.

Existing Plus Background traffic control and lane geometry is shown in **Figure 5.** Existing Plus Background AM and PM peak hour turning movement volumes are shown in **Figure 6**.

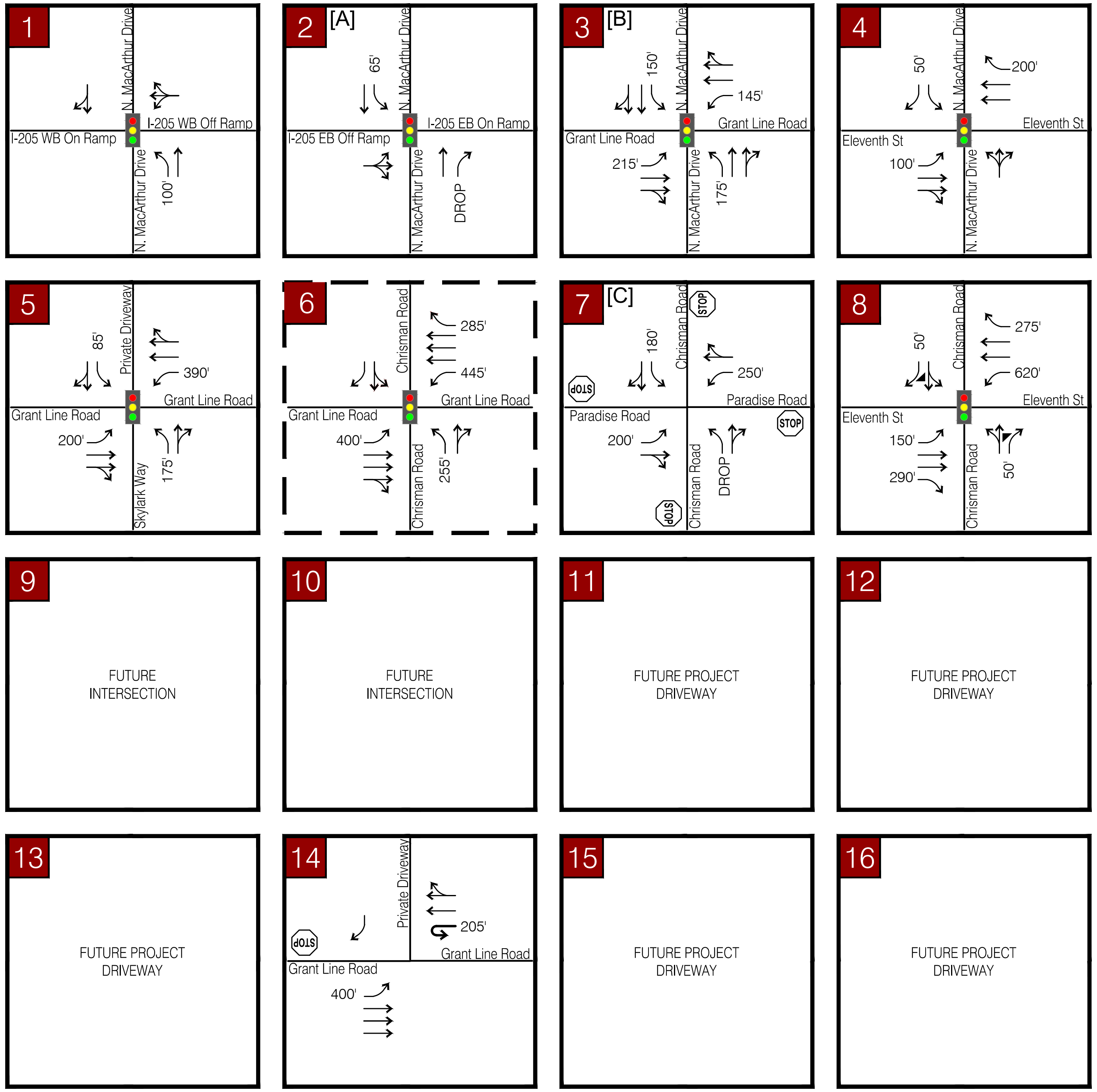
Existing Plus Background Conditions traffic operations were evaluated at the study intersections and the results are presented in **Table 4.** All study intersections function within acceptable LOS standards under this analysis scenario, except for the following intersections:

- #3 – MacArthur Drive / Grant Line Road (PM Peak Hour)
- #7 – Chrisman Road / Paradise Road (PM Peak Hour)

Analysis sheets are provided in the **Appendix**.



Note: Dashed intersection boxes reflect changed conditions from Existing Conditions.



[A] The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

[B] The northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) movement is analyzed as one left turn, two through, and one right turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure..

[C] The northbound (NB) approach is analyzed as one NBL, one NBT, and one NBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

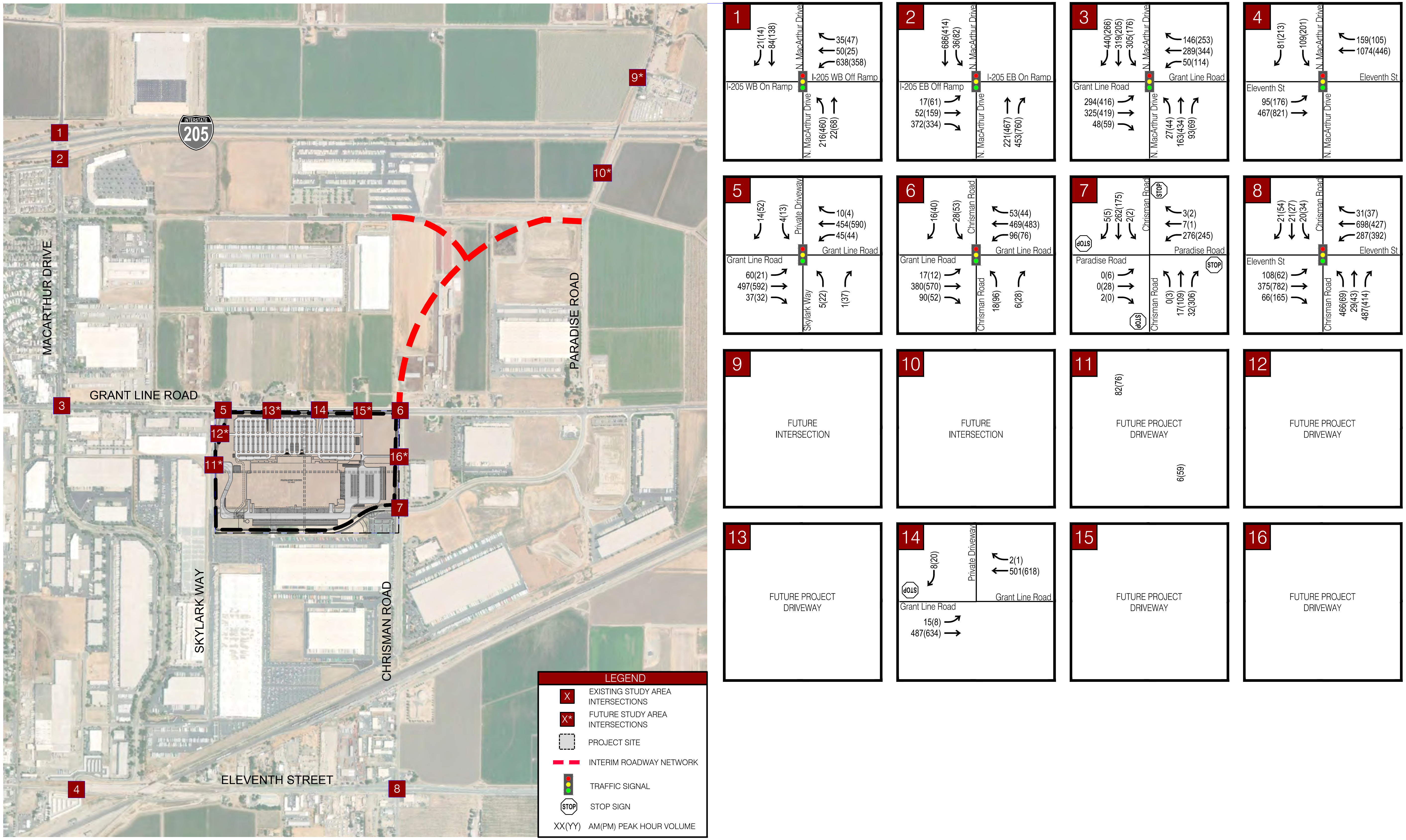
Kimley»Horn

NOT TO SCALE

FIGURE 5
EXISTING PLUS BACKGROUND LANE GEOMETRY AND TRAFFIC CONTROL

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

N

NOT TO SCALE

FIGURE 6

EXISTING PLUS BACKGROUND PEAK HOUR TURNING MOVEMENT VOLUMES

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

Table 4 – Existing Plus Background Conditions Level of Service

#	Intersection[1]	LOS Standard[2]	Jurisdiction	Control Type[3]	Existing + Background Conditions			
					AM Peak Hour		PM Peak Hour	
					LOS	Delay[4]	LOS	Delay[4]
1	MacArthur Drive & I-205 WB Ramps	D	Caltrans	Signal	C	32.0	C	27.8
2	MacArthur Drive & I-205 EB Ramps	D	Caltrans	Signal	B	17.2	D	40.0
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	D	41.8	**E**	**63.2**
4	MacArthur Drive & Eleventh Street	D	Tracy	Signal	B	11.4	B	18.8
5	Skylark Way & Grant Line Road	D	Tracy	Signal	A	9.9	B	13.5
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	B	14.3	B	19.7
7	Chrisman Road & Paradise Road	D	Tracy	AWSC	B	15.0	**E**	**45.9**
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	39.6	C	29.3
9	Chrisman Rd & I-205 WB Ramps	D	Caltrans	-	Future Intersection			
10	Chrisman Rd & I-205 EB Ramps	D	Caltrans	-	Future Intersection			
11	Driveway #1 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
12	Driveway #2 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
13	Driveway #3 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
14	Driveway #4 & Grant Line Road	D	Tracy	SSSC	A	0.2	A	0.2
	Worst Approach (SB)				B	10.2	B	10.9
15	Driveway #5 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
16	Driveway #6 & Chrisman Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.

1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy and Caltrans intersections is LOS D.
3. SSSC - Side Street Stop Control and AWSC – All-Way Stop Control.
4. Delay indicated in seconds/vehicle. In addition to average control delay, which is reported for signalized, AWSC, and SSSC intersections, the delay for the worst movement is also reported for SSSC intersections.

5. Existing Plus Background Plus Project Conditions

5.1 Project Lane Geometry and Configuration

In Plus Project Conditions, the proposed project will construct the following roadway improvements:

- Chrisman Road between Grant Line Road to south of Paradise Road will be widened from one lane in each direction with a two-way left-turn lane (TWLTL) to three lanes in each direction:
    - #6 – Chrisman Road / Grant Line Road will be reconfigured to:
        - Northbound Approach – one left turn, two throughs, and one right turn lane
        - Southbound Approach – one left turn, two throughs, and one right turn lane
    - #7 – Chrisman Road / Paradise Road will be reconfigured to:
        - Northbound Approach – one left turn, two throughs, and one shared through/right turn lane. However, one through lane will be hatched out during Existing Plus Background Plus Project Conditions but will be allowed for use in Cumulative Conditions
        - Southbound Approach – one left turn, three throughs, and one right turn lane. However, two through lanes will be hatched out during Existing Plus Background Plus Project Conditions but will be allowed for use in Cumulative Conditions
- #14 – Grant Line Road / Driveway #4 will be converted from a SSSC to a signalized intersection

Existing Plus Background Plus Project traffic control and lane geometry is shown in **Figure 7**.

5.2 Trip Generation

Trip generation for projects are typically calculated based on information contained in the Institute of Transportation Engineer's (ITE) publication, *Trip Generation*, 10th Edition. However, a custom trip generation was developed based on employee shift data provided by the project applicant to more accurately reflect the trips generated by the project. The data provides average weekday trips for both cars and trucks entering and exiting the project site which were then used to estimate the AM and PM peak hour trips. It should be noted that this study relies on the completeness and accuracy of the information provided by the project applicant and the City. Therefore, in the event that the project applicant finds the employee shift data no longer accurate, this study will no longer be valid and an additional traffic analysis should be completed. Employee shift data is provided in the **Appendix**.

The proposed project is anticipated to generate 3,573 daily trips, 593 AM peak hour trips (560 In / 33 Out), and 995 PM peak hour trips (494 In / 501 Out) for both passenger cars and truck trips. **Table 5** shows the estimated trip generation.

Table 5 – Project Trip Generation

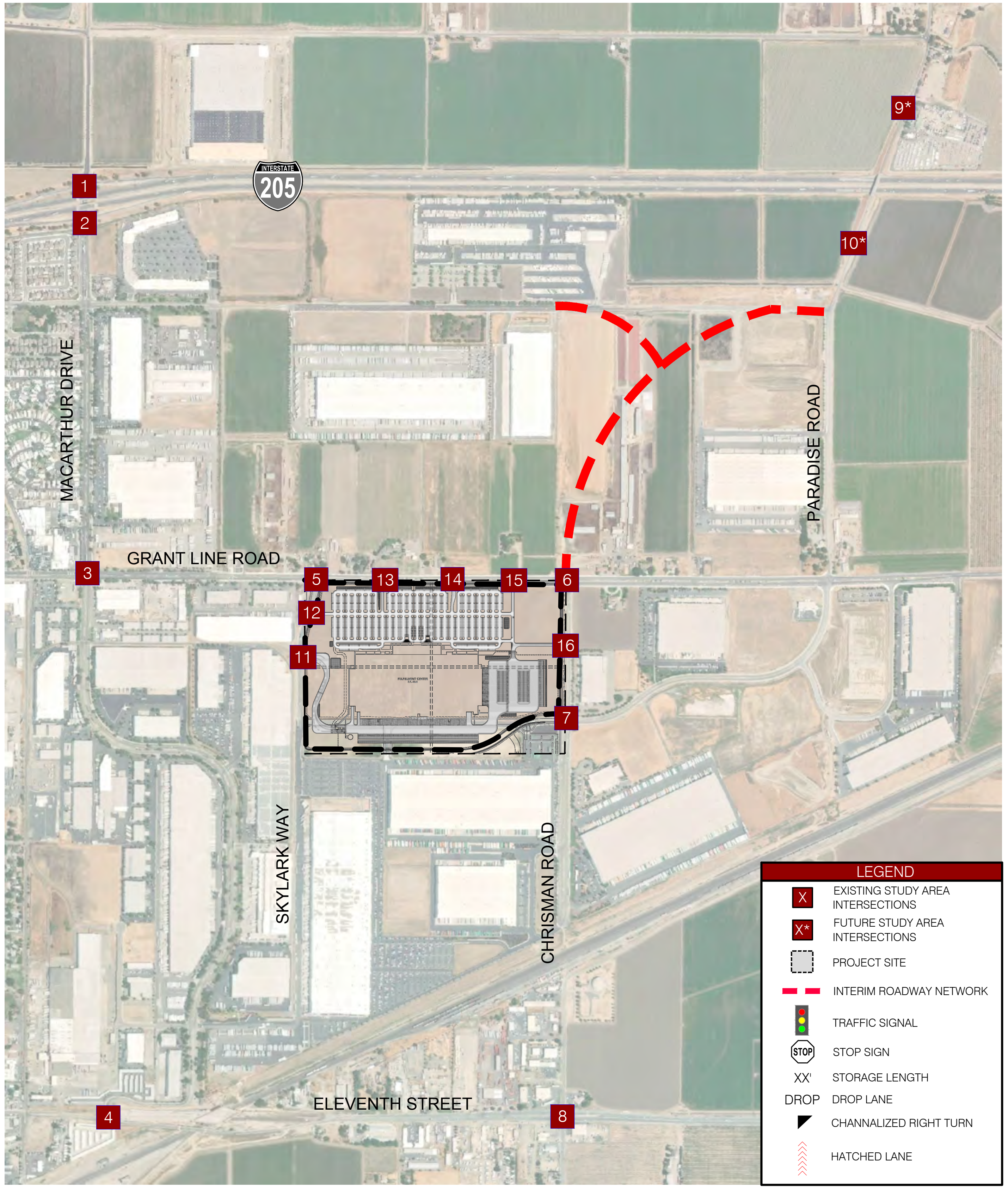
Land Uses	Project Size		DAILY	AM PEAK HOUR				PM PEAK HOUR			
			Total	Total Peak Hour	IN	/	OUT	Total Peak Hour	IN	/	OUT
NEI Phase 3 - Cars	3,485	KSF	3,013	573	550	/	23	979	486	/	493
NEI Phase 3 - Trucks			560	20	10	/	10	16	8	/	8
NEI Phase 3 - Total			**3,573**	**593**	**560**	**/**	**33**	**995**	**494**	**/**	**501**

Source: Kimley-Horn and Associates, Inc., 2020

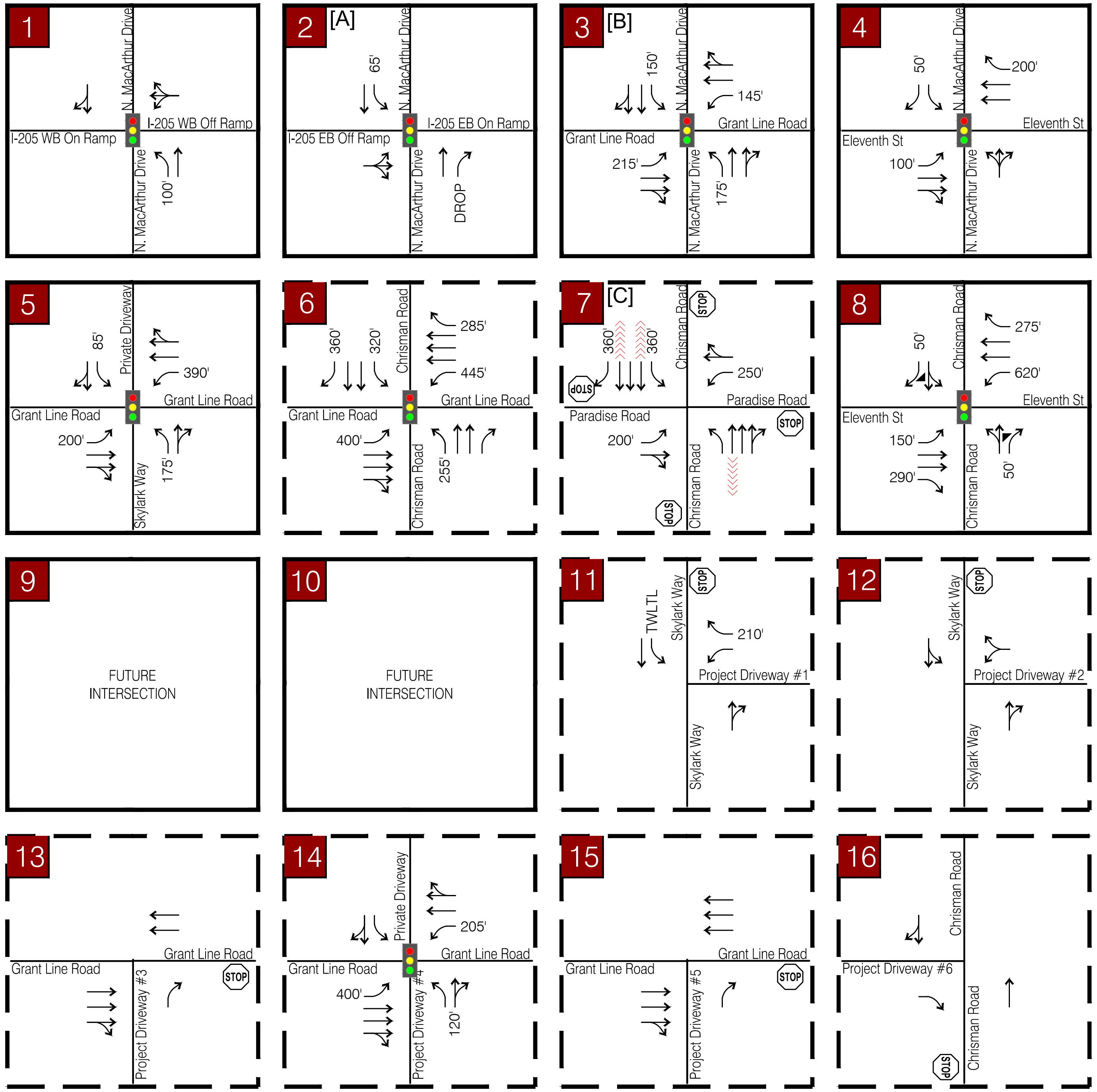
5.3 Trip Distribution and Assignment

The project trip distribution for the proposed project was based on existing City travel patterns, circulation access to Interstate 205, and the City Travel Demand Model. Two different trip distributions were developed, one for passenger cars and one for trucks. For passenger cars, it is estimated that there will be a 78 percent distribution going to and from west of the project site and 22 percent distribution going to and from east of the project site. For trucks, it is assumed that there will be a 66.67 percent distribution going to and from west of the project site and a 33.33 percent distribution going to and from south of the project site. Trucks are not allowed along Grant Line Road just east of the City Limits, therefore trucks going to and from north and south I-5 will use Eleventh Street rather than Grant Line Road.

Figure 8 illustrates the trip distribution assumed for Existing Plus Background Plus Project analysis. It should be noted that there is a different trip distribution for the Cumulative project conditions due to future roadway improvements. This will be discussed later in the memo in the Cumulative Traffic Conditions section. **Figure 9** and **Figure 10** illustrates the trip assignment for Existing Plus Background Plus Project Conditions for passenger cars and trucks, respectively. Existing Plus Background Plus Project AM and PM peak hour turning movement volumes are shown in **Figure 11**.



Note: Dashed intersection boxes reflect changed conditions from Background Conditions.



[A] The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

[B] The northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) movement is analyzed as one left turn, two through, and one right turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure..

[C] The southbound (SB) approach is striped as one SBL, three SBT, and one SBR turn lane. However, two SBT lanes will be hatched out to prohibit use. The northbound (NBT) approach will be striped as one NBL, two NBT, and one shared NBT/R tur lane. However, one NBT lane will be hatched out to prohibit use.

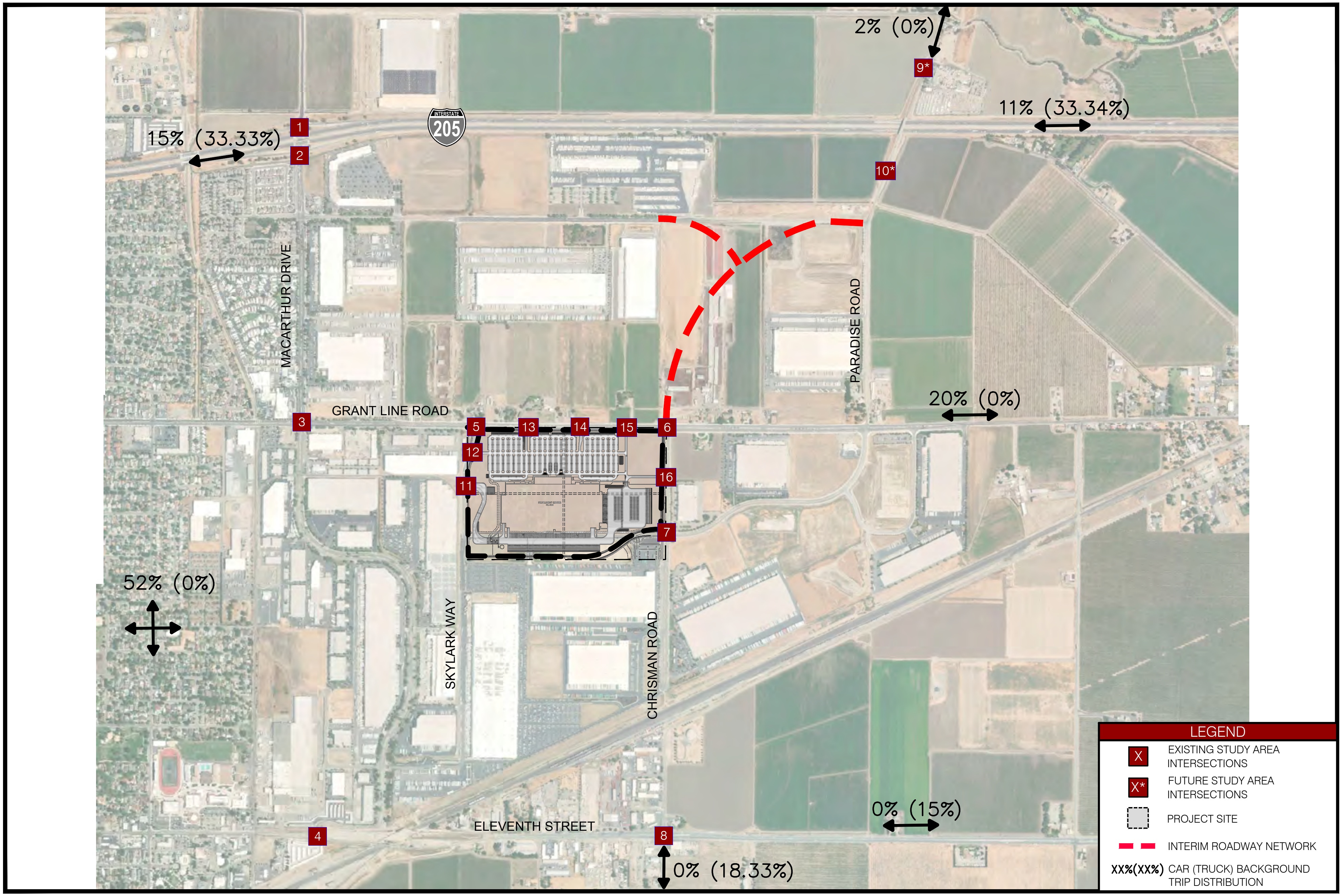
Kimley»Horn

N
NOT TO SCALE

FIGURE 7
EXISTING PLUS BACKGROUND PLUS PROJECT LANE GEOMETRY AND TRAFFIC CONTROL

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



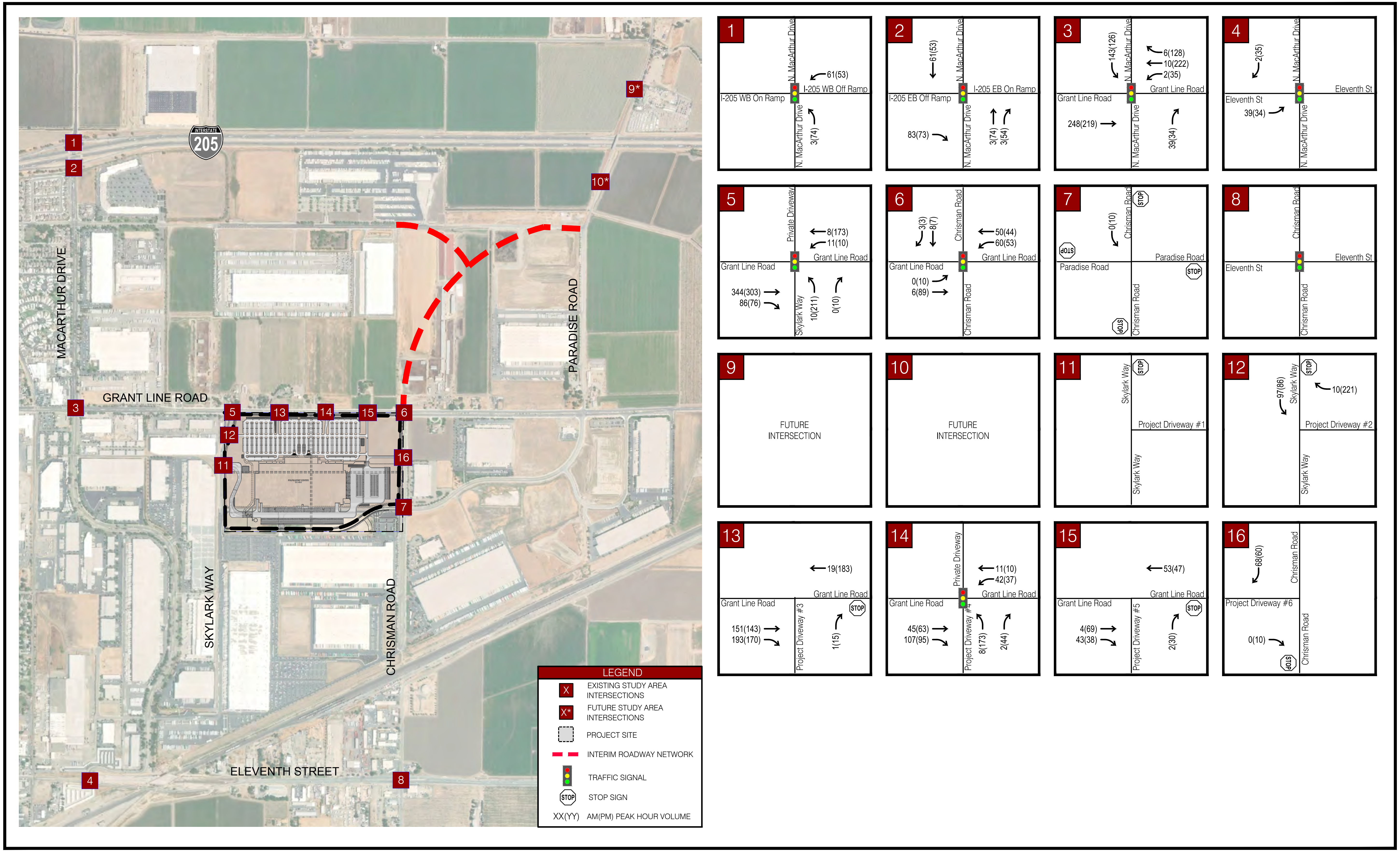
Kimley»Horn

FIGURE 8

EXISTING PLUS BACKGROUND TRIP DISTRIBUTION

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



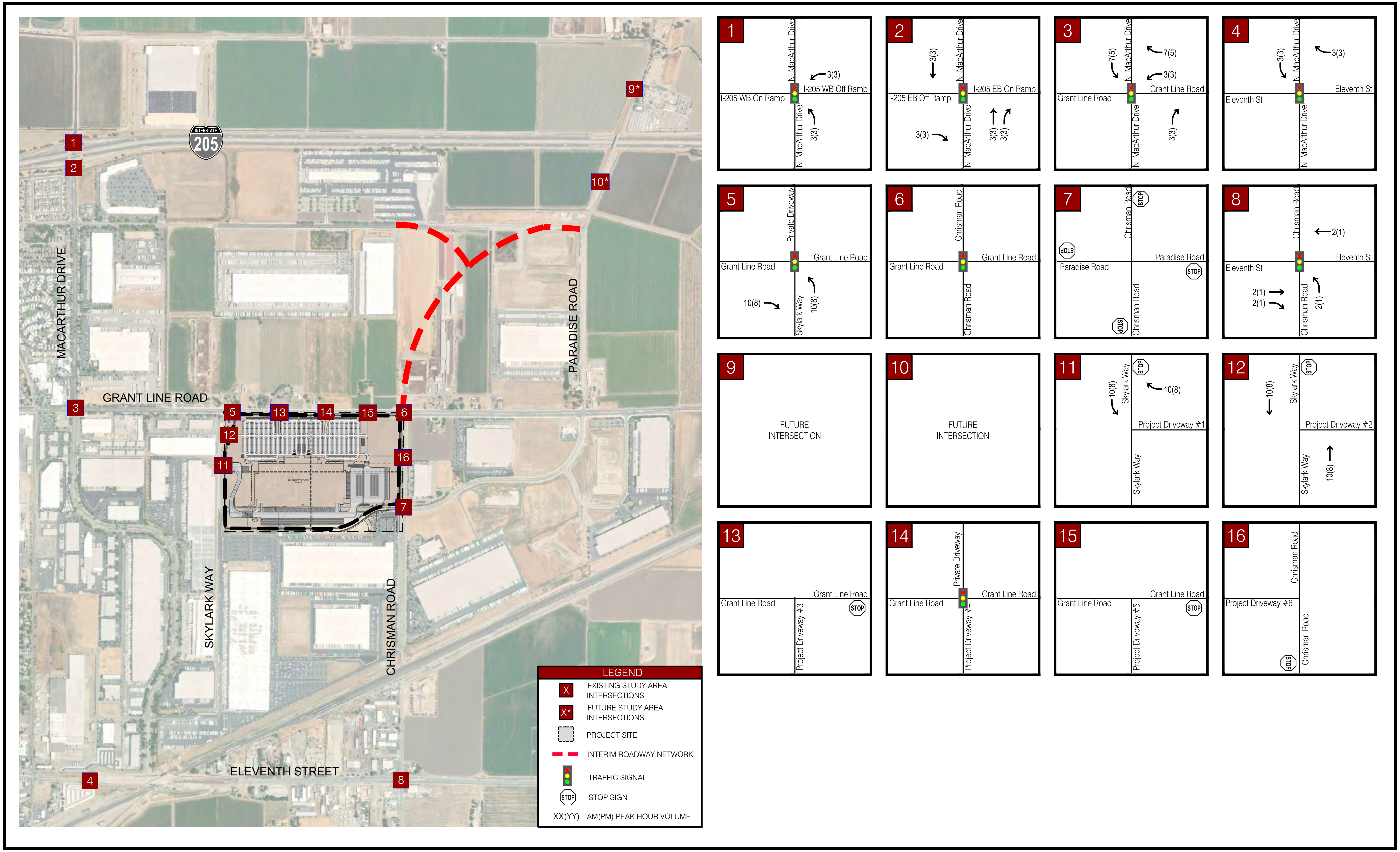
Kimley»Horn

NOT TO SCALE

FIGURE 9
EXISTING PLUS BACKGROUND PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES (CAR)

TRACY NEI PHASE 3

097008270 SEPTEMBER 2020



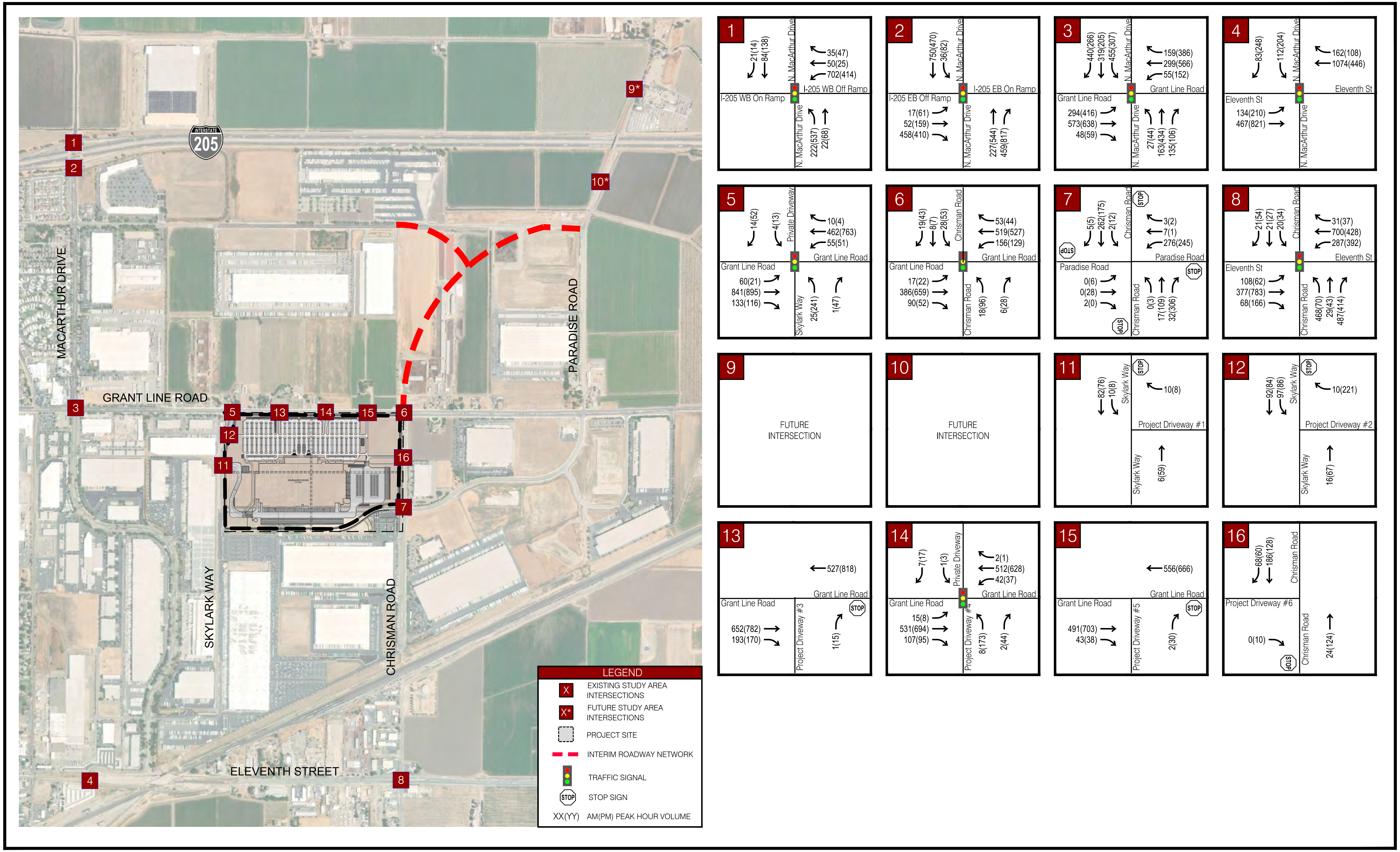
Kimley»Horn

N
NOT TO SCALE

FIGURE 10
EXISTING PLUS BACKGROUND PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCK)

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

N

NOT TO SCALE

FIGURE 11

EXISTING PLUS BACKGROUND PLUS PROJECT PEAK HOUR TURNING MOVEMENT VOLUMES

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

5.4 Intersection Level of Service

Existing Plus Background Plus Project Conditions traffic operations were evaluated at the study intersections and the results are presented in **Table 6.** All study intersections function within acceptable LOS standards under this analysis scenario, except for the following intersection:

- #2 – MacArthur Drive / I-205 EB Ramps (PM Peak Hour) – Intersection operating at an acceptable LOS D without the project and degrades to an unacceptable LOS E with the project – **Deficiency**
- #3 – MacArthur Drive / Grant Line Road (AM and PM Peak Hours) – Intersection operating at an acceptable LOS D without the project and degrades to an unacceptable LOS E with the project in the AM peak hour. Intersection operating at an unacceptable LOS E without the project with an increase in average delay of more than four (4) seconds in the PM peak hour – **Deficiency**
- #7 – Chrisman Road / Paradise Road (PM Peak Hour) – Intersection operating at an unacceptable LOS E without the project and degrades to an unacceptable LOS F with the project. The addition of the project trips contributes to a less than 10 percent volume increase to the intersection and the peak hour traffic signal warrant is not met – **Not a Deficiency**

Analysis sheets are provided in the **Appendix**.

5.5 Peak Hour Signal Warrant

Peak hour signal warrants were evaluated at the unsignalized intersection of Chrisman Road/Paradise Road and Driveway #4/Grant Line Road under Existing Plus Background Plus Project Conditions. The following intersection did not meet the peak hour signal warrant:

- #7 – Chrisman Road & Paradise Road

Analysis sheets are provided in the **Appendix**.

Table 6 – Existing Plus Background Plus Project Conditions Level of Service

#	Intersection[1]	LOS Standard[2]	Jurisdiction	Control Type[3]	Existing + Background Conditions				Existing + Background + Project Conditions					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
					LOS	Delay[4]	LOS	Delay[4]	LOS	Delay[4]	Delay Var	LOS	Delay[4]	Delay Var
1	MacArthur Drive & I-205 WB Ramps	D	Caltrans	Signal	C	32.0	C	27.8	D	45.1	13.1	D	48.3	20.5
2	MacArthur Drive & I-205 EB Ramps	D	Caltrans	Signal	B	17.2	D	40.0	C	28.0	10.8	**E**	**59.8**	**19.8**
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	D	41.8	**E**	**63.2**	**E**	**77.1**	**35.3**	**F**	**91.8**	**28.6**
4	MacArthur Drive & Eleventh Street	D	Tracy	Signal	B	11.4	B	18.8	B	12.1	0.7	C	21.6	2.8
5	Skylark Way & Grant Line Road	D	Tracy	Signal	A	9.9	B	13.5	B	11.8	1.9	C	22.3	8.8
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	B	14.3	B	19.7	B	15.3	1.0	C	21.2	1.5
7	Chrisman Road & Paradise Road	D	Tracy	AWSC	B	15.0	**E**	**45.9**	B	14.8	-0.2	**F**	**57.0**	**11.1**
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	39.6	C	29.3	D	39.8	0.2	C	29.3	0.0
9	Chrisman Rd & I-205 WB Ramps	D	Caltrans	-	Future Intersection									
10	Chrisman Rd & I-205 EB Ramps	D	Caltrans	-	Future Intersection									
11	Driveway #1 & Skylark Way	D	Tracy	-	Future Project Driveway				A	1.6	1.6	A	1.0	1.0
	Worst Approach								A	9.3	9.3	A	9.6	9.6
12	Driveway #2 & Skylark Way	D	Tracy	-	Future Project Driveway				A	3.7	3.7	A	6.1	6.1
	Worst Approach								A	8.4	8.4	A	9.8	9.8
13	Driveway #3 & Grant Line Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.1	0.1
	Worst Approach								B	12.7	12.7	B	13.7	13.7
14	Driveway #4 & Grant Line Road[5]	D	Tracy	SSSC/ Signal	A	0.2	A	0.2	B	14.1	3.9	B	18.6	7.7
	Worst Approach (SB)				B	10.2	B	10.9						
15	Driveway #5 & Grant Line Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.3	0.3
	Worst Approach								B	11.0	11.0	B	12.6	12.6
16	Driveway #6 & Chrisman Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.3	0.3
	Worst Approach								A	0.0	0.0	B	9.6	9.6

Note: Intersections that are operating below acceptable levels are shown in BOLD.

1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy and Caltrans intersections is LOS D.
3. SSSC - Side Street Stop Control and AWSC – All-Way Stop Control.
4. Delay indicated in seconds/vehicle. In addition to average control delay, which is reported for signalized, AWSC, and SSSC intersections, the delay for the worst movement is also reported for SSSC intersections.
5. Intersection #14 will be a SSSC in Existing Plus Background Conditions and will be signalized in Existing Plus Background Plus Project Conditions

5.6 Existing Plus Background Plus Project Recommended Improvements

After the initial analysis for this study was completed, City staff informed Kimley-Horn that the Tracy Alliance background project is not expected to be approved and constructed soon enough to be categorized as a background development for this analysis. Therefore, the two intersections, #2 and #3, were reanalyzed without the Tracy Alliance trips on the network. It can be assumed that all other intersections that had acceptable operations with the additional background trips will continue to have acceptable operations without the Tracy Alliance trips.

The following improvements are recommended at the deficient intersections under Existing Plus Background Plus Project Conditions:

- #3 – MacArthur Drive / Grant Line Road – It is recommended to add a westbound right-turn lane with an overlap and to optimize the cycle length. With the improvement, the intersection will operate at an acceptable LOS D in the AM peak hour and will operate at a LOS E, better than without project conditions, in the PM peak hour.

A summary of the traffic operations without Tracy Alliance is provided in **Table 7** and a summary of traffic operations with the improvements is provided in **Table 8**.

Analysis sheets are provided in the **Appendix**.

Table 7 – Existing Plus Background (without Tracy Alliance) Plus Project Conditions Level of Service

#	Intersection[1]	LOS Standard	Jurisdiction[2]	Control Type[3]	Existing + Background + Project Conditions				Existing + Background (w/o Alliance) + Project Conditions					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
					LOS	Delay[4]	LOS	Delay[4]	LOS	Delay[4]	Delay Var	LOS	Delay[4]	Delay Var
2	MacArthur Drive & I-205 EB Ramps	D	Caltrans	Signal	C	28.0	**E**	**59.8**	[redacted]	[redacted]	[redacted]	D	52.7	-7.1
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	**E**	**77.1**	**F**	**91.8**	**E**	**66.7**	**-10.4**	**F**	**86.5**	**-5.3**

Note: Intersections that are operating below acceptable levels are shown in BOLD.
1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy and Caltrans intersections is LOS D.
4. Delay indicated in seconds/vehicle. Average control delay is reported for signalized intersections.

Table 8 – Existing Plus Background (without Tracy Alliance) Plus Project Conditions Level of Service (With Improvements)

#	Intersection[1]	LOS Standard	Jurisdiction[2]	Control Type[3]	Existing + Background (w/o Alliance) + Project Conditions				Existing + Background (w/o Alliance) + Project Conditions w/Improvements					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
					LOS	Delay[4]	LOS	Delay[4]	LOS	Delay[4]	Delay Var	LOS	Delay[4]	Delay Var
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	**E**	**66.7**	**F**	**86.5**	C	32.0	-34.7	**E**	**55.4[5]**	**-31.1**

Note: Intersections that are operating below acceptable levels are shown in BOLD.
1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy and Caltrans intersections is LOS D.
4. Delay indicated in seconds/vehicle. Average control delay is reported for signalized intersections.
5. Although the intersection is LOS E and below standard, the delay is 7.8 seconds below pre-Project conditions.

6. Cumulative Conditions

In the Cumulative (2035) Conditions, the following intersection and roadway improvements were identified that would affect the study area:

- #1 – MacArthur Drive / I-205 WB Ramps – Add a second northbound left turn
- #2 – MacArthur Drive / I-205 EB Ramps – Add a second northbound though and southbound through lane
- #4 – N MacArthur Drive / Eleventh Street –
    - The southbound approach will be reconfigured to one left turn, one through, and one shared through/right turn lane and a westbound left turn will be constructed.
    - In addition, S MacArthur Drive will be realigned to connect to N MacArthur Drive as the south leg of the intersection. As a result, the northbound approach will be reconstructed to one left turn, one through, and one shared through/right turn lane
- #6 – Chrisman Road / Grant Line Road – The northbound approach will be reconfigured to one left, two throughs, and one right-turn lane. The southbound approach will be reconfigured to one left, two throughs, and one right-turn. A second eastbound left turn will be constructed and one westbound through lane will be reconfigured to be a second westbound left turn lane.
- #7 – Chrisman Road / Paradise Road – This intersection will be converted from an AWSC to a signalized intersection. The northbound approach will be reconfigured to one left turn, two throughs, and one shared through/right-turn. The southbound approach will be reconfigured to one left, three throughs, and one right-turn lane.
- #8 – Chrisman Road / Eleventh Street – The northbound and southbound approach will be reconfigured to one left, two throughs, and one right-turn lane and an additional eastbound left turn will be constructed.
- #9 – Paradise Road/Chrisman Road & I-205 WB Ramps – A new interchange will be constructed at Chrisman Road and I-205 WB Ramps with the following configuration:
    - Northbound Approach – two through lanes and one shared through/right turn lane
    - Southbound Approach – two through lanes and one shared through/right turn lane
    - Westbound Approach – two left turn lanes, one shared through/right turn lane, and one right turn lane
- #10 – Paradise Road/Chrisman Road & I-205 EB Ramps – A new interchange will be constructed at Chrisman Road and I-205 EB Ramps with the following configuration:
    - Northbound Approach – three through lanes and two right turn lanes
    - Southbound Approach – two through lanes and one shared through/right turn lane
    - Eastbound Approach – two left turn lanes and two right turn lanes

Cumulative Conditions traffic control and lane geometry is shown in **Figure 12**.

Cumulative (2035) turning movement volumes were derived from the City of Tracy TMP. Cumulative AM and PM peak hour turning movement volumes are shown in **Figure 13**.

Cumulative Conditions traffic operations were evaluated at the study intersections and the results are presented in **Table 9**. All study intersections function within acceptable LOS standards under this analysis scenario, except for the following intersections:

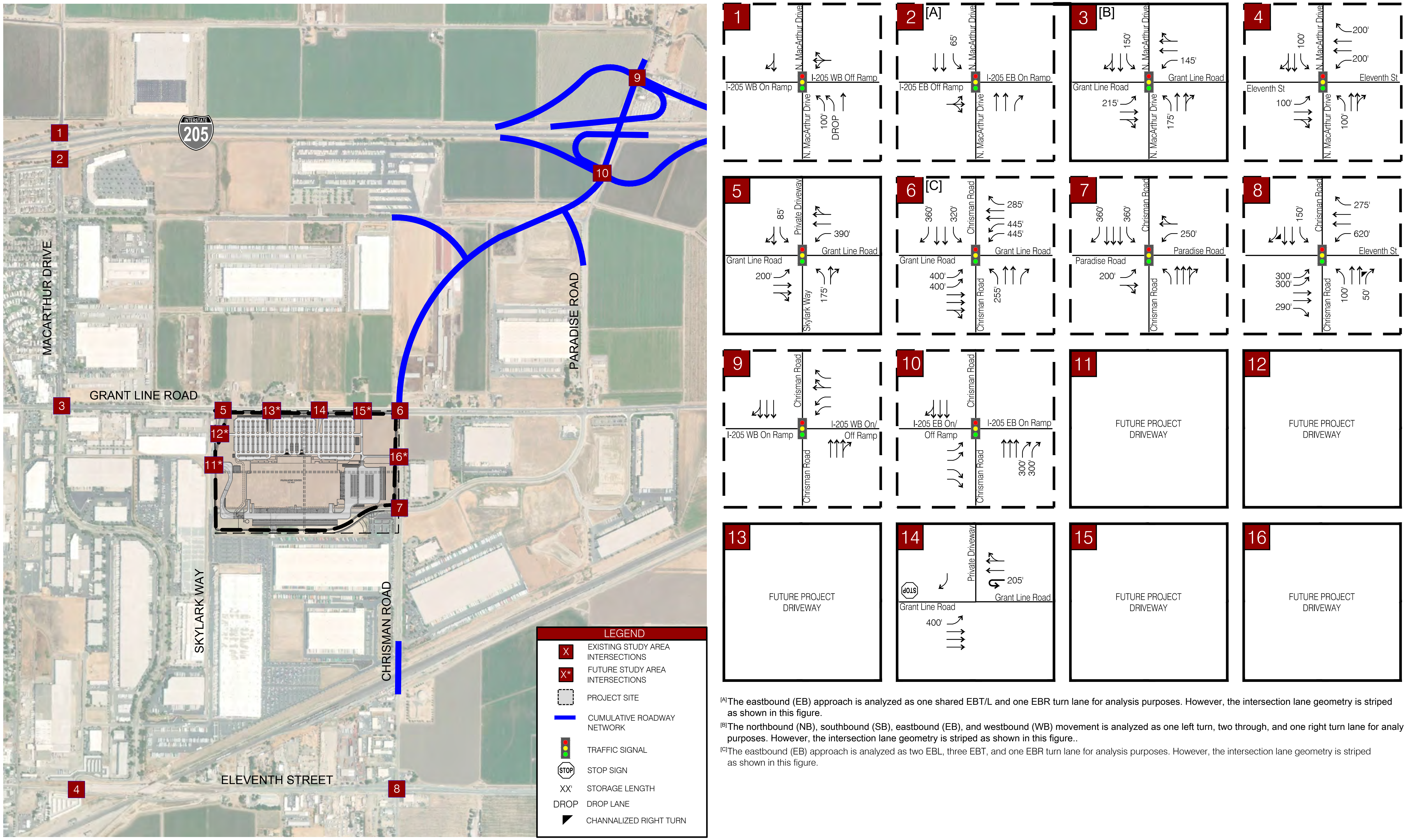
- #8 – Chrisman Road / Eleventh Street (PM Peak Hour)

Analysis sheets are provided in the **Appendix**.

Table 9 – Cumulative Conditions Level of Service

#	Intersection	LOS Standard	Jurisdiction	Control Type	Cumulative Conditions			
					AM Peak Hour		PM Peak Hour	
					LOS	Delay	LOS	Delay
1	MacArthur Drive & I-205 WB Ramps	C	Caltrans	Signal	B	12.1	B	16.7
2	MacArthur Drive & I-205 EB Ramps	C	Caltrans	Signal	B	12.2	B	14.1
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	C	24.7	D	36.2
4	MacArthur Drive & Eleventh Street	D	Tracy	Signal	C	28.3	D	41.8
5	Skylark Way & Grant Line Road	D	Tracy	Signal	B	10.2	C	34.0
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	C	22.4	D	47.7
7	Chrisman Road & Paradise Road	D	Tracy	Signal	B	12.9	B	13.2
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	52.5	**E**	**56.7**
9	Chrisman Rd & I-205 WB Ramps	C	Caltrans	Signal	A	5.6	A	3.9
10	Chrisman Rd & I-205 EB Ramps	C	Caltrans	Signal	A	6.0	B	13.8
11	Driveway #1 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
12	Driveway #2 & Skylark Way	D	Tracy	-	Future Project Driveway			
	Worst Approach							
13	Driveway #3 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
14	Driveway #4 & Grant Line Road	D	Tracy	SSSC	A	0.2	A	0.1
	Worst Approach (SB)				B	10.1	B	10.2
15	Driveway #5 & Grant Line Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							
16	Driveway #6 & Chrisman Road	D	Tracy	-	Future Project Driveway			
	Worst Approach							

Note: Intersections that are operating below acceptable levels are shown in **BOLD**.
1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy intersections is LOS D and for Caltrans intersections is LOS C.
3. SSSC - Side Street Stop Control and AWSC – All-Way Stop Control.
4. Delay indicated in seconds/vehicle. In addition to average control delay, which is reported for signalized, AWSC, and SSSC intersections, the delay for the worst movement is also reported for SSSC intersections.



Note: Dashed intersection boxes reflect changed conditions from Background Conditions.

[A] The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

[B] The northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) movement is analyzed as one left turn, two through, and one right turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure..

[C] The eastbound (EB) approach is analyzed as two EBL, three EBT, and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

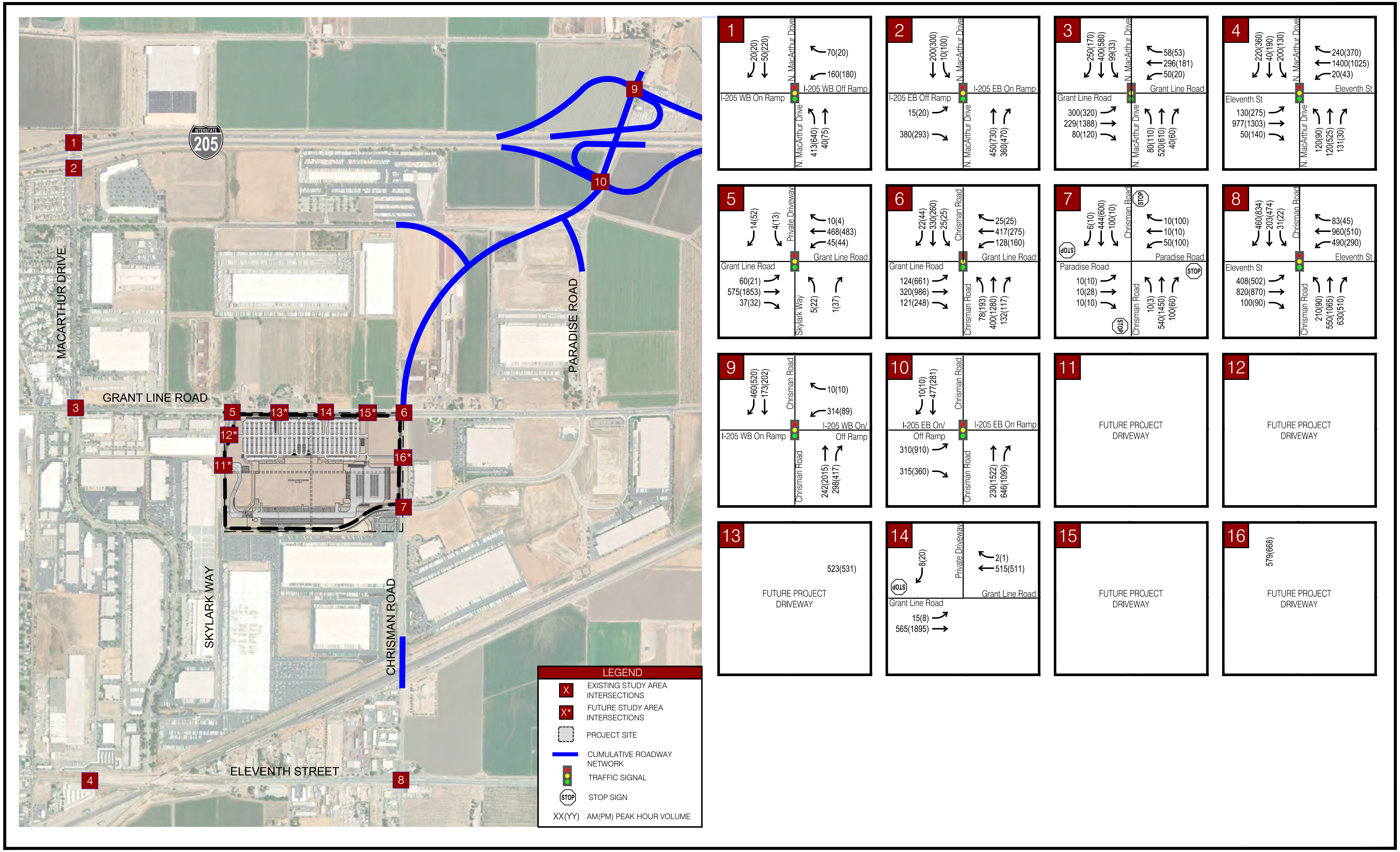
Kimley»Horn

NOT TO SCALE

FIGURE 12
CUMULATIVE LANE GEOMETRY AND TRAFFIC CONTROL

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

097008270 SEPTEMBER 2020

FIGURE 13
CUMULATIVE PEAK HOUR TURNING MOVEMENT VOLUMES

TRACY NEI PHASE 3

7. Cumulative Plus Project Conditions

Under Cumulative Plus Project Conditions, the proposed project will install a signal at Intersection #14 (Grant Line Road and Driveway #4). Cumulative Plus Project traffic control and lane geometry is shown in **Figure 14**.

7.1 Trip Distribution and Assignment

With the proposed roadway and intersection lane geometry improvements under Cumulative Conditions, a different trip distribution for the proposed project was developed for passenger cars and trucks. For passenger cars, it is estimated that there will be a 66 percent distribution going to and from west of the project site and 34 percent going to and from east of the project site. For trucks, it is assumed that there will be a 33.33 percent distribution going to and from west of the project site and a 66.67 percent distribution going to and from east and south of the project site.

Figure 15 illustrates the trip distribution assumed for Cumulative Plus Project analysis. **Figure 16** and **Figure 17** illustrates the trip assignment for Cumulative Plus Project Conditions for passenger cars and trucks, respectively. Cumulative Plus Project AM and PM peak hour turning movement volumes are shown in **Figure 18**.

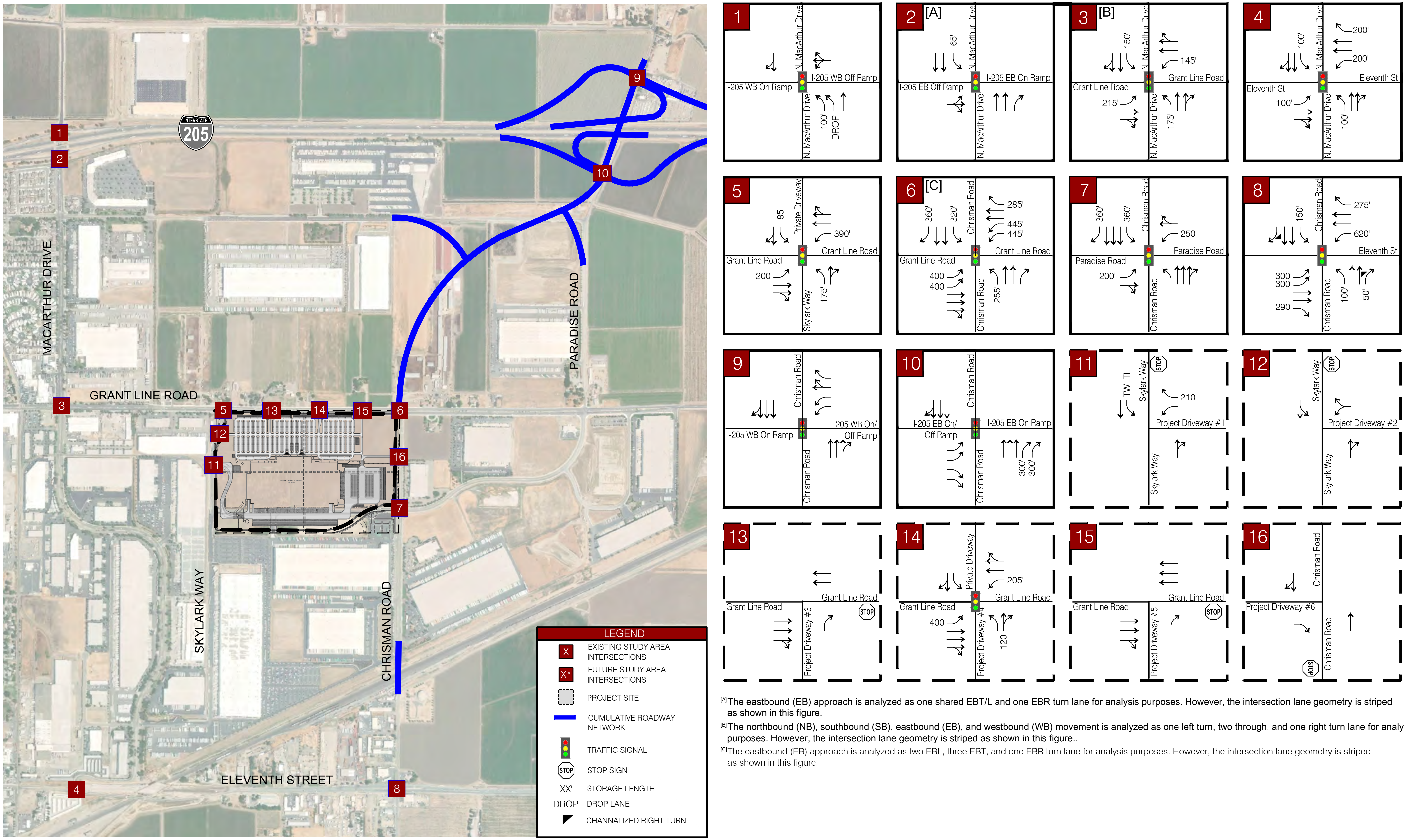
7.2 Intersection Level of Service

Under Cumulative Plus Project Conditions, the proposed project will install a signal at Intersection #14 (Grant Line Road and Driveway #4).

Cumulative Plus Project Conditions traffic operations were evaluated at the study intersections and the results are presented in **Table 10.** All study intersections function within acceptable LOS standards under this analysis scenario, except for the following intersection:

- #3 – MacArthur Drive / Grant Line Road (AM and PM Peak Hours) – Intersection operating at an acceptable LOS C and D in the AM and PM peak hour, respectively and degrades to an unacceptable LOS E with the project – **Deficiency**
- #5 – Skylark Way & Grant Line Road (PM Peak Hour) – Intersection operating at an acceptable LOS C without the project and degrades to an unacceptable LOS F with the project – **Deficiency**
- #6 – Chrisman Road & Grant Line Road (PM Peak Hour) – Intersection operating at an acceptable LOS D without the project and degrades to an unacceptable LOS E with the project – **Deficiency**
- #8 – Chrisman Road & Eleventh Street (AM and PM Peak Hours) – Intersection operating at an acceptable LOS D and degrades to an unacceptable LOS E in the AM peak hour. In the PM peak hour, intersection is operating at an unacceptable LOS E without the project, and the project increases the average delay of more than four (4) seconds – **Deficiency**

Analysis sheets are provided in the **Appendix**.



[A] The eastbound (EB) approach is analyzed as one shared EBT/L and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

[B] The northbound (NB), southbound (SB), eastbound (EB), and westbound (WB) movement is analyzed as one left turn, two through, and one right turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure..

[C] The eastbound (EB) approach is analyzed as two EBL, three EBT, and one EBR turn lane for analysis purposes. However, the intersection lane geometry is striped as shown in this figure.

Note: Dashed intersection boxes reflect changed conditions from Background Conditions.

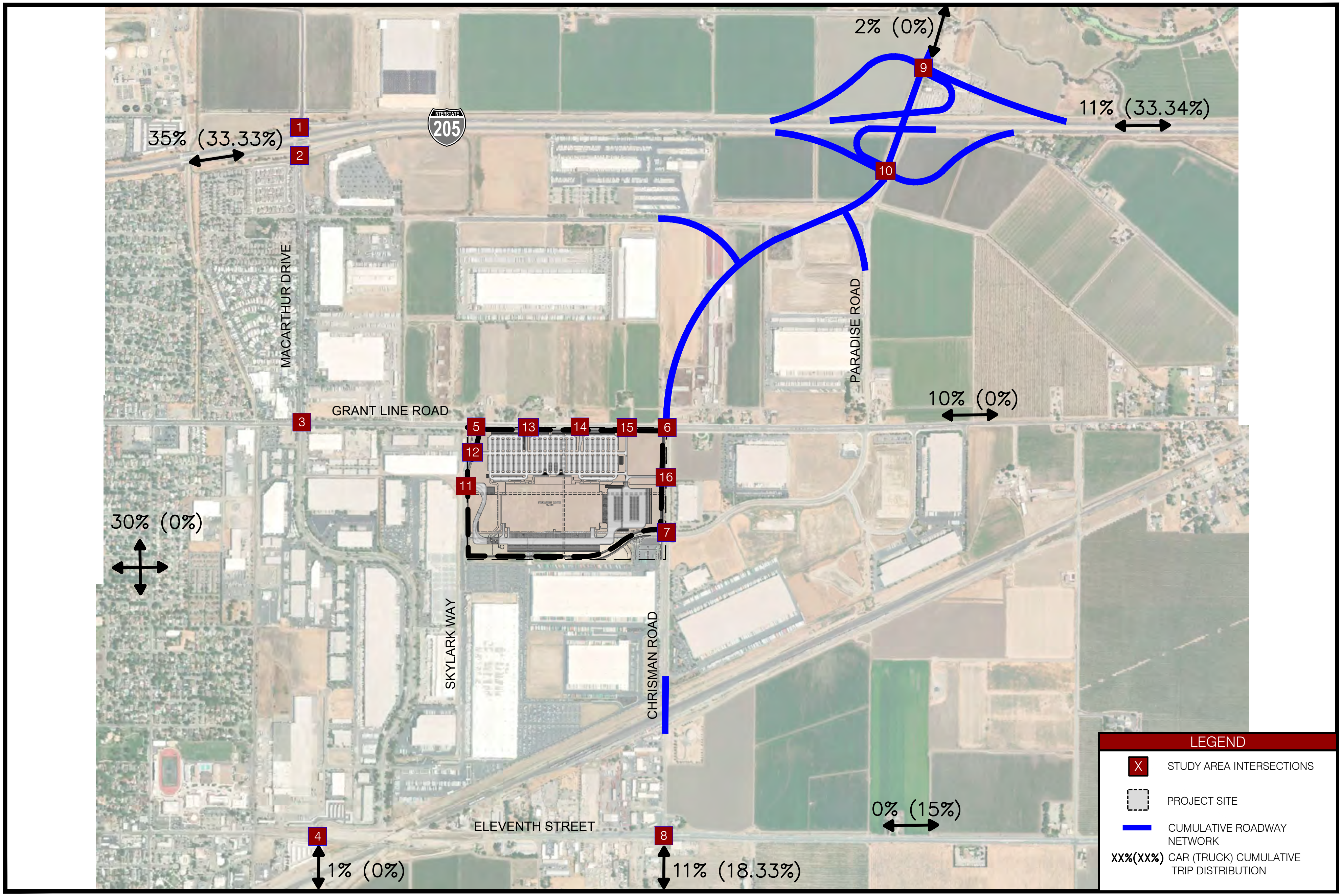
Kimley»Horn

N
NOT TO SCALE

FIGURE 14
CUMULATIVE PLUS PROJECT LANE GEOMETRY AND TRAFFIC CONTROL

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

N

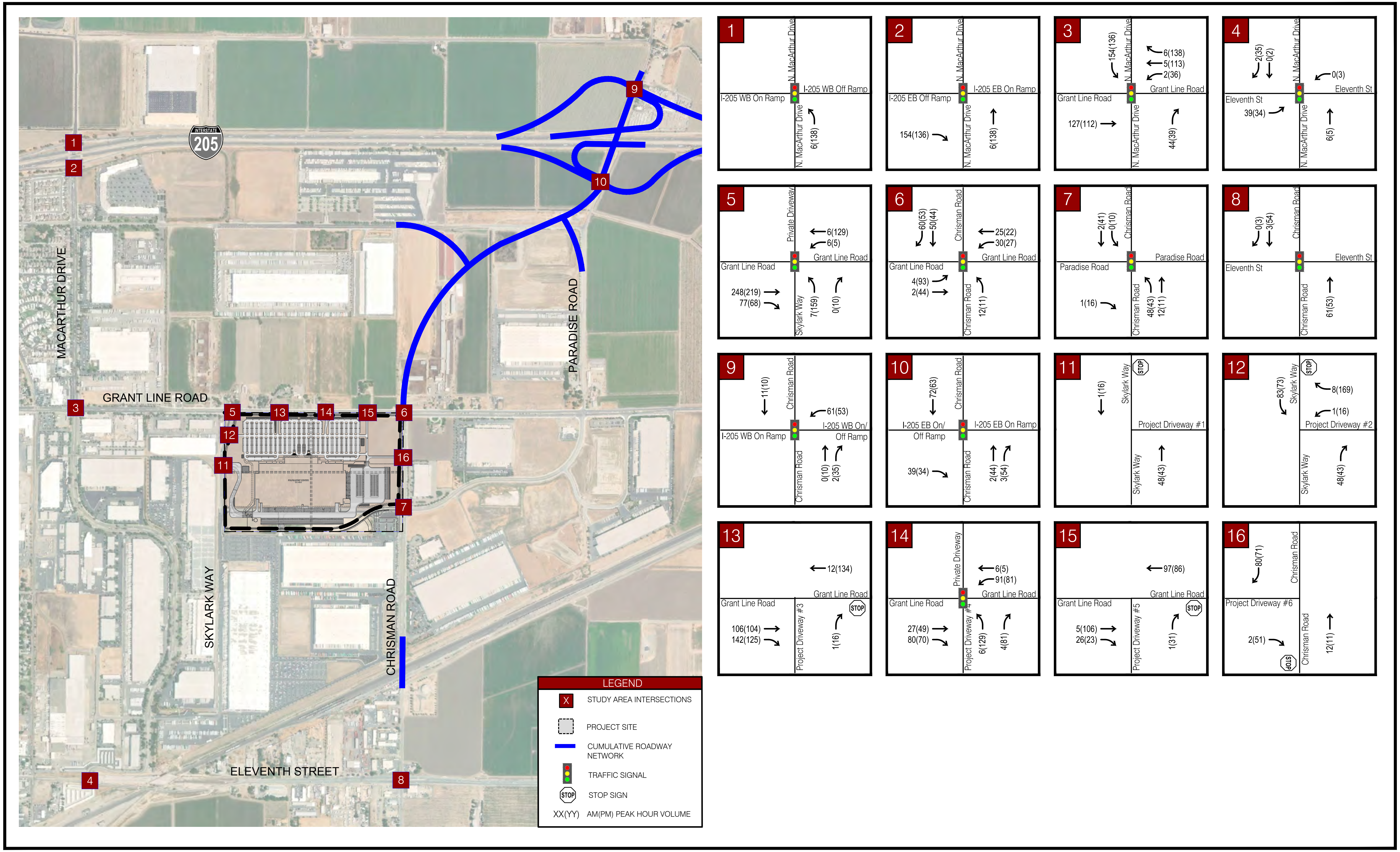
NOT TO SCALE

FIGURE 15

CUMULATIVE TRIP DISTRIBUTION

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

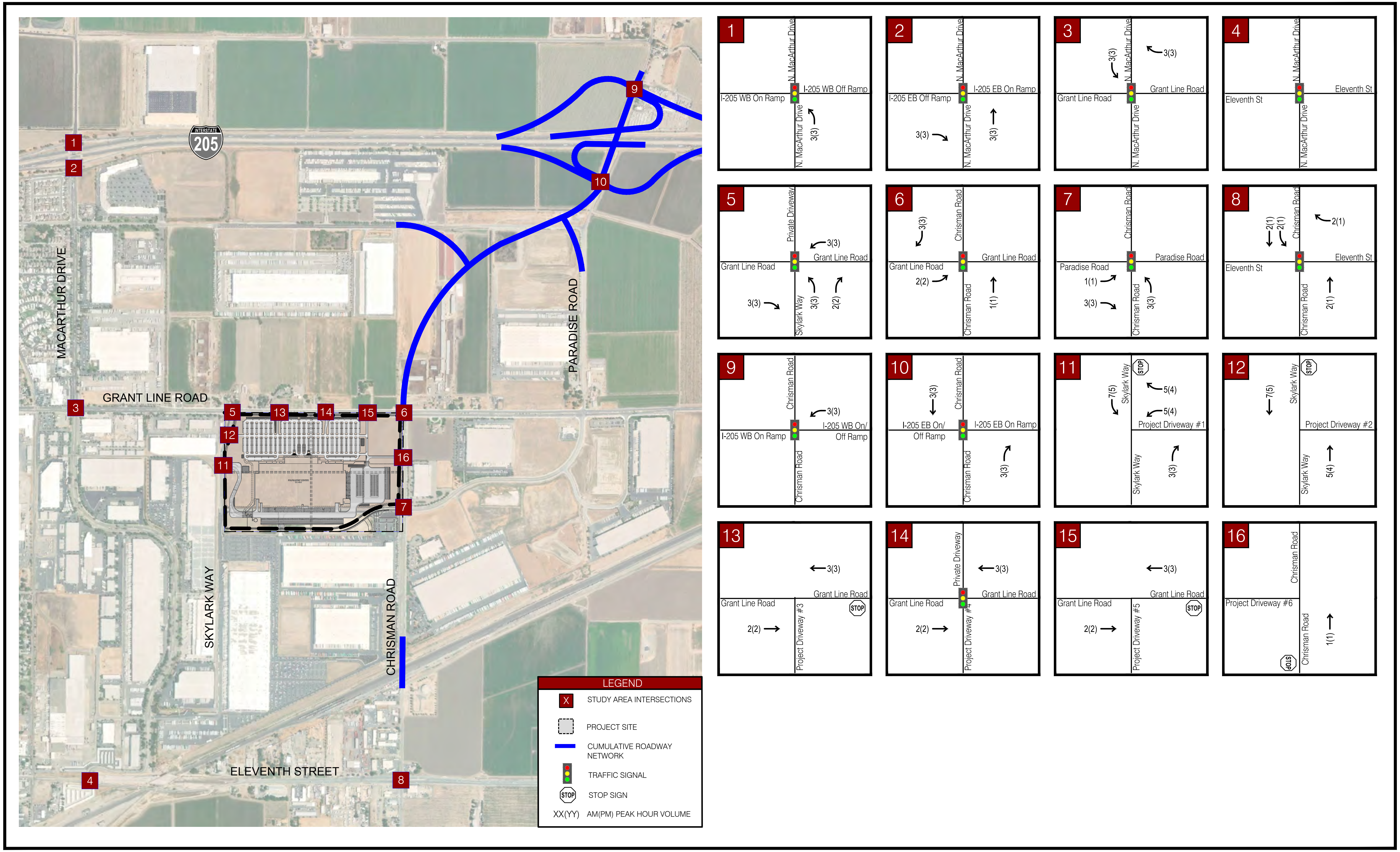


N
NOT TO SCALE

FIGURE 16
CUMULATIVE PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES (CAR)

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



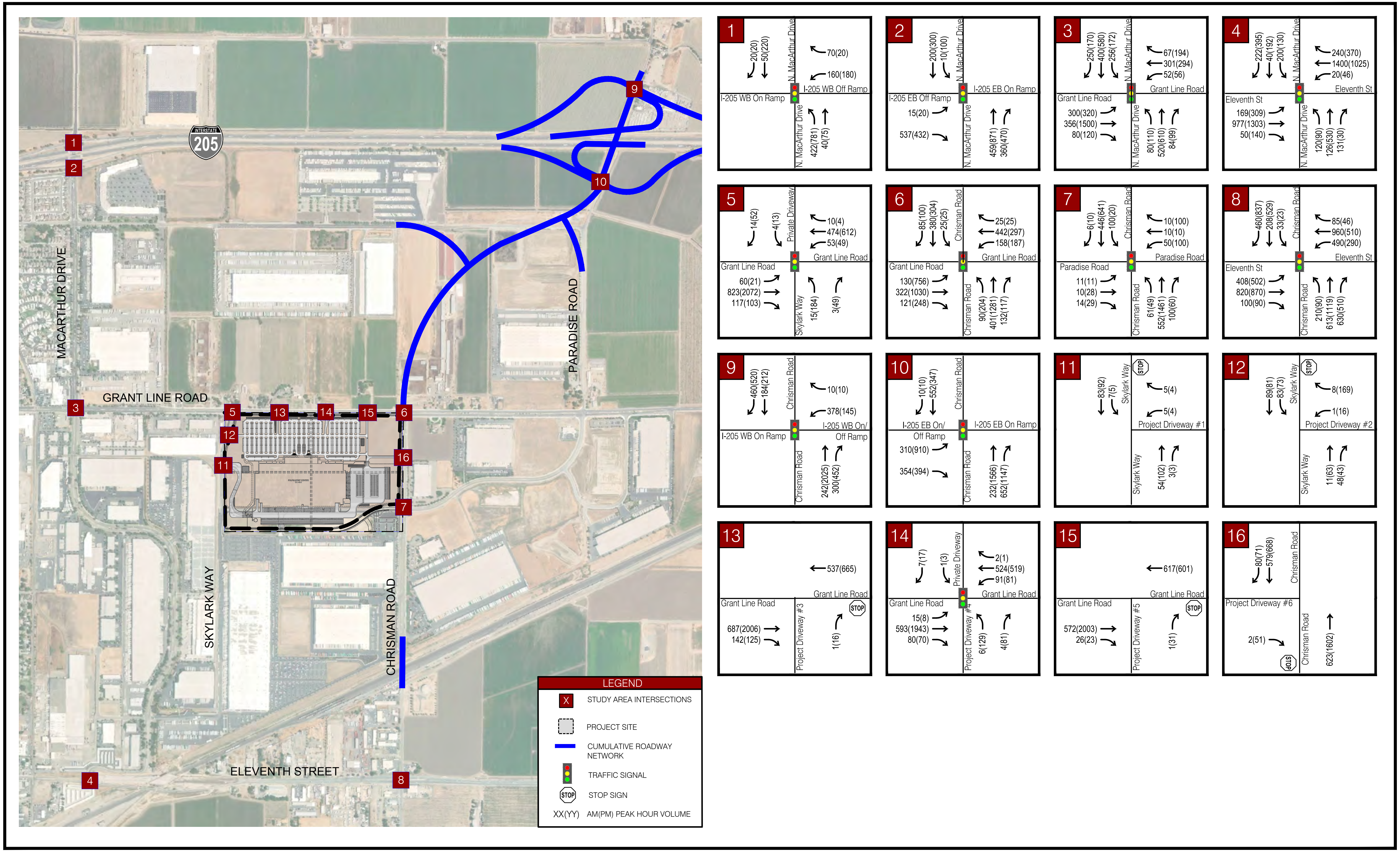
Kimley»Horn

N
NOT TO SCALE

FIGURE 17
CUMULATIVE PROJECT GENERATED PEAK HOUR TURNING MOVEMENT VOLUMES (TRUCK)

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3



Kimley»Horn

N

NOT TO SCALE

FIGURE 18

CUMULATIVE PLUS PROJECT PEAK HOUR TURNING MOVEMENT VOLUMES

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

Table 10 – Cumulative Plus Project Conditions Level of Service

#	Intersection[1]	LOS Standard	Jurisdiction	Control Type[3]	Cumulative Conditions				Cumulative + Project Conditions					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
					LOS	Delay	LOS	Delay	LOS	Delay	Delay Var	LOS	Delay	Delay Var
1	MacArthur Drive & I-205 WB Ramps	C	Caltrans	Signal	B	12.1	B	16.7	B	12.2	0.1	C	20.3	3.6
2	MacArthur Drive & I-205 EB Ramps	C	Caltrans	Signal	B	12.2	B	14.1	C	22.2	10.0	C	23.2	9.1
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	C	24.7	D	36.2	**E**	**55.6**	**30.9**	**E**	**57.5**	**21.3**
4	MacArthur Drive & Eleventh Street	D	Tracy	Signal	C	28.3	D	41.8	C	31.3	3.0	D	53.3	11.5
5	Skylark Way & Grant Line Road	D	Tracy	Signal	B	10.2	C	34.0	B	11.4	1.2	**F**	**107.2**	**73.2**
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	C	22.4	D	47.7	C	23.3	0.9	**E**	**57.1**	**9.4**
7	Chrisman Road & Paradise Road	D	Tracy	Signal	B	12.9	B	13.2	B	14.2	1.3	B	15.0	1.8
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	52.5	**E**	**56.7**	**E**	**56.5**	**4.0**	**E**	**60.9**	**4.2**
9	Chrisman Rd & I-205 WB Ramps	C	Caltrans	-	A	5.6	A	3.9	A	6.1	0.5	A	4.7	0.8
10	Chrisman Rd & I-205 EB Ramps	C	Caltrans	-	A	6.0	B	13.8	A	6.2	0.2	B	15.6	1.8
11	Driveway #1 & Skylark Way	D	Tracy	-	Future Project Driveway				A	1.0	1.0	A	0.6	0.6
	Worst Approach								B	10.2	10.2	B	10.5	10.5
12	Driveway #2 & Skylark Way	D	Tracy	-	Future Project Driveway				A	2.9	2.9	A	5.3	5.3
	Worst Approach								A	8.7	8.7	A	9.8	9.8
13	Driveway #3 & Grant Line Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.1	0.1
	Worst Approach								B	12.2	12.2	D	26.2	26.2
14	Driveway #4 & Grant Line Road	D	Tracy	SSSC/ Signal	A	0.2	A	0.1	B	14.5	4.4	C	21.0	10.8
	Worst Approach (SB)				B	10.1	B	10.2						
15	Driveway #5 & Grant Line Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.3	0.3
	Worst Approach								B	11.1	11.1	D	26.0	26.0
16	Driveway #6 & Chrisman Road	D	Tracy	-	Future Project Driveway				A	0.0	0.0	A	0.3	0.3
	Worst Approach								B	11.4	11.4	B	12.5	12.5

Note: Intersections that are operating below acceptable levels are shown in BOLD.

1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy intersections is LOS D and for Caltrans intersections is LOS C.
3. SSSC - Side Street Stop Control and AWSC – All-Way Stop Control.
4. Delay indicated in seconds/vehicle. In addition to average control delay, which is reported for signalized, AWSC, and SSSC intersections, the delay for the worst movement is also reported for SSSC intersections.
5. Intersection #14 will be a SSSC in Cumulative Conditions and will be signalized in Cumulative Plus Project Conditions

7.3 Cumulative Plus Project Recommended Improvements

The following improvements are recommended at the deficient intersections under Cumulative Plus Project Conditions:

- #3 – MacArthur Drive / Grant Line Road – It is recommended to optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS C and LOS D in the AM and PM peak hour, respectively.
- #5 – Skylark Way & Grant Line Road – It is recommended to optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS D in the PM peak hour.
- #6 – Chrisman Road & Grant Line Road – It is recommended to optimize the cycle length at this intersection. With the improvement, the intersection will operate at an acceptable LOS D in the PM peak hour.
- #8 – Chrisman Road & Eleventh Street – It is recommended that an additional second westbound left turn lane be constructed and the signal timing be modified to allow lagging phase for the eastbound left turn and northbound left turn. With the improvement, the intersection will operate at an acceptable LOS D in the AM and PM peak hours.

A summary of the traffic operations with the improvements are provided in **Table 11**.

Analysis sheets are provided in the **Appendix**.

Table 11 – Cumulative Plus Project Conditions Level of Service (With Improvements)

#	Intersection	LOS Standard	Jurisdiction	Control Type	Cumulative Conditions				Cumulative + Project Conditions					
					AM Peak Hour		PM Peak Hour		AM Peak Hour			PM Peak Hour		
					LOS	Delay	LOS	Delay	LOS	Delay	Delay Var	LOS	Delay	Delay Var
3	MacArthur Drive & Grant Line Road	D	Tracy	Signal	C	24.7	D	36.2	C	30.7	6.0	D	48.0	11.8
5	Skylark Way & Grant Line Road	D	Tracy	Signal	B	10.2	C	34.0	[redacted]	[redacted]	[redacted]	D	51.6	17.6
6	Chrisman Road & Grant Line Road	D	Tracy	Signal	C	22.4	D	47.7	[redacted]	[redacted]	[redacted]	D	49.8	2.1
8	Chrisman Road & Eleventh Street	D	Tracy	Signal	D	52.5	**E**	**56.7**	D	40.9	-11.6	D	45.1	-11.6

Note: Intersections that are operating below acceptable levels are shown in BOLD.

1. Analysis performed using HCM 6th edition methodology.
2. Overall level of service (LOS) standard for City of Tracy intersections is LOS D and for Caltrans intersections is LOS C.
4. Delay indicated in seconds/vehicle. Average control delay is reported for signalized intersections.

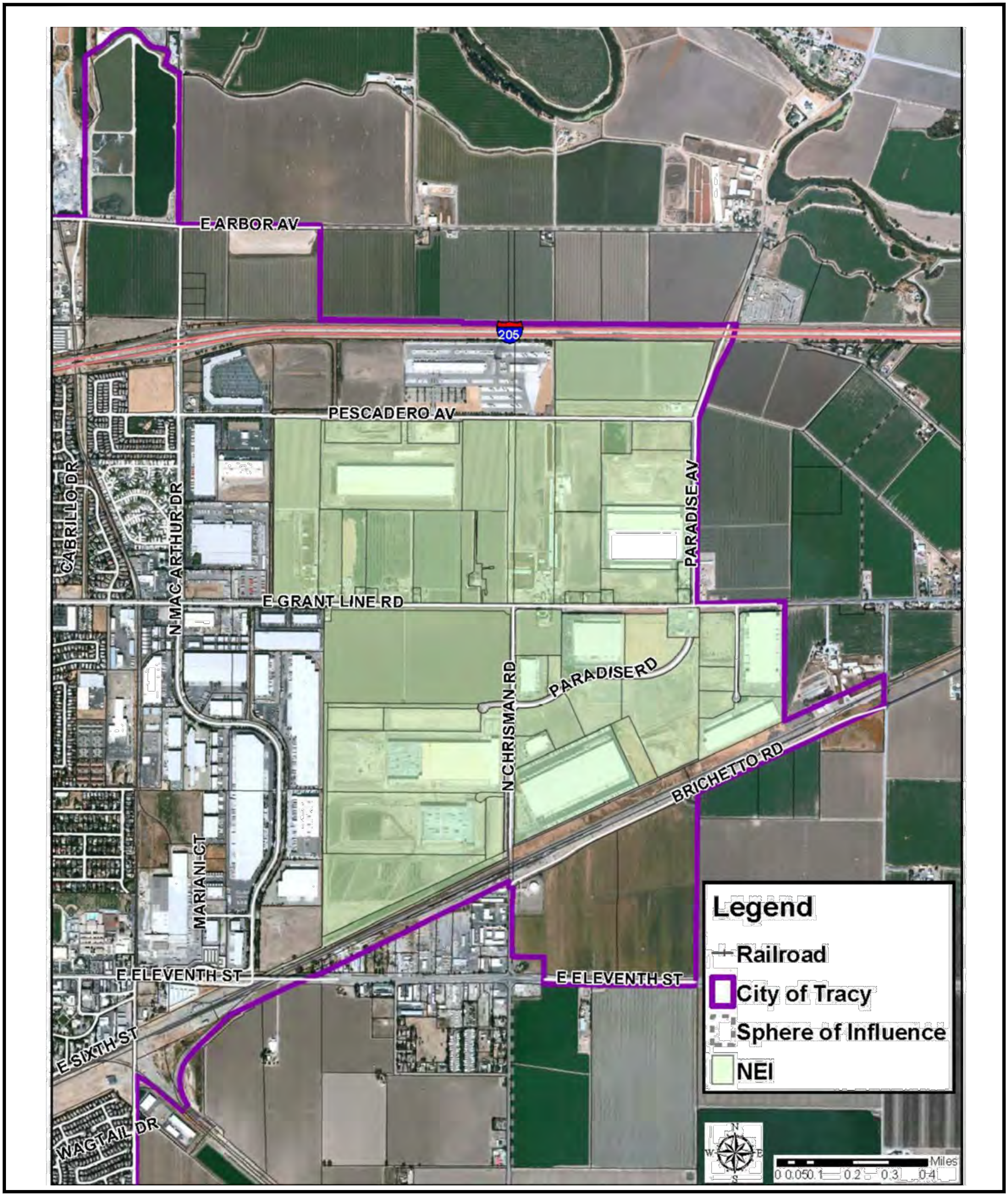
8. Fair Share Analysis

Fair share improvement contributions were reviewed at the following intersections:

- MacArthur Drive / Grant Line Road (Intersection #3): Background Plus Project Conditions - add westbound right turn pocket, **44.64%**
- Chrisman Road / Paradise Road (Intersection #7): Cumulative Conditions – add signal, **8.99%**
- Chrisman Road / Eleventh Street (Intersection #8): Cumulative Conditions – add 2nd westbound left turn lane, **3.29%**
- Grant Line Road / Project Driveway #4 (Intersection #14) – Background Plus Project Conditions signal, **Project to pay remainder of cost after FEMA Distribution Center payment**

9. NEI Truck Route Study

A STAA truck route study was conducted for the NEI Specific Plan area as part of the Seefried Project, shown in **Figure 19**. An NEI Truck Route Map, which defines STAA truck routing, indicates the existing and interim truck routes. Truck routes from the City of Tracy Transportation Master Plan (TMP) and the interim routes & proposed signage are shown in **Figure 20,** while the ultimate routes and proposed signage are shown in **Figure 21**. The interim truck routes (excluding the Chrisman Road interchange) would provide access to the primarily existing truck routes and the Chrisman road extension to Paradise Road, and the ultimate truck routes would provide access to the future interchange. For site access and improvement at all intersections and on the roadways, the design shall include turning radii that accommodate STAA trucks. See **Appendix B1. NEI Truck Route Study Turning Templates** for STAA truck turning templates.



Kimley»Horn

FIGURE 19

NEI SPECIFIC PLAN MAP

097008270 SEPTEMBER 2020

TRACY NEI PHASE 3

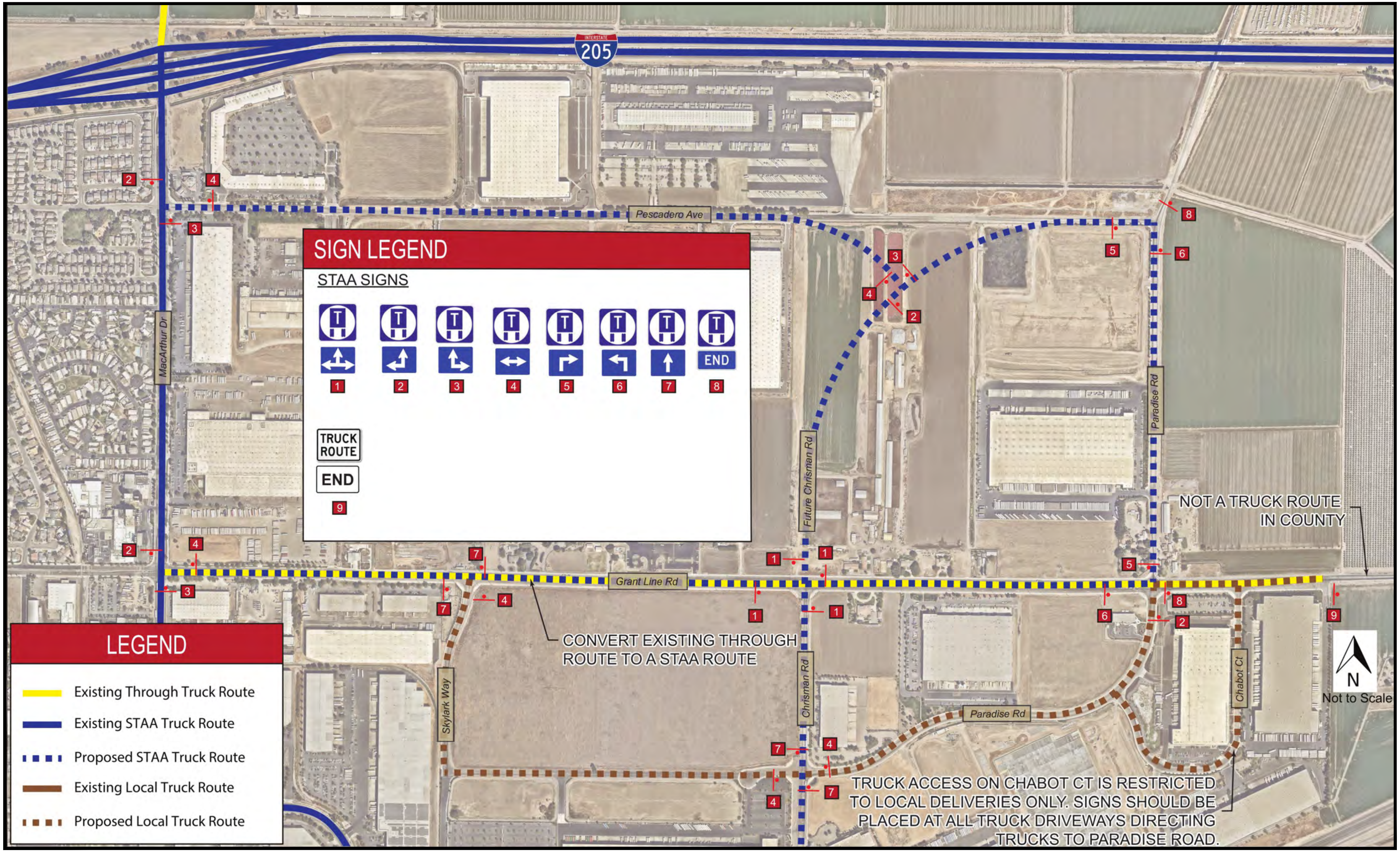
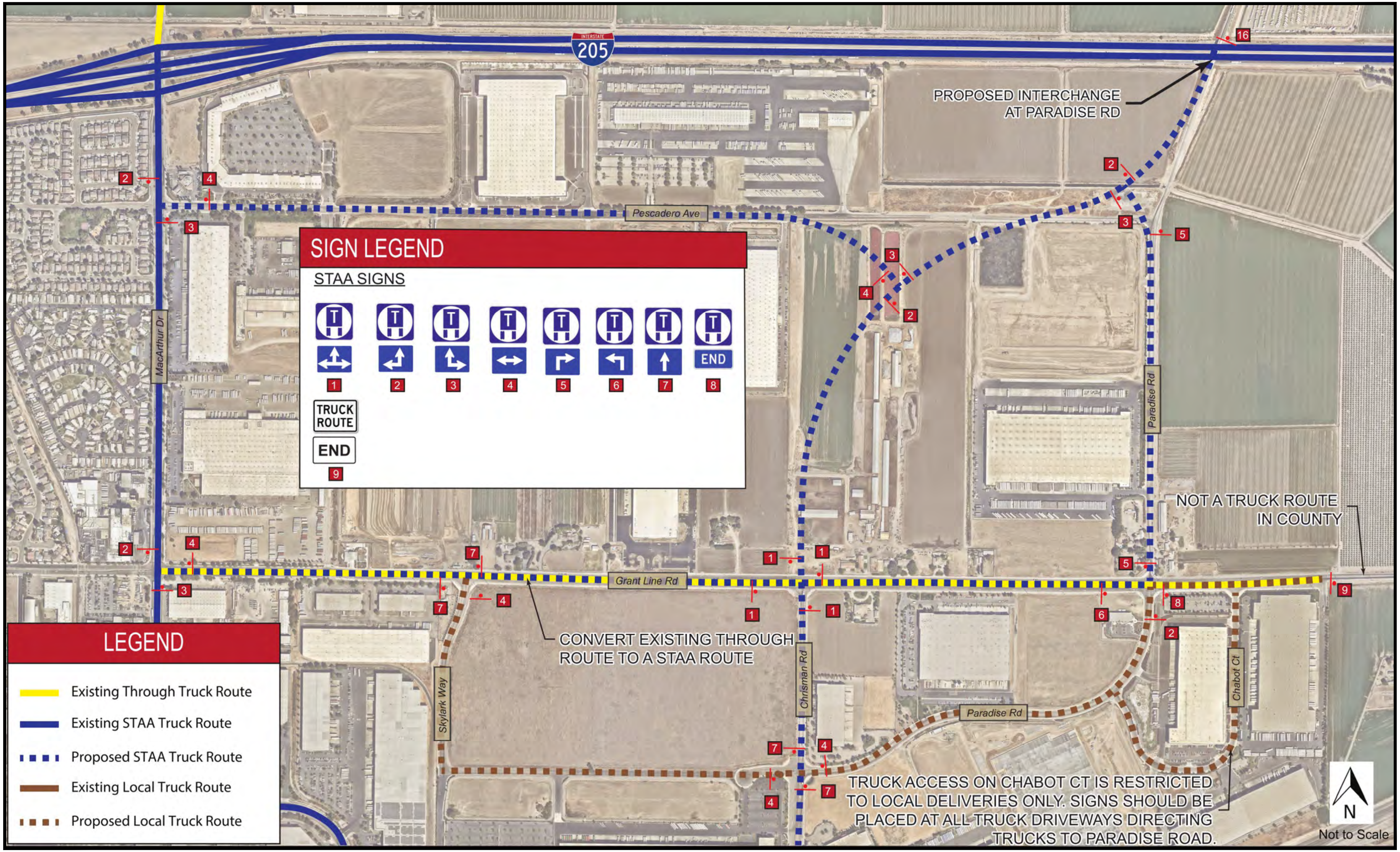


FIGURE 20
INTERIM NEI TRUCK ROUTE MAP



Kimley»Horn

FIGURE 21
ULTIMATE NEI TRUCK ROUTE MAP

10. NEI SP Overall Trip Generation Consistency Review

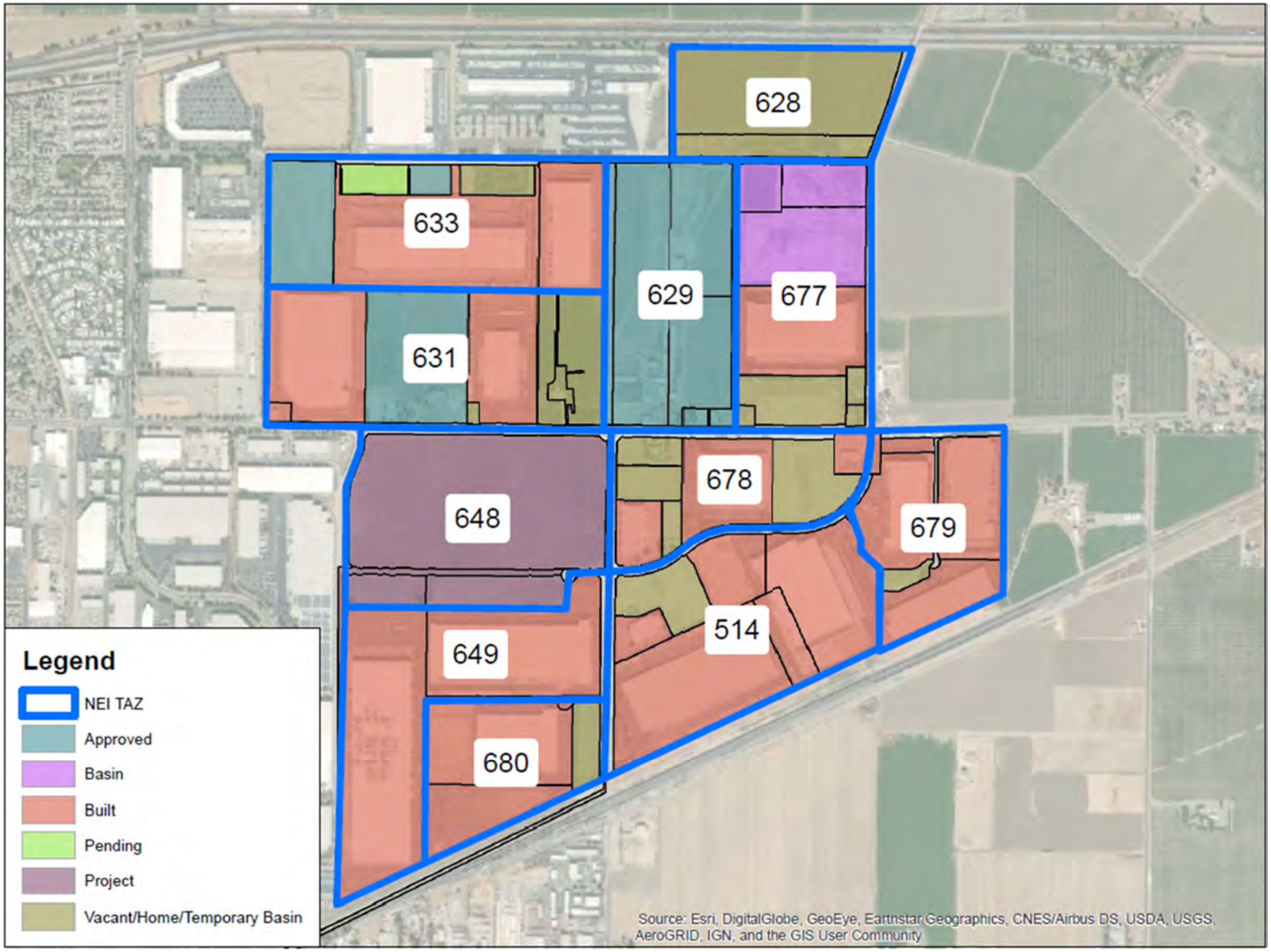
A trip generation analysis was conducted to compare the existing, existing plus Project and future trip generation of the most recent development and vacant land in the NEI Specific Plan area to the previously prepared NEI EIR trip generation estimates.

10.1 NEI Specific Plan Trip Generation

NEI Specific Plan Development Status

Figure 22 maps the current development status of the NEI Specific Plan area. **Table 12** provides the current NEI development status in gross acres organized by transportation analysis zone (TAZ), and **Table 13** provides the list of built, approved and pending projects within the NEI Specific Plan.

Figure 22 – Current NEI Specific Plan Development Status



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Table 12 – NEI Specific Plan Development Status per TAZ

TAZ	Project Type (Gross Acres)					
	Vacant	Basin	Built	Approved	Pending	Project
514	10.48	0	86.49	0	0	0
628	52.2	0	0	0	0	0
629	0	0	0	78.33	0	0
631	20.52	0	48.06	29.27	0	0
633	5.35	0	63.49	21.4	4.73	0
648	0	0	0	0	0	94.14
649	0	0	90.43	0	0	0
677	14.66	35.07	25.15	0	0	0
678	23.83	0	28.53	0	0	0
679	2.18	0	51.33	0	0	0
680	9.18	0	44.97	0	0	0
Total	138.4	35.07	438.45	129	4.73	94.14
Percentage of Specific Plan	17%	4%	52%	15%	1%	11%
Specific Plan Area (Gross Acres)[1]						845

Notes:

1. The total above excludes the existing or proposed roadways (25.9 acres).

Table 12 shows that NEI has currently developed 52% of available land with 15% more approved and 1% further pending approval. With inclusion of the future basin and the Project, NEI will have developed 83% of available land. Therefore, only 17% will remain either vacant or currently occupied by a single-family dwelling unit.

Table 13 – Built, Approved and Pending Projects

Type	Projects	
Built	○ Kellogg's ○ Katerra ○ Pacific Medical ○ FEMA ○ IPT 2 ○ Home Depot ○ Ridgeline ○ Crate & Barrel	○ Amazon Fulfillment Center ○ Animal Shelter ○ Barbosa Cabinets ○ Top Shelf ○ Bossard ○ BestBuy ○ SSA ○ WSID
Approved	○ Seefried ○ IPT 4	○ Central Plastics ○ Home Depot Parking
Pending	○ Interstate Truck Center	

10.2 Trip Generation Analysis

Trip generation for existing uses, planned uses (approved and pending), and vacant land were calculated. The floor area for all existing buildings was estimated by measuring the building footprint on an aerial. Site plans or traffic studies were available for approved and pending projects. Trip generation for built, approved and pending buildings was analyzed using TMP employment densities and peak hour trip rates and is shown in **Table 14.**

Table 14 – Employment and Trip Rate Assumptions

Type	Employment Density	AM Trip Rate per ksf	PM Trip Rate per ksf
High-cube Warehouse	1 employee per ksf	0.12	0.14
Warehouse	1 employee per ksf	0.17	0.33
Office	3 employees per ksf	0.66	1.26
NEI EIR	0.5 employee per ksf	0.16	0.16

Total trip generation for the NEI Specific Plan area with the Project is provided in **Table 15**. The built/approved/pending trip generation is 1,269 trips in the AM peak hour and 1,650 in the PM peak hour. The Project is anticipated to add 593 AM peak hour trips and 995 PM peak hour trips. With the addition of the Project trips, NEI trip generation remains well below the EIR buildout estimates.

Next, trip generation was estimated for the remaining undeveloped parcels using the NEI EIR assumptions for employment density and trip rates. The estimated future trip generation is 443 trips for both AM and PM peak hours. With the addition of the future trips to the built/approved/pending plus Project trips, the NEI trip generation remains below the EIR buildout estimates.

Therefore, the Project is consistent with NEI traffic circulation analysis assumptions.

Table 15 – Trip Generation with TMP Assumption

TAZ	Projects	Project Size		AM Peak Hour	PM Peak Hour
Built/Approved/Pending Projects					
514	Built – Kellogg's, Katerra, Pacific Medical	1,383	KSF	199	262
628	Vacant				
629	Approved - Seefried	1,028	KSF	124	144
631	Built - FEMA, IPT 2 Approved - IPT 4	1,415	KSF	247	276
633	Built - Home Depot, Ridgeline Approved - Central Plastics, Home Depot Parking Pending - Interstate Truck Center	1,133	KSF	134	180
648	Project				
649	Built - Crate & Barrel, Amazon Fulfillment Center	1,921	KSF	231	269
677	Built - Hollingsworth	537	KSF	91	177
678	Built - Animal Shelter, Barbosa Cabinets, Top Shelf	416	KSF	76	147
679	Built - Bossard, Best Buy, SSA	993	KSF	119	139
680	Crate & Barrel, WSID, Amazon Parking	400	KSF	48	56
Built/Approved/Pending Subtotal				**1,269**	**1,650**
Project					
NEI Phase 3				593	995
Future Development[1]					
		2767	KSF	443	443
NEI EIR Trip Generation					
NEI EIR Trip Generation				3,000	5,241
Trip Generation Summary					
Built/Approved/Pending Net Total				**1,269**	**1,650**
Built/Approved/Pending + Project				**1,862**	**2,645**
Built/Approved/Pending + Project + Future				**2,305**	**3,088**
(Approved + Project) - NEI Trip Generation[2]				**-1,138**	**-2,596**
(Built/Approved/Pending + Project + Future) - NEI Trip Generation[2]				**-695**	**-2,153**

Notes:

1. It was also assumed that all current and future developments were industrial since no commercial land uses are shown in the City's *General Plan* (2011, 2016 update).

11. Appendix

A1. Turning Movement Counts
A2. Existing Synchro Outputs
A3. Existing Plus Background Synchro Outputs
A4. Employee Shift Data
A5. Existing Plus Background Plus Project Synchro Outputs
A6. Existing Plus Background Plus Project with Improvements Synchro Outputs
A7. Peak Hour Signal Warrants
A8. Cumulative Synchro Outputs
A9. Cumulative Plus Project Synchro Outputs
A10. Cumulative Plus Project with Improvements Synchro Outputs
B1. NEI Truck Route Study Turning Templates

A1. Turning Movement Counts

Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

				205 WB Ramp_A			MacArthur Dr			N. MacArthur Dr_A			
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	-	-	-	5,685	880	639	4,595	680	-	-	924	306	13,709
01: 12am (12am-1am)	-	-	-	25	7	4	36	1	-	-	3	2	78
02: 1am (1am-2am)	-	-	-	25	5	5	31	2	-	-	4	-	72
03: 2am (2am-3am)	-	-	-	31	10	3	47	7	-	-	6	2	106
04: 3am (3am-4am)	-	-	-	78	40	7	129	1	-	-	1	9	265
05: 4am (4am-5am)	-	-	-	263	45	8	141	5	-	-	13	8	483
06: 5am (5am-6am)	-	-	-	422	58	30	144	28	-	-	11	20	713
07: 6am (6am-7am)	-	-	-	315	43	53	160	15	-	-	38	25	649
08: 7am (7am-8am)	-	-	-	544	50	35	170	21	-	-	82	21	923
09: 8am (8am-9am)	-	-	-	364	45	44	233	25	-	-	28	22	761
10: 9am (9am-10am)	-	-	-	283	60	31	200	18	-	-	32	19	643
11: 10am (10am-11am)	-	-	-	259	55	62	246	27	-	-	47	20	716
12: 11am (11am-12noon)	-	-	-	228	51	28	261	30	-	-	52	22	672
13: 12pm (12noon-1pm)	-	-	-	285	59	40	277	51	-	-	59	15	786
14: 1pm (1pm-2pm)	-	-	-	289	48	27	270	40	-	-	55	16	745
15: 2pm (2pm-3pm)	-	-	-	335	46	42	239	56	-	-	70	20	808
16: 3pm (3pm-4pm)	-	-	-	416	34	43	315	92	-	-	91	18	1,009
17: 4pm (4pm-5pm)	-	-	-	309	25	47	337	63	-	-	133	14	928
18: 5pm (5pm-6pm)	-	-	-	339	67	44	333	52	-	-	62	14	911
19: 6pm (6pm-7pm)	-	-	-	268	40	23	324	54	-	-	47	12	768
20: 7pm (7pm-8pm)	-	-	-	167	26	22	198	25	-	-	39	6	483
21: 8pm (8pm-9pm)	-	-	-	150	28	12	153	24	-	-	32	8	407
22: 9pm (9pm-10pm)	-	-	-	152	27	16	182	29	-	-	14	10	430
23: 10pm (10pm-11pm)	-	-	-	92	11	6	79	8	-	-	4	1	201
24: 11pm (11pm-12am)	-	-	-	40	15	9	69	3	-	-	4	2	142

TURNING MOVEMENT PERCENTAGE

				205 WB Ramp_A			MacArthur Dr			N. MacArthur Dr_A		
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	-	-	-	79%	12%	9%	87%	13%	0%	0%	75%	25%
01: 12am (12am-1am)	-	-	-	69%	19%	11%	97%	3%	0%	0%	60%	40%
02: 1am (1am-2am)	-	-	-	71%	14%	14%	94%	6%	0%	0%	100%	0%
03: 2am (2am-3am)	-	-	-	70%	23%	7%	87%	13%	0%	0%	75%	25%
04: 3am (3am-4am)	-	-	-	62%	32%	6%	99%	1%	0%	0%	10%	90%
05: 4am (4am-5am)	-	-	-	83%	14%	3%	97%	3%	0%	0%	62%	38%
06: 5am (5am-6am)	-	-	-	83%	11%	6%	84%	16%	0%	0%	35%	65%
07: 6am (6am-7am)	-	-	-	77%	10%	13%	91%	9%	0%	0%	60%	40%
08: 7am (7am-8am)	-	-	-	86%	8%	6%	89%	11%	0%	0%	80%	20%
09: 8am (8am-9am)	-	-	-	80%	10%	10%	90%	10%	0%	0%	56%	44%
10: 9am (9am-10am)	-	-	-	76%	16%	8%	92%	8%	0%	0%	63%	37%
11: 10am (10am-11am)	-	-	-	69%	15%	16%	90%	10%	0%	0%	70%	30%
12: 11am (11am-12noon)	-	-	-	74%	17%	9%	90%	10%	0%	0%	70%	30%
13: 12pm (12noon-1pm)	-	-	-	74%	15%	10%	84%	16%	0%	0%	80%	20%
14: 1pm (1pm-2pm)	-	-	-	79%	13%	7%	87%	13%	0%	0%	77%	23%
15: 2pm (2pm-3pm)	-	-	-	79%	11%	10%	81%	19%	0%	0%	78%	22%
16: 3pm (3pm-4pm)	-	-	-	84%	7%	9%	77%	23%	0%	0%	83%	17%
17: 4pm (4pm-5pm)	-	-	-	81%	7%	12%	84%	16%	0%	0%	90%	10%
18: 5pm (5pm-6pm)	-	-	-	75%	15%	10%	86%	14%	0%	0%	82%	18%
19: 6pm (6pm-7pm)	-	-	-	81%	12%	7%	86%	14%	0%	0%	80%	20%
20: 7pm (7pm-8pm)	-	-	-	78%	12%	10%	89%	11%	0%	0%	87%	13%
21: 8pm (8pm-9pm)	-	-	-	79%	15%	6%	86%	14%	0%	0%	80%	20%
22: 9pm (9pm-10pm)	-	-	-	78%	14%	8%	86%	14%	0%	0%	58%	42%
23: 10pm (10pm-11pm)	-	-	-	84%	10%	6%	91%	9%	0%	0%	80%	20%
24: 11pm (11pm-12am)	-	-	-	63%	23%	14%	96%	4%	0%	0%	67%	33%

Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

	EB 205_A						MacAurthur Dr_2			MacArthur Dr			
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	601	1,674	4,517	-	-	-	-	4,748	7,248	500	6,199	-	25,487
01: 12am (12am-1am)	2	23	32	-	-	-	-	33	65	2	24	-	181
02: 1am (1am-2am)	2	20	48	-	-	-	-	29	98	3	24	-	224
03: 2am (2am-3am)	2	11	31	-	-	-	-	42	191	2	32	-	311
04: 3am (3am-4am)	5	13	28	-	-	-	-	110	91	1	72	-	320
05: 4am (4am-5am)	4	15	89	-	-	-	-	104	147	5	274	-	638
06: 5am (5am-6am)	10	21	163	-	-	-	-	146	242	5	439	-	1,026
07: 6am (6am-7am)	7	36	226	-	-	-	-	157	278	15	331	-	1,050
08: 7am (7am-8am)	17	52	281	-	-	-	-	183	422	36	605	-	1,596
09: 8am (8am-9am)	20	67	281	-	-	-	-	229	302	17	370	-	1,286
10: 9am (9am-10am)	15	48	197	-	-	-	-	203	287	18	298	-	1,066
11: 10am (10am-11am)	29	57	179	-	-	-	-	239	280	36	275	-	1,095
12: 11am (11am-12noon)	23	87	224	-	-	-	-	264	313	22	254	-	1,187
13: 12pm (12noon-1pm)	41	81	247	-	-	-	-	294	359	19	319	-	1,360
14: 1pm (1pm-2pm)	41	95	342	-	-	-	-	268	386	31	309	-	1,472
15: 2pm (2pm-3pm)	82	126	286	-	-	-	-	262	606	33	384	-	1,779
16: 3pm (3pm-4pm)	63	162	227	-	-	-	-	402	627	69	471	-	2,021
17: 4pm (4pm-5pm)	61	159	293	-	-	-	-	370	681	82	378	-	2,024
18: 5pm (5pm-6pm)	51	131	319	-	-	-	-	364	563	33	383	-	1,844
19: 6pm (6pm-7pm)	52	132	268	-	-	-	-	343	486	25	303	-	1,609
20: 7pm (7pm-8pm)	22	106	270	-	-	-	-	216	256	22	190	-	1,082
21: 8pm (8pm-9pm)	33	98	188	-	-	-	-	146	214	17	166	-	862
22: 9pm (9pm-10pm)	16	66	147	-	-	-	-	185	146	10	162	-	732
23: 10pm (10pm-11pm)	6	47	77	-	-	-	-	84	112	7	95	-	428
24: 11pm (11pm-12am)	8	28	65	-	-	-	-	71	87	3	37	-	299

TURNING MOVEMENT PERCENTAGE

	EB 205_A						MacAurthur Dr_2			MacArthur Dr		
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	9%	25%	67%	-	-	-	0%	40%	60%	7%	93%	0%
01: 12am (12am-1am)	4%	40%	56%	-	-	-	0%	34%	66%	8%	92%	0%
02: 1am (1am-2am)	3%	29%	69%	-	-	-	0%	23%	77%	11%	89%	0%
03: 2am (2am-3am)	5%	25%	70%	-	-	-	0%	18%	82%	6%	94%	0%
04: 3am (3am-4am)	11%	28%	61%	-	-	-	0%	55%	45%	1%	99%	0%
05: 4am (4am-5am)	4%	14%	82%	-	-	-	0%	41%	59%	2%	98%	0%
06: 5am (5am-6am)	5%	11%	84%	-	-	-	0%	38%	62%	1%	99%	0%
07: 6am (6am-7am)	3%	13%	84%	-	-	-	0%	36%	64%	4%	96%	0%
08: 7am (7am-8am)	5%	15%	80%	-	-	-	0%	30%	70%	6%	94%	0%
09: 8am (8am-9am)	5%	18%	76%	-	-	-	0%	43%	57%	4%	96%	0%
10: 9am (9am-10am)	6%	18%	76%	-	-	-	0%	41%	59%	6%	94%	0%
11: 10am (10am-11am)	11%	22%	68%	-	-	-	0%	46%	54%	12%	88%	0%
12: 11am (11am-12noon)	7%	26%	67%	-	-	-	0%	46%	54%	8%	92%	0%
13: 12pm (12noon-1pm)	11%	22%	67%	-	-	-	0%	45%	55%	6%	94%	0%
14: 1pm (1pm-2pm)	9%	20%	72%	-	-	-	0%	41%	59%	9%	91%	0%
15: 2pm (2pm-3pm)	17%	26%	58%	-	-	-	0%	30%	70%	8%	92%	0%
16: 3pm (3pm-4pm)	14%	36%	50%	-	-	-	0%	39%	61%	13%	87%	0%
17: 4pm (4pm-5pm)	12%	31%	57%	-	-	-	0%	35%	65%	18%	82%	0%
18: 5pm (5pm-6pm)	10%	26%	64%	-	-	-	0%	39%	61%	8%	92%	0%
19: 6pm (6pm-7pm)	12%	29%	59%	-	-	-	0%	41%	59%	8%	92%	0%
20: 7pm (7pm-8pm)	6%	27%	68%	-	-	-	0%	46%	54%	10%	90%	0%
21: 8pm (8pm-9pm)	10%	31%	59%	-	-	-	0%	41%	59%	9%	91%	0%
22: 9pm (9pm-10pm)	7%	29%	64%	-	-	-	0%	56%	44%	6%	94%	0%
23: 10pm (10pm-11pm)	5%	36%	59%	-	-	-	0%	43%	57%	7%	93%	0%
24: 11pm (11pm-12am)	8%	28%	64%	-	-	-	0%	45%	55%	8%	93%	0%

Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

	W. Grant Line_A			E. Grant Line_A			S. MacArthur_A			N. MacArthur Dr_A			
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	4,001	2,957	797	649	2,953	2,361	549	3,807	408	2,221	3,698	3,730	28,131
01: 12am (12am-1am)	10	18	1	6	12	12	14	51	15	19	28	17	203
02: 1am (1am-2am)	11	7	3	2	4	12	5	91	5	14	19	19	192
03: 2am (2am-3am)	11	8	3	6	11	21	6	131	7	12	19	14	249
04: 3am (3am-4am)	47	6	1	34	33	39	7	48	9	14	50	31	319
05: 4am (4am-5am)	62	77	7	52	58	56	11	47	33	71	106	108	688
06: 5am (5am-6am)	89	76	24	45	90	164	6	55	12	143	263	95	1,062
07: 6am (6am-7am)	126	144	34	28	80	67	5	100	12	228	154	115	1,093
08: 7am (7am-8am)	259	243	48	20	257	106	27	128	14	210	309	426	2,047
09: 8am (8am-9am)	201	88	71	32	186	115	14	161	12	125	211	163	1,379
10: 9am (9am-10am)	158	76	20	24	125	120	16	149	13	98	196	131	1,126
11: 10am (10am-11am)	171	109	40	15	146	147	33	150	19	95	150	157	1,232
12: 11am (11am-12noon)	174	131	44	26	188	152	53	180	14	104	147	164	1,377
13: 12pm (12noon-1pm)	217	216	64	13	172	131	46	203	16	113	197	182	1,570
14: 1pm (1pm-2pm)	198	155	56	26	196	139	37	228	31	150	183	205	1,604
15: 2pm (2pm-3pm)	225	223	48	73	170	180	25	324	51	114	239	262	1,934
16: 3pm (3pm-4pm)	336	281	126	88	310	215	57	389	30	87	272	268	2,459
17: 4pm (4pm-5pm)	397	380	59	20	244	144	44	415	32	138	183	242	2,298
18: 5pm (5pm-6pm)	398	304	53	24	262	192	58	289	28	164	205	267	2,244
19: 6pm (6pm-7pm)	315	176	30	11	155	155	40	257	21	100	229	329	1,818
20: 7pm (7pm-8pm)	243	100	37	23	102	50	17	147	16	63	165	193	1,156
21: 8pm (8pm-9pm)	183	82	18	25	68	37	14	88	14	65	166	153	913
22: 9pm (9pm-10pm)	86	22	7	24	33	43	7	86	3	32	102	106	551
23: 10pm (10pm-11pm)	57	25	5	4	14	34	4	46	3	24	52	57	325
24: 11pm (11pm-12am)	21	21	11	26	35	26	3	43	10	18	48	31	293

TURNING MOVEMENT PERCENTAGE

	W. Grant Line_A			E. Grant Line_A			S. MacArthur_A			N. MacArthur Dr_A		
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	52%	38%	10%	11%	50%	40%	12%	80%	9%	23%	38%	39%
01: 12am (12am-1am)	34%	62%	3%	20%	40%	40%	18%	64%	19%	30%	44%	27%
02: 1am (1am-2am)	52%	33%	14%	11%	22%	67%	5%	90%	5%	27%	37%	37%
03: 2am (2am-3am)	50%	36%	14%	16%	29%	55%	4%	91%	5%	27%	42%	31%
04: 3am (3am-4am)	87%	11%	2%	32%	31%	37%	11%	75%	14%	15%	53%	33%
05: 4am (4am-5am)	42%	53%	5%	31%	35%	34%	12%	52%	36%	25%	37%	38%
06: 5am (5am-6am)	47%	40%	13%	15%	30%	55%	8%	75%	16%	29%	52%	19%
07: 6am (6am-7am)	41%	47%	11%	16%	46%	38%	4%	85%	10%	46%	31%	23%
08: 7am (7am-8am)	47%	44%	9%	5%	67%	28%	16%	76%	8%	22%	33%	45%
09: 8am (8am-9am)	56%	24%	20%	10%	56%	35%	7%	86%	6%	25%	42%	33%
10: 9am (9am-10am)	62%	30%	8%	9%	46%	45%	9%	84%	7%	23%	46%	31%
11: 10am (10am-11am)	53%	34%	13%	5%	47%	48%	16%	74%	9%	24%	37%	39%
12: 11am (11am-12noon)	50%	38%	13%	7%	51%	42%	21%	73%	6%	25%	35%	40%
13: 12pm (12noon-1pm)	44%	43%	13%	4%	54%	41%	17%	77%	6%	23%	40%	37%
14: 1pm (1pm-2pm)	48%	38%	14%	7%	54%	39%	13%	77%	10%	28%	34%	38%
15: 2pm (2pm-3pm)	45%	45%	10%	17%	40%	43%	6%	81%	13%	19%	39%	43%
16: 3pm (3pm-4pm)	45%	38%	17%	14%	51%	35%	12%	82%	6%	14%	43%	43%
17: 4pm (4pm-5pm)	47%	45%	7%	5%	60%	35%	9%	85%	7%	25%	33%	43%
18: 5pm (5pm-6pm)	53%	40%	7%	5%	55%	40%	15%	77%	7%	26%	32%	42%
19: 6pm (6pm-7pm)	60%	34%	6%	3%	48%	48%	13%	81%	7%	15%	35%	50%
20: 7pm (7pm-8pm)	64%	26%	10%	13%	58%	29%	9%	82%	9%	15%	39%	46%
21: 8pm (8pm-9pm)	65%	29%	6%	19%	52%	28%	12%	76%	12%	17%	43%	40%
22: 9pm (9pm-10pm)	75%	19%	6%	24%	33%	43%	7%	90%	3%	13%	43%	44%
23: 10pm (10pm-11pm)	66%	29%	6%	8%	27%	65%	8%	87%	6%	18%	39%	43%
24: 11pm (11pm-12am)	40%	40%	21%	30%	40%	30%	5%	77%	18%	19%	49%	32%

Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

	W. 11th Street_A			E 11th Street_A						N. MacArthur_A			
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	1,217	7,478	-	-	7,224	1,692	-	-	-	1,682	-	1,294	20,587
01: 12am (12am-1am)	4	20	-	-	28	14	-	-	-	26	-	11	103
02: 1am (1am-2am)	1	15	-	-	30	15	-	-	-	12	-	5	78
03: 2am (2am-3am)	3	17	-	-	27	25	-	-	-	20	-	9	101
04: 3am (3am-4am)	7	13	-	-	169	26	-	-	-	19	-	10	244
05: 4am (4am-5am)	44	35	-	-	242	81	-	-	-	17	-	32	451
06: 5am (5am-6am)	24	66	-	-	299	72	-	-	-	21	-	36	518
07: 6am (6am-7am)	34	154	-	-	444	78	-	-	-	56	-	18	784
08: 7am (7am-8am)	15	467	-	-	1,074	125	-	-	-	96	-	54	1,831
09: 8am (8am-9am)	61	306	-	-	461	107	-	-	-	55	-	33	1,023
10: 9am (9am-10am)	39	240	-	-	356	76	-	-	-	50	-	49	810
11: 10am (10am-11am)	52	290	-	-	326	72	-	-	-	75	-	35	850
12: 11am (11am-12noon)	43	315	-	-	316	86	-	-	-	81	-	55	896
13: 12pm (12noon-1pm)	47	357	-	-	300	78	-	-	-	80	-	61	923
14: 1pm (1pm-2pm)	69	389	-	-	309	107	-	-	-	89	-	73	1,036
15: 2pm (2pm-3pm)	93	537	-	-	323	91	-	-	-	126	-	74	1,244
16: 3pm (3pm-4pm)	165	1,022	-	-	454	151	-	-	-	203	-	95	2,090
17: 4pm (4pm-5pm)	133	821	-	-	446	92	-	-	-	169	-	129	1,790
18: 5pm (5pm-6pm)	114	756	-	-	563	100	-	-	-	122	-	91	1,746
19: 6pm (6pm-7pm)	139	585	-	-	351	76	-	-	-	102	-	113	1,366
20: 7pm (7pm-8pm)	75	421	-	-	248	72	-	-	-	73	-	106	995
21: 8pm (8pm-9pm)	32	335	-	-	195	55	-	-	-	84	-	132	833
22: 9pm (9pm-10pm)	23	167	-	-	154	37	-	-	-	38	-	44	463
23: 10pm (10pm-11pm)	16	80	-	-	77	19	-	-	-	34	-	9	235
24: 11pm (11pm-12am)	7	50	-	-	50	12	-	-	-	30	-	25	174

TURNING MOVEMENT PERCENTAGE

	W. 11th Street_A			E 11th Street_A						N. MacArthur_A		
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	14%	86%	0%	0%	81%	19%	-	-	-	57%	0%	43%
01: 12am (12am-1am)	17%	83%	0%	0%	67%	33%	-	-	-	70%	0%	30%
02: 1am (1am-2am)	6%	94%	0%	0%	67%	33%	-	-	-	71%	0%	29%
03: 2am (2am-3am)	15%	85%	0%	0%	52%	48%	-	-	-	69%	0%	31%
04: 3am (3am-4am)	35%	65%	0%	0%	87%	13%	-	-	-	66%	0%	34%
05: 4am (4am-5am)	56%	44%	0%	0%	75%	25%	-	-	-	35%	0%	65%
06: 5am (5am-6am)	27%	73%	0%	0%	81%	19%	-	-	-	37%	0%	63%
07: 6am (6am-7am)	18%	82%	0%	0%	85%	15%	-	-	-	76%	0%	24%
08: 7am (7am-8am)	3%	97%	0%	0%	90%	10%	-	-	-	64%	0%	36%
09: 8am (8am-9am)	17%	83%	0%	0%	81%	19%	-	-	-	63%	0%	38%
10: 9am (9am-10am)	14%	86%	0%	0%	82%	18%	-	-	-	51%	0%	49%
11: 10am (10am-11am)	15%	85%	0%	0%	82%	18%	-	-	-	68%	0%	32%
12: 11am (11am-12noon)	12%	88%	0%	0%	79%	21%	-	-	-	60%	0%	40%
13: 12pm (12noon-1pm)	12%	88%	0%	0%	79%	21%	-	-	-	57%	0%	43%
14: 1pm (1pm-2pm)	15%	85%	0%	0%	74%	26%	-	-	-	55%	0%	45%
15: 2pm (2pm-3pm)	15%	85%	0%	0%	78%	22%	-	-	-	63%	0%	37%
16: 3pm (3pm-4pm)	14%	86%	0%	0%	75%	25%	-	-	-	68%	0%	32%
17: 4pm (4pm-5pm)	14%	86%	0%	0%	83%	17%	-	-	-	57%	0%	43%
18: 5pm (5pm-6pm)	13%	87%	0%	0%	85%	15%	-	-	-	57%	0%	43%
19: 6pm (6pm-7pm)	19%	81%	0%	0%	82%	18%	-	-	-	47%	0%	53%
20: 7pm (7pm-8pm)	15%	85%	0%	0%	78%	23%	-	-	-	41%	0%	59%
21: 8pm (8pm-9pm)	9%	91%	0%	0%	78%	22%	-	-	-	39%	0%	61%
22: 9pm (9pm-10pm)	12%	88%	0%	0%	81%	19%	-	-	-	46%	0%	54%
23: 10pm (10pm-11pm)	17%	83%	0%	0%	80%	20%	-	-	-	79%	0%	21%
24: 11pm (11pm-12am)	12%	88%	0%	0%	81%	19%	-	-	-	55%	0%	45%

Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

	W. Grantline_A			E. Grant Line_A			Skylark_A						
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	-	5,007	252	179	4,846	-	280	-	176	-	-	-	10,740
01: 12am (12am-1am)	-	68	-	-	21	-	3	-	2	-	-	-	94
03: 2am (2am-3am)	-	27	-	-	31	-	4	-	1	-	-	-	63
04: 3am (3am-4am)	-	22	1	1	92	-	2	-	3	-	-	-	121
05: 4am (4am-5am)	-	161	13	1	123	-	26	-	28	-	-	-	352
06: 5am (5am-6am)	-	174	4	2	196	-	59	-	10	-	-	-	445
07: 6am (6am-7am)	-	252	41	63	174	-	4	-	2	-	-	-	536
08: 7am (7am-8am)	-	358	37	39	319	-	5	-	1	-	-	-	759
09: 8am (8am-9am)	-	187	9	3	324	-	1	-	3	-	-	-	527
10: 9am (9am-10am)	-	160	6	5	252	-	3	-	2	-	-	-	428
11: 10am (10am-11am)	-	200	9	3	260	-	9	-	1	-	-	-	482
12: 11am (11am-12noon)	-	235	9	1	299	-	11	-	5	-	-	-	560
13: 12pm (12noon-1pm)	-	320	7	1	251	-	10	-	7	-	-	-	596
14: 1pm (1pm-2pm)	-	280	12	3	315	-	7	-	1	-	-	-	618
15: 2pm (2pm-3pm)	-	378	10	3	328	-	17	-	9	-	-	-	745
16: 3pm (3pm-4pm)	-	389	7	3	454	-	37	-	13	-	-	-	903
17: 4pm (4pm-5pm)	-	541	13	2	351	-	9	-	8	-	-	-	924
18: 5pm (5pm-6pm)	-	497	32	40	362	-	22	-	36	-	-	-	989
19: 6pm (6pm-7pm)	-	281	25	19	231	-	47	-	33	-	-	-	636
20: 7pm (7pm-8pm)	-	165	1	1	149	-	2	-	3	-	-	-	321
21: 8pm (8pm-9pm)	-	128	6	-	101	-	3	-	3	-	-	-	241
22: 9pm (9pm-10pm)	-	-	-	-	-	-	-	-	-	-	-	-	-
23: 10pm (10pm-11pm)	-	42	2	-	33	-	2	-	2	-	-	-	81
24: 11pm (11pm-12am)	-	51	1	1	73	-	3	-	2	-	-	-	131
02: 1am (1am-2am)	-	27	-	-	13	-	1	-	3	-	-	-	44

TURNING MOVEMENT PERCENTAGE

	W. Grantline_A			E. Grant Line_A			Skylark_A					
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	0%	95%	5%	4%	96%	0%	61%	0%	39%	-	-	-
01: 12am (12am-1am)	0%	100%	0%	0%	100%	0%	60%	0%	40%	-	-	-
03: 2am (2am-3am)	0%	100%	0%	0%	100%	0%	80%	0%	20%	-	-	-
04: 3am (3am-4am)	0%	96%	4%	1%	99%	0%	40%	0%	60%	-	-	-
05: 4am (4am-5am)	0%	93%	7%	1%	99%	0%	48%	0%	52%	-	-	-
06: 5am (5am-6am)	0%	98%	2%	1%	99%	0%	86%	0%	14%	-	-	-
07: 6am (6am-7am)	0%	86%	14%	27%	73%	0%	67%	0%	33%	-	-	-
08: 7am (7am-8am)	0%	91%	9%	11%	89%	0%	83%	0%	17%	-	-	-
09: 8am (8am-9am)	0%	95%	5%	1%	99%	0%	25%	0%	75%	-	-	-
10: 9am (9am-10am)	0%	96%	4%	2%	98%	0%	60%	0%	40%	-	-	-
11: 10am (10am-11am)	0%	96%	4%	1%	99%	0%	90%	0%	10%	-	-	-
12: 11am (11am-12noon)	0%	96%	4%	0%	100%	0%	69%	0%	31%	-	-	-
13: 12pm (12noon-1pm)	0%	98%	2%	0%	100%	0%	59%	0%	41%	-	-	-
14: 1pm (1pm-2pm)	0%	96%	4%	1%	99%	0%	88%	0%	13%	-	-	-
15: 2pm (2pm-3pm)	0%	97%	3%	1%	99%	0%	65%	0%	35%	-	-	-
16: 3pm (3pm-4pm)	0%	98%	2%	1%	99%	0%	74%	0%	26%	-	-	-
17: 4pm (4pm-5pm)	0%	98%	2%	1%	99%	0%	53%	0%	47%	-	-	-
18: 5pm (5pm-6pm)	0%	94%	6%	10%	90%	0%	38%	0%	62%	-	-	-
19: 6pm (6pm-7pm)	0%	92%	8%	8%	92%	0%	59%	0%	41%	-	-	-
20: 7pm (7pm-8pm)	0%	99%	1%	1%	99%	0%	40%	0%	60%	-	-	-
21: 8pm (8pm-9pm)	0%	96%	4%	0%	100%	0%	50%	0%	50%	-	-	-
22: 9pm (9pm-10pm)	-	-	-	-	-	-	-	-	-	-	-	-
23: 10pm (10pm-11pm)	0%	95%	5%	0%	100%	0%	50%	0%	50%	-	-	-
24: 11pm (11pm-12am)	0%	98%	2%	1%	99%	0%	60%	0%	40%	-	-	-
02: 1am (1am-2am)	0%	100%	0%	0%	100%	0%	25%	0%	75%	-	-	-

Prepared by National Data & Surveying Services

Chrisman Rd & Grant Line Rd

Peak Hour Turning Movement Count

ID: 19-08103-001
City: Tracy

Day: Thursday
Date: 02/28/2019

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	07:00 AM - 09:00 AM
NONE	NONE
05:00 PM - 06:00 PM	04:00 PM - 06:00 PM

Chrisman Rd

SOUTHBOUND

	↲	↓	↳	⮏	⇧	
AM	0	0	0	0	0	AM
NOON	0	0	0	0	0	NOON
PM	0	0	0	0	0	PM
	0	0	0	0		

Grant Line Rd

EASTBOUND

	AM	NOON	PM	
⇦	305	0	301	
⮌	0	0	0	0
⮥	0	0	0	1
→	217	0	359	3
⮧	77	0	39	0

CONTROL

Signalized

	AM	NOON	PM
TEV	675	0	773
PHF	0.80		0.85

Grant Line Rd

WESTBOUND

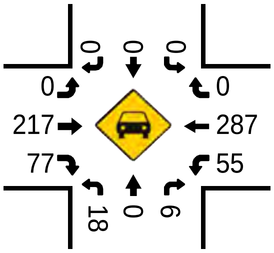
		PM	NOON	AM
0	⮤	0	0	0
3	←	205	0	287
1	↰	45	0	55
0	⮎	1	0	15
	⇨	388	0	238

NORTHBOUND

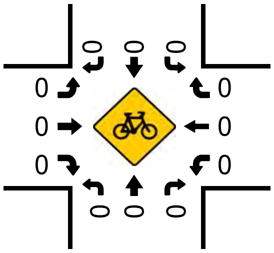
Chrisman Rd

	⇩	⮍	↰	↑	↱	
		0	1	0	1	
PM	84	0	96	0	28	PM
NOON	0	0	0	0	0	NOON
AM	132	0	18	0	6	AM

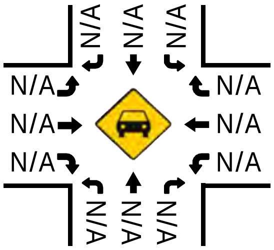
Total Vehicles (AM)



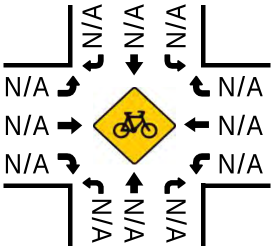
Bikes (AM)



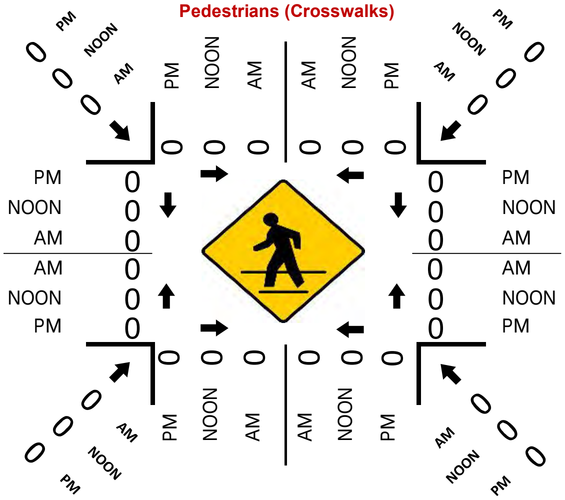
Total Vehicles (Noon)



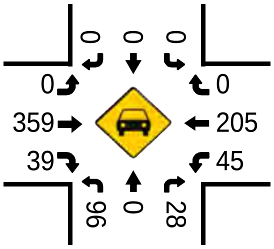
Bikes (NOON)



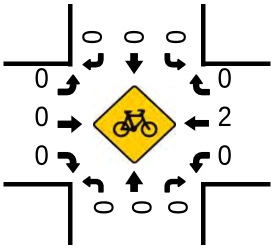
Pedestrians (Crosswalks)



Total Vehicles (PM)



Bikes (PM)



Prepared by National Data & Surveying Services

Chrisman Rd & Paradise Rd

Peak Hour Turning Movement Count

ID: 18-08075-001
City: Tracy

Day: Tuesday
Date: 02/27/2018

PEAK HOURS	COUNT PERIODS
06:30 AM - 07:30 AM	06:30 AM - 09:00 AM
NONE	NONE
05:30 PM - 06:30 PM	04:30 PM - 06:30 PM

Chrisman Rd

SOUTHBOUND

	↲	↓	↳	↶	⇧	
AM	5	262	2	0	20	AM
NOON	0	0	0	0	0	NOON
PM	5	175	2	0	117	PM
	0.5	0.5	1	0		

Paradise Rd

EASTBOUND

	AM	NOON	PM	
⇦	12	0	9	
↶	0	0	0	0
↱	0	0	6	1
→	0	0	28	0.5
↴	2	0	0	0.5

WESTBOUND

Paradise Rd

		PM	NOON	AM
0.5	↰	2	0	3
0.5	←	1	0	7
1	↙	245	0	275
0	↶	0	0	1
	⇨	336	0	35

CONTROL

4-Way Stop

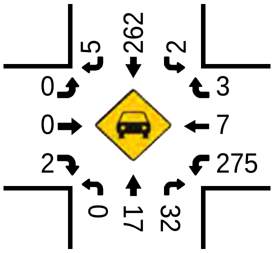
	AM	NOON	PM
TEV	606	0	882
PHF	0.89		0.64

	⇩	↶	↰	↑	↱	
		0	1	0.5	0.5	
PM	420	0	3	109	306	PM
NOON	0	0	0	0	0	NOON
AM	539	0	0	17	32	AM

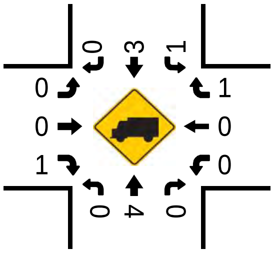
NORTHBOUND

Chrisman Rd

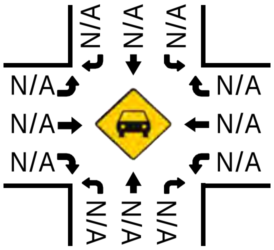
Total Vehicles (AM)



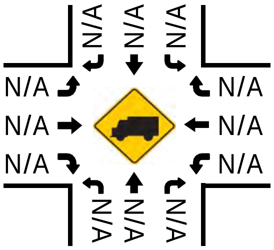
HT (AM)



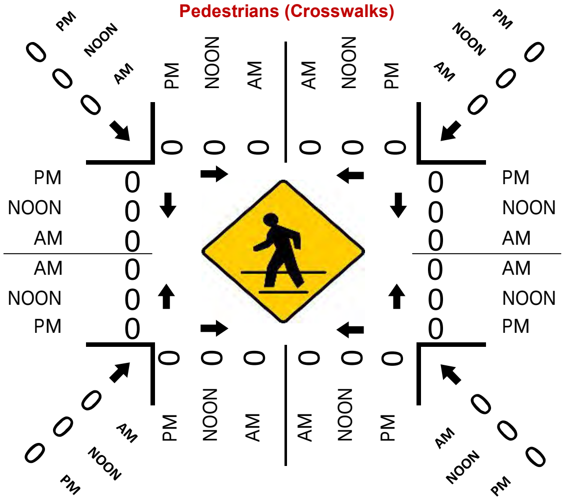
Total Vehicles (Noon)



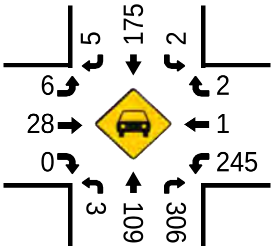
HT (NOON)



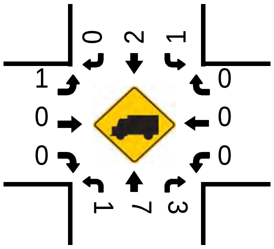
Pedestrians (Crosswalks)



Total Vehicles (PM)



HT (PM)



Day Type

1: Weekday (Tu-Th)

TURNING MOVEMENT COUNTS

	W 11th St_A			E. 11th St_A			S. Chrisman_A			N. Chrisman_A			
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right	Total
00: All Day (12am-12am)	895	6,536	1,582	4,602	6,782	460	1,500	451	5,077	270	411	410	28,976
01: 12am (12am-1am)	1	32	6	22	39	1	4	1	15	-	2	1	124
02: 1am (1am-2am)	-	26	4	46	39	2	4	-	12	-	12	2	147
03: 2am (2am-3am)	1	37	2	11	39	-	11	-	4	1	8	2	116
04: 3am (3am-4am)	2	24	9	17	202	10	4	-	12	1	-	2	283
05: 4am (4am-5am)	5	40	11	51	331	8	8	4	26	-	-	-	484
06: 5am (5am-6am)	9	74	18	227	360	20	33	17	136	2	7	2	905
07: 6am (6am-7am)	14	138	55	476	501	47	79	7	259	9	60	1	1,646
08: 7am (7am-8am)	108	369	59	287	682	31	448	29	487	20	21	21	2,562
09: 8am (8am-9am)	65	269	40	220	438	35	81	19	341	15	18	34	1,575
10: 9am (9am-10am)	42	196	31	169	344	34	47	34	242	15	15	29	1,198
11: 10am (10am-11am)	38	264	62	149	322	22	51	31	265	24	18	13	1,259
12: 11am (11am-12noon)	49	246	63	162	297	19	61	25	225	14	18	13	1,192
13: 12pm (12noon-1pm)	50	301	64	176	276	32	52	22	204	18	19	15	1,229
14: 1pm (1pm-2pm)	39	364	68	209	318	31	62	28	253	12	15	22	1,421
15: 2pm (2pm-3pm)	74	509	64	212	297	27	58	20	406	19	15	32	1,733
16: 3pm (3pm-4pm)	106	705	427	256	399	25	134	44	604	27	39	37	2,803
17: 4pm (4pm-5pm)	62	767	148	392	421	37	62	43	414	34	27	54	2,461
18: 5pm (5pm-6pm)	81	686	112	419	475	40	120	39	393	20	29	37	2,451
19: 6pm (6pm-7pm)	49	528	100	274	305	13	60	27	316	16	19	36	1,743
20: 7pm (7pm-8pm)	36	343	87	202	227	21	36	42	178	8	8	26	1,214
21: 8pm (8pm-9pm)	26	308	86	282	207	8	29	10	120	9	14	13	1,112
22: 9pm (9pm-10pm)	17	144	40	187	146	12	13	4	92	6	35	9	705
23: 10pm (10pm-11pm)	8	96	15	108	72	-	12	6	82	1	3	9	412
24: 11pm (11pm-12am)	-	58	11	55	47	-	8	-	15	2	2	3	201

TURNING MOVEMENT PERCENTAGE

	W 11th St_A			E. 11th St_A			S. Chrisman_A			N. Chrisman_A		
Day Part	EB Left	EB Thru	EB Right	WB Left	WB Thru	WB Right	NB Left	NB Thru	NB Right	SB Left	SB Thru	SB Right
00: All Day (12am-12am)	10%	73%	18%	39%	57%	4%	21%	6%	72%	25%	38%	38%
01: 12am (12am-1am)	3%	82%	15%	35%	63%	2%	20%	5%	75%	0%	67%	33%
02: 1am (1am-2am)	0%	87%	13%	53%	45%	2%	25%	0%	75%	0%	86%	14%
03: 2am (2am-3am)	3%	93%	5%	22%	78%	0%	73%	0%	27%	9%	73%	18%
04: 3am (3am-4am)	6%	69%	26%	7%	88%	4%	25%	0%	75%	33%	0%	67%
05: 4am (4am-5am)	9%	71%	20%	13%	85%	2%	21%	11%	68%	-	-	-
06: 5am (5am-6am)	9%	73%	18%	37%	59%	3%	18%	9%	73%	18%	64%	18%
07: 6am (6am-7am)	7%	67%	27%	46%	49%	5%	23%	2%	75%	13%	86%	1%
08: 7am (7am-8am)	20%	69%	11%	29%	68%	3%	46%	3%	51%	32%	34%	34%
09: 8am (8am-9am)	17%	72%	11%	32%	63%	5%	18%	4%	77%	22%	27%	51%
10: 9am (9am-10am)	16%	73%	12%	31%	63%	6%	15%	11%	75%	25%	25%	49%
11: 10am (10am-11am)	10%	73%	17%	30%	65%	4%	15%	9%	76%	44%	33%	24%
12: 11am (11am-12noon)	14%	69%	18%	34%	62%	4%	20%	8%	72%	31%	40%	29%
13: 12pm (12noon-1pm)	12%	73%	15%	36%	57%	7%	19%	8%	73%	35%	37%	29%
14: 1pm (1pm-2pm)	8%	77%	14%	37%	57%	6%	18%	8%	74%	24%	31%	45%
15: 2pm (2pm-3pm)	11%	79%	10%	40%	55%	5%	12%	4%	84%	29%	23%	48%
16: 3pm (3pm-4pm)	9%	57%	34%	38%	59%	4%	17%	6%	77%	26%	38%	36%
17: 4pm (4pm-5pm)	6%	79%	15%	46%	50%	4%	12%	8%	80%	30%	23%	47%
18: 5pm (5pm-6pm)	9%	78%	13%	45%	51%	4%	22%	7%	71%	23%	34%	43%
19: 6pm (6pm-7pm)	7%	78%	15%	46%	52%	2%	15%	7%	78%	23%	27%	51%
20: 7pm (7pm-8pm)	8%	74%	19%	45%	50%	5%	14%	16%	70%	19%	19%	62%
21: 8pm (8pm-9pm)	6%	73%	20%	57%	42%	2%	18%	6%	75%	25%	39%	36%
22: 9pm (9pm-10pm)	8%	72%	20%	54%	42%	3%	12%	4%	84%	12%	70%	18%
23: 10pm (10pm-11pm)	7%	81%	13%	60%	40%	0%	12%	6%	82%	8%	23%	69%
24: 11pm (11pm-12am)	0%	84%	16%	54%	46%	0%	35%	0%	65%	29%	29%	43%

A2. Existing Synchro Outputs

HCM 6th Signalized Intersection Summary
Existing Conditions

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	557	50	35	178	22	0	0	84	21
Future Volume (veh/h)	0	0	0	557	50	35	178	22	0	0	84	21
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				619	56	39	198	24	0	0	93	23
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				677	61	43	256	621	0	0	144	36
Arrive On Green				0.47	0.47	0.47	0.15	0.35	0.00	0.00	0.11	0.11
Sat Flow, veh/h				1442	130	91	1668	1752	0	0	1356	335
Grp Volume(v), veh/h				714	0	0	198	24	0	0	0	116
Grp Sat Flow(s),veh/h/ln				1663	0	0	1668	1752	0	0	0	1691
Q Serve(g_s), s				20.6	0.0	0.0	5.9	0.5	0.0	0.0	0.0	3.4
Cycle Q Clear(g_c), s				20.6	0.0	0.0	5.9	0.5	0.0	0.0	0.0	3.4
Prop In Lane				0.87		0.05	1.00		0.00	0.00		0.20
Lane Grp Cap(c), veh/h				781	0	0	256	621	0	0	0	180
V/C Ratio(X)				0.91	0.00	0.00	0.77	0.04	0.00	0.00	0.00	0.65
Avail Cap(c_a), veh/h				1126	0	0	968	847	0	0	0	818
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				12.7	0.0	0.0	21.0	10.9	0.0	0.0	0.0	22.2
Incr Delay (d2), s/veh				6.8	0.0	0.0	3.7	0.0	0.0	0.0	0.0	1.4
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.1	0.0	0.0	2.2	0.1	0.0	0.0	0.0	1.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				19.5	0.0	0.0	24.8	10.9	0.0	0.0	0.0	23.6
LnGrp LOS				B	A	A	C	B	A	A	A	C
Approach Vol, veh/h					714			222			116	
Approach Delay, s/veh					19.5			23.3			23.6	
Approach LOS					B			C			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		23.2			12.8	10.4		28.5				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		2.5			7.9	5.4		22.6				
Green Ext Time (p_c), s		0.0			0.5	0.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			20.8									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
Existing Conditions

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	17	52	281	0	0	0	0	183	422	36	605	0
Future Volume (veh/h)	17	52	281	0	0	0	0	183	422	36	605	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	18	57	305				0	199	459	39	658	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	105	333	376				0	730	618	71	958	0
Arrive On Green	0.25	0.25	0.25				0.00	0.42	0.42	0.04	0.55	0.00
Sat Flow, veh/h	415	1316	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	75	0	305				0	199	459	39	658	0
Grp Sat Flow(s),veh/h/ln	1731	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	1.5	0.0	8.8				0.0	3.4	11.9	1.0	12.4	0.0
Cycle Q Clear(g_c), s	1.5	0.0	8.8				0.0	3.4	11.9	1.0	12.4	0.0
Prop In Lane	0.24		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	438	0	376				0	730	618	71	958	0
V/C Ratio(X)	0.17	0.00	0.81				0.00	0.27	0.74	0.55	0.69	0.00
Avail Cap(c_a), veh/h	950	0	815				0	2115	1792	549	2115	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.3	0.0	16.0				0.0	8.8	11.2	21.4	7.5	0.0
Incr Delay (d2), s/veh	0.1	0.0	1.6				0.0	0.3	2.5	6.4	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	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	2.6				0.0	1.0	3.1	0.5	2.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.3	0.0	17.6				0.0	9.0	13.8	27.8	8.7	0.0
LnGrp LOS	B	A	B				A	A	B	C	A	A
Approach Vol, veh/h		380						658			697	
Approach Delay, s/veh		16.8						12.3			9.8	
Approach LOS		B						B			A	
Timer - Assigned Phs	1	2		4		6						
Phs Duration (G+Y+Rc), s	5.9	23.9		15.7		29.8						
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9						
Max Green Setting (Gmax), s	15.0	55.0		* 25		55.0						
Max Q Clear Time (g_c+I1), s	3.0	13.9		10.8		14.4						
Green Ext Time (p_c), s	0.1	5.1		0.8		5.2						
Intersection Summary												
HCM 6th Ctrl Delay			12.3									
HCM 6th LOS			B									

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	259	243	48	20	257	106	27	128	14	210	309	426
Future Volume (veh/h)	259	243	48	20	257	106	27	128	14	210	309	426
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	282	264	52	22	279	115	29	139	15	228	336	463
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	324	1041	464	50	500	211	65	762	340	267	1173	554
Arrive On Green	0.18	0.30	0.30	0.03	0.14	0.14	0.04	0.23	0.23	0.16	0.35	0.35
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	282	264	52	22	279	115	29	139	15	228	336	463
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	11.1	4.1	1.7	0.9	5.3	5.2	1.2	2.4	0.6	9.5	5.2	19.4
Cycle Q Clear(g_c), s	11.1	4.1	1.7	0.9	5.3	5.2	1.2	2.4	0.6	9.5	5.2	19.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	324	1041	464	50	500	211	65	762	340	267	1173	554
V/C Ratio(X)	0.87	0.25	0.11	0.44	0.56	0.55	0.45	0.18	0.04	0.85	0.29	0.84
Avail Cap(c_a), veh/h	370	1475	658	349	1475	621	370	1392	621	349	1392	658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.5	19.2	18.4	34.2	28.7	28.6	33.8	22.2	21.5	29.3	16.7	21.3
Incr Delay (d2), s/veh	16.5	0.2	0.2	2.3	1.7	3.7	1.8	0.2	0.1	12.0	0.2	9.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	1.6	0.6	0.4	2.2	1.9	0.5	0.9	0.2	4.4	1.8	7.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.0	19.5	18.6	36.5	30.3	32.4	35.6	22.4	21.6	41.3	17.0	30.5
LnGrp LOS	D	B	B	D	C	C	D	C	C	D	B	C
Approach Vol, veh/h		598			416			183			1027	
Approach Delay, s/veh		31.4			31.2			24.5			28.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.5	21.9	7.1	26.2	7.6	30.8	18.1	15.2
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	11.5	4.4	2.9	6.1	3.2	21.4	13.1	7.3
Green Ext Time (p_c), s	0.1	1.1	0.0	2.3	0.0	3.9	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			↑↑	↱		✥			↰	↱
Traffic Volume (veh/h)	15	467	0	0	1074	125	0	0	0	96	0	54
Future Volume (veh/h)	15	467	0	0	1074	125	0	0	0	96	0	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	16	508	0	0	1167	136	0	0	0	104	0	59
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	57	2145	0	0	1680	708	0	337	0	415	0	303
Arrive On Green	0.03	0.61	0.00	0.00	0.48	0.48	0.00	0.00	0.00	0.19	0.00	0.19
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	16	508	0	0	1167	136	0	0	0	104	0	59
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	0.4	3.0	0.0	0.0	11.7	2.4	0.0	0.0	0.0	3.1	0.0	1.4
Cycle Q Clear(g_c), s	0.4	3.0	0.0	0.0	11.7	2.4	0.0	0.0	0.0	3.1	0.0	1.4
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	57	2145	0	0	1680	708	0	337	0	415	0	303
V/C Ratio(X)	0.28	0.24	0.00	0.00	0.69	0.19	0.00	0.00	0.00	0.25	0.00	0.19
Avail Cap(c_a), veh/h	1172	3898	0	0	3898	1642	0	969	0	1187	0	1217
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.4	4.1	0.0	0.0	9.3	6.8	0.0	0.0	0.0	16.0	0.0	15.3
Incr Delay (d2), s/veh	1.0	0.1	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.6	0.0	0.0	3.1	0.5	0.0	0.0	0.0	0.9	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	4.1	0.0	0.0	9.8	6.9	0.0	0.0	0.0	16.1	0.0	15.4
LnGrp LOS	C	A	A	A	A	A	A	A	A	B	A	B
Approach Vol, veh/h		524			1303			0			163	
Approach Delay, s/veh		4.7			9.5			0.0			15.9	
Approach LOS		A			A						B	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		32.0		13.2	6.0	26.1		13.2				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		50.0		35.0	30.0	50.0		25.0				
Max Q Clear Time (g_c+I1), s		5.0		5.1	2.4	13.7		0.0				
Green Ext Time (p_c), s		2.4		0.5	0.0	7.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	8.7
HCM 6th LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	0	358	37	45	369	0	5	0	1	0	0	0
Future Volume (veh/h)	0	358	37	45	369	0	5	0	1	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	0	389	40	49	401	0	5	0	1	0	0	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	6	1285	131	94	2058	0	11	0	24	6	6	0
Arrive On Green	0.00	0.42	0.42	0.06	0.62	0.00	0.01	0.00	0.02	0.00	0.00	0.00
Sat Flow, veh/h	1668	3048	312	1668	3416	0	1668	0	1485	1668	1752	0
Grp Volume(v), veh/h	0	211	218	49	401	0	5	0	1	0	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1696	1668	1664	0	1668	0	1485	1668	1752	0
Q Serve(g_s), s	0.0	2.4	2.4	0.8	1.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	2.4	2.4	0.8	1.5	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.18	1.00		0.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	6	701	715	94	2058	0	11	0	24	6	6	0
V/C Ratio(X)	0.00	0.30	0.30	0.52	0.19	0.00	0.44	0.00	0.04	0.00	0.00	0.00
Avail Cap(c_a), veh/h	879	2630	2680	1465	7015	0	1172	0	2347	879	2154	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	5.5	5.5	13.1	2.4	0.0	14.1	0.0	13.8	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.7	0.0	0.0	9.6	0.0	0.3	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.3	0.3	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	5.5	5.6	14.7	2.4	0.0	23.7	0.0	14.0	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	C	A	B	A	A	A
Approach Vol, veh/h		429			450			6			0	
Approach Delay, s/veh		5.5			3.7			22.1			0.0	
Approach LOS		A			A			C				

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.6	17.8	0.0	5.1	0.0	23.4	4.2	0.9
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	2.8	4.4	0.0	2.0	0.0	3.5	2.1	0.0
Green Ext Time (p_c), s	0.0	1.4	0.0	0.0	0.0	1.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	4.7
HCM 6th LOS	A

7: Chrisman Rd/CHRISMAN & Paradise Rd

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑↱	
Traffic Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Future Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	2	310	8	3	0	19	36	2	294	6
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	8.8	16.4	9.2	14.6
HCM LOS	A	C	A	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	100%	0%	100%	0%	0%	70%	0%	98%
Vol Right, %	0%	0%	100%	0%	100%	0%	30%	0%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	17	32	0	2	276	10	2	267
LT Vol	0	0	0	0	0	276	0	2	0
Through Vol	0	17	0	0	0	0	7	0	262
RT Vol	0	0	32	0	2	0	3	0	5
Lane Flow Rate	0	19	36	0	2	310	11	2	300
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.035	0.059	0	0.004	0.551	0.018	0.004	0.5
Departure Headway (Hd)	6.643	6.643	5.932	6.766	6.056	6.392	5.678	6.517	5.999
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	539	604	0	591	564	632	550	603
Service Time	4.38	4.38	3.669	4.506	3.795	4.114	3.4	4.243	3.725
HCM Lane V/C Ratio	0	0.035	0.06	0	0.003	0.55	0.017	0.004	0.498
HCM Control Delay	9.4	9.6	9	9.5	8.8	16.7	8.5	9.3	14.6
HCM Lane LOS	N	A	A	N	A	C	A	A	B
HCM 95th-tile Q	0	0.1	0.2	0	0	3.3	0.1	0	2.8

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰	↱		↰	↱
Traffic Volume (veh/h)	108	369	59	287	682	31	448	29	487	20	21	21
Future Volume (veh/h)	108	369	59	287	682	31	448	29	487	20	21	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	117	401	64	312	741	34	487	32	0	22	23	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	186	717	320	354	1052	469	532	30		340	332	
Arrive On Green	0.11	0.22	0.22	0.21	0.32	0.32	0.36	0.36	0.00	0.36	0.36	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	1256	82	1485	772	929	1485
Grp Volume(v), veh/h	117	401	64	312	741	34	519	0	0	45	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1338	0	1485	1701	0	1485
Q Serve(g_s), s	5.6	9.0	3.0	15.2	16.4	1.3	28.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.6	9.0	3.0	15.2	16.4	1.3	30.0	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.94		1.00	0.49		1.00
Lane Grp Cap(c), veh/h	186	717	320	354	1052	469	562	0		673	0	
V/C Ratio(X)	0.63	0.56	0.20	0.88	0.70	0.07	0.92	0.00		0.07	0.00	
Avail Cap(c_a), veh/h	995	1985	885	398	1985	885	562	0		673	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	35.6	29.3	27.0	32.0	25.2	20.1	27.9	0.0	0.0	17.7	0.0	0.0
Incr Delay (d2), s/veh	7.3	1.5	0.7	20.9	1.9	0.1	22.6	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	3.5	1.0	7.5	6.0	0.4	13.2	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.9	30.8	27.6	52.9	27.1	20.2	50.5	0.0	0.0	17.9	0.0	0.0
LnGrp LOS	D	C	C	D	C	C	D	A		B	A	
Approach Vol, veh/h		582			1087			519	A		45	A
Approach Delay, s/veh		32.9			34.3			50.5			17.9	
Approach LOS		C			C			D			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.8	24.1		36.0	15.3	32.5		36.0
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	17.2	11.0		3.4	7.6	18.4		32.0
Green Ext Time (p_c), s	0.6	4.7		0.3	1.0	8.1		0.0

Intersection Summary	
HCM 6th Ctrl Delay	37.4
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		⮌		↑↱							↱
Traffic Vol, veh/h	15	344	0	0	0	406	2	0	0	0	0	0	8
Future Vol, veh/h	15	344	0	0	0	406	2	0	0	0	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	0	0	0	10	10	10
Mvmt Flow	16	374	0	0	0	441	2	0	0	0	0	0	9

Major/Minor	Major1			Major2				Minor2		
Conflicting Flow All	443	0	-	273	-	-	0	-	-	222
Stage 1	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-	-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-	-	-	3.4
Pot Cap-1 Maneuver	1059	-	0	1057	0	-	-	0	0	758
Stage 1	-	-	0	-	0	-	-	0	0	-
Stage 2	-	-	0	-	0	-	-	0	0	-
Platoon blocked, %		-				-	-			
Mov Cap-1 Maneuver	1059	-	-	1057	-	-	-	-	0	758
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	0	-
Stage 1	-	-	-	-	-	-	-	-	0	-
Stage 2	-	-	-	-	-	-	-	-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	1059	-	1057	-	-	758
HCM Lane V/C Ratio	0.015	-	-	-	-	0.011
HCM Control Delay (s)	8.5	-	0	-	-	9.8
HCM Lane LOS	A	-	A	-	-	A
HCM 95th %tile Q(veh)	0	-	0	-	-	0

HCM Signalized Intersection Capacity Analysis

6: Chrisman Rd & Grant Line Rd

Existing Conditions

Timing Plan: AM Peak

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶	↑↑↱		↰	↑↑↑	↰	↱
Traffic Volume (vph)	0	254	90	95	390	18	6
Future Volume (vph)	0	254	90	95	390	18	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.91		1.00	0.91	1.00	1.00
Frt		0.96		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		4530		1641	4715	1641	1468
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		4530		1641	4715	1641	1468
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	318	112	119	488	22	8
RTOR Reduction (vph)	0	69	0	0	0	0	8
Lane Group Flow (vph)	0	362	0	119	488	23	0
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%
Turn Type	Prot	NA		Prot	NA	Prot	Perm
Protected Phases	5	2		1	6	8	
Permitted Phases							8
Actuated Green, G (s)		17.1		8.0	31.1	0.8	0.8
Effective Green, g (s)		17.1		8.0	31.1	0.8	0.8
Actuated g/C Ratio		0.39		0.18	0.71	0.02	0.02
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		2.0		3.0	2.0	1.0	1.0
Lane Grp Cap (vph)		1764		299	3340	29	26
v/s Ratio Prot		c0.08		c0.07	0.10	c0.01	
v/s Ratio Perm							0.00
v/c Ratio		0.21		0.40	0.15	0.79	0.01
Uniform Delay, d1		8.9		15.8	2.1	21.5	21.2
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.0		0.9	0.0	79.5	0.0
Delay (s)		8.9		16.7	2.1	101.0	21.2
Level of Service		A		B	A	F	C
Approach Delay (s)		8.9			5.0	80.4	
Approach LOS		A			A	F	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	18.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP

Timing Plan: PM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	322	25	47	363	68	0	0	138	14
Future Volume (veh/h)	0	0	0	322	25	47	363	68	0	0	138	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				358	28	52	403	76	0	0	153	16
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				415	32	60	478	905	0	0	211	22
Arrive On Green				0.31	0.31	0.31	0.29	0.52	0.00	0.00	0.14	0.14
Sat Flow, veh/h				1348	105	196	1668	1752	0	0	1559	163
Grp Volume(v), veh/h				438	0	0	403	76	0	0	0	169
Grp Sat Flow(s),veh/h/ln				1649	0	0	1668	1752	0	0	0	1722
Q Serve(g_s), s				13.0	0.0	0.0	11.8	1.1	0.0	0.0	0.0	4.9
Cycle Q Clear(g_c), s				13.0	0.0	0.0	11.8	1.1	0.0	0.0	0.0	4.9
Prop In Lane				0.82		0.12	1.00		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				508	0	0	478	905	0	0	0	233
V/C Ratio(X)				0.86	0.00	0.00	0.84	0.08	0.00	0.00	0.00	0.72
Avail Cap(c_a), veh/h				1114	0	0	966	905	0	0	0	831
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				16.9	0.0	0.0	17.4	6.3	0.0	0.0	0.0	21.5
Incr Delay (d2), s/veh				1.7	0.0	0.0	3.1	0.0	0.0	0.0	0.0	1.6
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				4.3	0.0	0.0	4.1	0.3	0.0	0.0	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				18.6	0.0	0.0	20.5	6.3	0.0	0.0	0.0	23.1
LnGrp LOS				B	A	A	C	A	A	A	A	C
Approach Vol, veh/h					438			479			169	
Approach Delay, s/veh					18.6			18.2			23.1	
Approach LOS					B			B			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		31.7			19.8	11.9		20.1				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		3.1			13.8	6.9		15.0				
Green Ext Time (p_c), s		0.1			1.1	0.1		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			19.2									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary

Existing Conditions

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	61	159	293	0	0	0	0	370	681	82	378	0
Future Volume (veh/h)	61	159	293	0	0	0	0	370	681	82	378	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	66	173	318				0	402	740	89	411	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	114	298	353				0	958	812	113	1156	0
Arrive On Green	0.24	0.24	0.24				0.00	0.55	0.55	0.07	0.66	0.00
Sat Flow, veh/h	477	1251	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	239	0	318				0	402	740	89	411	0
Grp Sat Flow(s),veh/h/ln	1728	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	10.9	0.0	18.5				0.0	12.0	40.1	4.7	9.3	0.0
Cycle Q Clear(g_c), s	10.9	0.0	18.5				0.0	12.0	40.1	4.7	9.3	0.0
Prop In Lane	0.28		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	411	0	353				0	958	812	113	1156	0
V/C Ratio(X)	0.58	0.00	0.90				0.00	0.42	0.91	0.78	0.36	0.00
Avail Cap(c_a), veh/h	485	0	417				0	1082	917	281	1156	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	30.0	0.0	32.9				0.0	11.9	18.2	40.8	6.7	0.0
Incr Delay (d2), s/veh	0.5	0.0	18.4				0.0	0.4	12.7	11.2	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	8.2				0.0	4.2	14.5	2.2	2.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	0.0	51.3				0.0	12.3	30.9	52.0	7.0	0.0
LnGrp LOS	C	A	D				A	B	C	D	A	A
Approach Vol, veh/h		557						1142			500	
Approach Delay, s/veh		42.4						24.4			15.0	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.1	53.6		25.4		63.6
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	15.0	55.0		* 25		55.0
Max Q Clear Time (g_c+I1), s	6.7	42.1		20.5		11.3
Green Ext Time (p_c), s	0.1	6.6		0.7		2.8

Intersection Summary			
HCM 6th Ctrl Delay			26.8
HCM 6th LOS			C

Notes

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

HCM 6th Signalized Intersection Summary
3: MACARTHUR DRIVE (N) & GRANT LINE RD

Existing Conditions
Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	397	380	59	20	244	144	44	415	32	138	183	242
Future Volume (veh/h)	397	380	59	20	244	144	44	415	32	138	183	242
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	432	413	64	22	265	157	48	451	35	150	199	263
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	383	1261	563	50	603	254	92	683	305	185	879	415
Arrive On Green	0.22	0.36	0.36	0.03	0.17	0.17	0.05	0.21	0.21	0.11	0.26	0.26
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	432	413	64	22	265	157	48	451	35	150	199	263
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	15.0	5.9	1.9	0.9	4.7	6.8	1.8	8.6	1.3	6.1	3.2	10.2
Cycle Q Clear(g_c), s	15.0	5.9	1.9	0.9	4.7	6.8	1.8	8.6	1.3	6.1	3.2	10.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	383	1261	563	50	603	254	92	683	305	185	879	415
V/C Ratio(X)	1.13	0.33	0.11	0.44	0.44	0.62	0.52	0.66	0.11	0.81	0.23	0.63
Avail Cap(c_a), veh/h	383	1527	681	361	1527	643	383	1442	643	361	1442	681
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.1	16.2	14.9	33.0	25.7	26.6	32.0	25.3	22.4	30.1	19.9	22.5
Incr Delay (d2), s/veh	85.7	0.3	0.2	2.3	0.9	4.2	1.7	1.9	0.3	3.2	0.2	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.8	2.2	0.6	0.4	1.8	2.5	0.8	3.3	0.4	2.4	1.2	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	112.8	16.4	15.0	35.3	26.6	30.8	33.6	27.2	22.7	33.2	20.2	25.2
LnGrp LOS	F	B	B	D	C	C	C	C	C	C	C	C
Approach Vol, veh/h		909			444			534			612	
Approach Delay, s/veh		62.1			28.5			27.5			25.6	
Approach LOS		E			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.7	19.7	7.1	29.8	8.6	23.8	20.0	16.8
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	8.1	10.6	2.9	7.9	3.8	12.2	17.0	8.8
Green Ext Time (p_c), s	0.1	3.6	0.0	3.6	0.0	3.3	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	39.8
HCM 6th LOS	D

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱			↑↑	↱		✥			↰	↱
Traffic Volume (veh/h)	133	821	0	0	446	92	0	0	0	169	0	129
Future Volume (veh/h)	133	821	0	0	446	92	0	0	0	169	0	129
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	145	892	0	0	485	100	0	0	0	184	0	140
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	177	2614	0	0	2095	882	0	289	0	294	0	259
Arrive On Green	0.10	0.74	0.00	0.00	0.59	0.59	0.00	0.00	0.00	0.16	0.00	0.16
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	145	892	0	0	485	100	0	0	0	184	0	140
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	7.7	8.4	0.0	0.0	6.2	2.8	0.0	0.0	0.0	12.9	0.0	7.8
Cycle Q Clear(g_c), s	7.7	8.4	0.0	0.0	6.2	2.8	0.0	0.0	0.0	12.9	0.0	7.8
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	177	2614	0	0	2095	882	0	289	0	294	0	259
V/C Ratio(X)	0.82	0.34	0.00	0.00	0.23	0.11	0.00	0.00	0.00	0.63	0.00	0.54
Avail Cap(c_a), veh/h	285	2614	0	0	2095	882	0	520	0	469	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	42.3	4.3	0.0	0.0	9.2	8.5	0.0	0.0	0.0	38.9	0.0	36.8
Incr Delay (d2), s/veh	4.1	0.4	0.0	0.0	0.3	0.3	0.0	0.0	0.0	0.8	0.0	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	2.4	0.0	0.0	2.2	0.9	0.0	0.0	0.0	4.3	0.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.4	4.7	0.0	0.0	9.4	8.7	0.0	0.0	0.0	39.7	0.0	37.4
LnGrp LOS	D	A	A	A	A	A	A	A	A	D	A	D
Approach Vol, veh/h		1037			585			0			324	
Approach Delay, s/veh		10.5			9.3			0.0			38.7	
Approach LOS		B			A						D	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		75.7		20.3	14.1	61.5		20.3				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		58.5		28.5	15.5	38.5		28.5				
Max Q Clear Time (g_c+I1), s		10.4		14.9	9.7	8.2		0.0				
Green Ext Time (p_c), s		4.8		0.9	0.1	2.7		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			14.8
HCM 6th LOS			B

Notes

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

5: SKYLARK WAY/PRIVATE DWY & GRANT LINE RD

Timing Plan: PM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	0	504	32	44	401	0	22	0	37	0	0	0
Future Volume (veh/h)	0	504	32	44	401	0	22	0	37	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	0	548	35	48	436	0	24	0	40	0	0	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	5	1171	75	90	1816	0	50	0	200	5	5	0
Arrive On Green	0.00	0.37	0.37	0.05	0.55	0.00	0.03	0.00	0.13	0.00	0.00	0.00
Sat Flow, veh/h	1668	3177	203	1668	3416	0	1668	0	1485	1668	1752	0
Grp Volume(v), veh/h	0	287	296	48	436	0	24	0	40	0	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1715	1668	1664	0	1668	0	1485	1668	1752	0
Q Serve(g_s), s	0.0	4.3	4.3	0.9	2.2	0.0	0.5	0.0	0.8	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.0	4.3	4.3	0.9	2.2	0.0	0.5	0.0	0.8	0.0	0.0	0.0
Prop In Lane	1.00		0.12	1.00		0.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	5	613	632	90	1816	0	50	0	200	5	5	0
V/C Ratio(X)	0.00	0.47	0.47	0.53	0.24	0.00	0.48	0.00	0.20	0.00	0.00	0.00
Avail Cap(c_a), veh/h	769	2300	2371	1281	6134	0	1025	0	2052	769	1883	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d), s/veh	0.0	7.8	7.8	15.0	3.9	0.0	15.5	0.0	12.5	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.2	0.2	1.8	0.0	0.0	2.6	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.8	0.8	0.3	0.1	0.0	0.2	0.0	0.2	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	8.0	8.0	16.8	3.9	0.0	18.2	0.0	12.7	0.0	0.0	0.0
LnGrp LOS	A	A	A	B	A	A	B	A	B	A	A	A
Approach Vol, veh/h		583			484			64			0	
Approach Delay, s/veh		8.0			5.2			14.8			0.0	
Approach LOS		A			A			B				

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.8	17.8	0.0	9.0	0.0	23.6	5.0	4.0
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	2.9	6.3	0.0	2.8	0.0	4.2	2.5	0.0
Green Ext Time (p_c), s	0.0	2.0	0.0	0.1	0.0	1.8	0.0	0.0

Intersection Summary		
HCM 6th Ctrl Delay		7.2
HCM 6th LOS		A

Intersection	
Intersection Delay, s/veh	45.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↱	
Traffic Vol, veh/h	6	28	0	245	1	2	3	109	306	2	175	5
Future Vol, veh/h	6	28	0	245	1	2	3	109	306	2	175	5
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	9	44	0	383	2	3	5	170	478	3	273	8
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	13.9	59.4	48.2	28
HCM LOS	B	F	E	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	33%	0%	97%
Vol Right, %	0%	0%	100%	0%	0%	0%	67%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	109	306	6	28	245	3	2	180
LT Vol	3	0	0	6	0	245	0	2	0
Through Vol	0	109	0	0	28	0	1	0	175
RT Vol	0	0	306	0	0	0	2	0	5
Lane Flow Rate	5	170	478	9	44	383	5	3	281
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.011	0.38	0.97	0.027	0.12	0.937	0.01	0.008	0.681
Departure Headway (Hd)	8.535	8.022	7.303	10.374	9.854	8.815	7.828	9.249	8.711
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	421	450	497	345	364	413	459	387	416
Service Time	6.259	5.745	5.026	8.144	7.624	6.539	5.551	6.999	6.461
HCM Lane V/C Ratio	0.012	0.378	0.962	0.026	0.121	0.927	0.011	0.008	0.675
HCM Control Delay	11.4	15.6	60.2	13.4	14	60	10.6	12.1	28.2
HCM Lane LOS	B	C	F	B	B	F	B	B	D
HCM 95th-tile Q	0	1.8	12.5	0.1	0.4	10.5	0	0	4.9

8: CHRISMAN & ELEVENTH ST.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	62	767	148	392	421	37	62	43	414	34	27	54
Future Volume (veh/h)	62	767	148	392	421	37	62	43	414	34	27	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	67	834	161	426	458	40	67	47	0	37	29	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	165	1262	563	434	1797	802	173	95		167	109	
Arrive On Green	0.10	0.38	0.38	0.26	0.54	0.54	0.13	0.13	0.00	0.13	0.13	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	777	747	1485	737	853	1485
Grp Volume(v), veh/h	67	834	161	426	458	40	114	0	0	66	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1524	0	1485	1590	0	1485
Q Serve(g_s), s	2.9	16.0	5.8	19.5	5.6	1.0	2.5	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	16.0	5.8	19.5	5.6	1.0	5.2	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.59		1.00	0.56		1.00
Lane Grp Cap(c), veh/h	165	1262	563	434	1797	802	268	0		275	0	
V/C Ratio(X)	0.41	0.66	0.29	0.98	0.25	0.05	0.43	0.00		0.24	0.00	
Avail Cap(c_a), veh/h	1084	2163	965	434	2163	965	649	0		655	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	32.5	19.8	16.6	28.3	9.4	8.4	31.5	0.0	0.0	30.5	0.0	0.0
Incr Delay (d2), s/veh	3.4	1.3	0.6	38.7	0.2	0.1	3.8	0.0	0.0	1.6	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.6	1.8	11.4	1.6	0.2	2.1	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.0	21.1	17.2	67.0	9.6	8.4	35.3	0.0	0.0	32.1	0.0	0.0
LnGrp LOS	D	C	B	E	A	A	D	A		C	A	
Approach Vol, veh/h		1062			924			114	A		66	A
Approach Delay, s/veh		21.4			36.0			35.3			32.1	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.0	35.2		15.8	13.6	47.6		15.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	21.5	18.0		4.7	4.9	7.6		7.2
Green Ext Time (p_c), s	0.0	11.2		0.5	0.5	5.0		1.0

Intersection Summary	
HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		↶		↑↱							↱
Traffic Vol, veh/h	8	533	0	0	0	425	1	0	0	0	0	0	20
Future Vol, veh/h	8	533	0	0	0	425	1	0	0	0	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	0	0	0	10	10	10
Mvmt Flow	9	579	0	0	0	462	1	0	0	0	0	0	22

Major/Minor	Major1			Major2							Minor2		
Conflicting Flow All	463	0	-	423	-	-	0				-	-	232
Stage 1	-	-	-	-	-	-	-				-	-	-
Stage 2	-	-	-	-	-	-	-				-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-				-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-				-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-				-	-	3.4
Pot Cap-1 Maneuver	1040	-	0	871	0	-	-				0	0	746
Stage 1	-	-	0	-	0	-	-				0	0	-
Stage 2	-	-	0	-	0	-	-				0	0	-
Platoon blocked, %		-				-	-						
Mov Cap-1 Maneuver	1040	-	-	871	-	-	-				-	0	746
Mov Cap-2 Maneuver	-	-	-	-	-	-	-				-	0	-
Stage 1	-	-	-	-	-	-	-				-	0	-
Stage 2	-	-	-	-	-	-	-				-	0	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	1040	-	871	-	-	746
HCM Lane V/C Ratio	0.008	-	-	-	-	0.029
HCM Control Delay (s)	8.5	-	0	-	-	10
HCM Lane LOS	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	-	0	-	-	0.1

Movement	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	⮌	↑↑↑↱		↰	↑↑↑	↰	↱
Traffic Volume (vph)	0	481	52	74	330	96	28
Future Volume (vph)	0	481	52	74	330	96	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0	6.0	6.0
Lane Util. Factor		0.91		1.00	0.91	1.00	1.00
Frt		0.99		1.00	1.00	1.00	0.85
Flt Protected		1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)		4646		1641	4715	1641	1468
Flt Permitted		1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)		4646		1641	4715	1641	1468
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	601	65	92	412	120	35
RTOR Reduction (vph)	0	18	0	0	0	0	31
Lane Group Flow (vph)	0	648	0	93	413	120	4
Heavy Vehicles (%)	10%	10%	10%	10%	10%	10%	10%
Turn Type	Prot	NA		Prot	NA	Prot	Perm
Protected Phases	5	2		1	6	8	
Permitted Phases							8
Actuated Green, G (s)		15.5		5.6	27.1	5.2	5.2
Effective Green, g (s)		15.5		5.6	27.1	5.2	5.2
Actuated g/C Ratio		0.35		0.13	0.61	0.12	0.12
Clearance Time (s)		6.0		6.0	6.0	6.0	6.0
Vehicle Extension (s)		2.0		3.0	2.0	1.0	1.0
Lane Grp Cap (vph)		1625		207	2884	192	172
v/s Ratio Prot		c0.14		c0.06	0.09	c0.07	
v/s Ratio Perm							0.00
v/c Ratio		0.40		0.45	0.14	0.62	0.02
Uniform Delay, d1		10.9		17.9	3.7	18.6	17.3
Progression Factor		1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2		0.1		1.6	0.0	4.5	0.0
Delay (s)		10.9		19.5	3.7	23.1	17.3
Level of Service		B		B	A	C	B
Approach Delay (s)		10.9			6.6	21.8	
Approach LOS		B			A	C	

Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	18.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

A3. Existing Plus Background Synchro Outputs

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	638	50	35	216	22	0	0	84	21
Future Volume (veh/h)	0	0	0	638	50	35	216	22	0	0	84	21
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				709	56	39	240	24	0	0	93	23
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				744	59	41	295	616	0	0	134	33
Arrive On Green				0.51	0.51	0.51	0.18	0.35	0.00	0.00	0.10	0.10
Sat Flow, veh/h				1467	116	81	1668	1752	0	0	1356	335
Grp Volume(v), veh/h				804	0	0	240	24	0	0	0	116
Grp Sat Flow(s),veh/h/ln				1664	0	0	1668	1752	0	0	0	1691
Q Serve(g_s), s				29.7	0.0	0.0	8.9	0.6	0.0	0.0	0.0	4.3
Cycle Q Clear(g_c), s				29.7	0.0	0.0	8.9	0.6	0.0	0.0	0.0	4.3
Prop In Lane				0.88		0.05	1.00		0.00	0.00		0.20
Lane Grp Cap(c), veh/h				843	0	0	295	616	0	0	0	167
V/C Ratio(X)				0.95	0.00	0.00	0.81	0.04	0.00	0.00	0.00	0.69
Avail Cap(c_a), veh/h				905	0	0	778	681	0	0	0	657
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				15.1	0.0	0.0	25.5	13.7	0.0	0.0	0.0	28.0
Incr Delay (d2), s/veh				18.5	0.0	0.0	4.1	0.0	0.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln				13.2	0.0	0.0	3.5	0.2	0.0	0.0	0.0	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				33.6	0.0	0.0	29.5	13.7	0.0	0.0	0.0	30.0
LnGrp LOS				C	A	A	C	B	A	A	A	C
Approach Vol, veh/h					804			264			116	
Approach Delay, s/veh					33.6			28.1			30.0	
Approach LOS					C			C			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		27.5			16.3	11.3		36.8				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		2.6			10.9	6.3		31.7				
Green Ext Time (p_c), s		0.0			0.6	0.1		0.9				

Intersection Summary			
HCM 6th Ctrl Delay			32.0
HCM 6th LOS			C

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	17	52	372	0	0	0	0	221	453	36	686	0
Future Volume (veh/h)	17	52	372	0	0	0	0	221	453	36	686	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	18	57	404				0	240	492	39	746	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	128	406	459				0	738	626	67	932	0
Arrive On Green	0.31	0.31	0.31				0.00	0.42	0.42	0.04	0.53	0.00
Sat Flow, veh/h	415	1316	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	75	0	404				0	240	492	39	746	0
Grp Sat Flow(s),veh/h/ln	1731	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	1.8	0.0	14.8				0.0	5.2	16.4	1.3	19.8	0.0
Cycle Q Clear(g_c), s	1.8	0.0	14.8				0.0	5.2	16.4	1.3	19.8	0.0
Prop In Lane	0.24		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	535	0	459				0	738	626	67	932	0
V/C Ratio(X)	0.14	0.00	0.88				0.00	0.33	0.79	0.58	0.80	0.00
Avail Cap(c_a), veh/h	757	0	649				0	1686	1429	438	1686	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	14.3	0.0	18.8				0.0	11.1	14.3	26.9	10.9	0.0
Incr Delay (d2), s/veh	0.0	0.0	7.7				0.0	0.4	3.2	7.6	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	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	5.4				0.0	1.7	4.8	0.6	5.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.3	0.0	26.5				0.0	11.4	17.5	34.6	13.2	0.0
LnGrp LOS	B	A	C				A	B	B	C	B	A
Approach Vol, veh/h		479						732			785	
Approach Delay, s/veh		24.6						15.5			14.3	
Approach LOS		C						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	6.3	29.0		21.9		35.3
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	15.0	55.0		* 25		55.0
Max Q Clear Time (g_c+I1), s	3.3	18.4		16.8		21.8
Green Ext Time (p_c), s	0.0	5.7		0.9		6.1

Intersection Summary			
HCM 6th Ctrl Delay			17.2
HCM 6th LOS			B

Notes

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

HCM 6th Signalized Intersection Summary
3: MACARTHUR DRIVE (N) & GRANT LINE RD

Ex+Background
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	294	325	48	50	289	146	27	163	93	305	319	440
Future Volume (veh/h)	294	325	48	50	289	146	27	163	93	305	319	440
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	353	52	54	314	159	29	177	101	332	347	478
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	336	1077	480	88	593	250	63	640	285	317	1153	545
Arrive On Green	0.19	0.31	0.31	0.05	0.17	0.17	0.04	0.19	0.19	0.19	0.35	0.35
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	353	52	54	314	159	29	177	101	332	347	478
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	14.1	6.1	1.9	2.5	6.4	7.9	1.3	3.6	4.7	15.0	6.0	22.5
Cycle Q Clear(g_c), s	14.1	6.1	1.9	2.5	6.4	7.9	1.3	3.6	4.7	15.0	6.0	22.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	336	1077	480	88	593	250	63	640	285	317	1153	545
V/C Ratio(X)	0.95	0.33	0.11	0.61	0.53	0.64	0.46	0.28	0.35	1.05	0.30	0.88
Avail Cap(c_a), veh/h	336	1339	597	317	1339	564	336	1265	564	317	1265	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
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	21.2	19.7	36.6	30.0	30.6	37.3	27.2	27.6	32.0	18.8	24.2
Incr Delay (d2), s/veh	36.5	0.3	0.2	2.6	1.3	4.6	1.9	0.4	1.3	63.5	0.2	14.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	2.4	0.6	1.0	2.6	2.9	0.6	1.4	1.6	11.2	2.2	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.2	21.5	19.9	39.2	31.2	35.1	39.2	27.6	28.9	95.5	19.1	38.3
LnGrp LOS	E	C	B	D	C	D	D	C	C	F	B	D
Approach Vol, veh/h		725			527			307			1157	
Approach Delay, s/veh		42.0			33.2			29.1			49.0	
Approach LOS		D			C			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	20.7	9.2	29.1	7.8	32.9	20.0	18.3
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	17.0	6.7	4.5	8.1	3.3	24.5	16.1	9.9
Green Ext Time (p_c), s	0.0	2.0	0.0	3.0	0.0	2.8	0.0	3.4

Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱			↑↑	↱		✥			↰	↱
Traffic Volume (veh/h)	95	467	0	0	1074	159	0	0	0	109	0	81
Future Volume (veh/h)	95	467	0	0	1074	159	0	0	0	109	0	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	103	508	0	0	1167	173	0	0	0	118	0	88
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	206	2311	0	0	1605	676	0	310	0	369	0	279
Arrive On Green	0.12	0.66	0.00	0.00	0.46	0.46	0.00	0.00	0.00	0.18	0.00	0.18
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	103	508	0	0	1167	173	0	0	0	118	0	88
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	2.9	3.1	0.0	0.0	14.5	3.9	0.0	0.0	0.0	4.3	0.0	2.6
Cycle Q Clear(g_c), s	2.9	3.1	0.0	0.0	14.5	3.9	0.0	0.0	0.0	4.3	0.0	2.6
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	206	2311	0	0	1605	676	0	310	0	369	0	279
V/C Ratio(X)	0.50	0.22	0.00	0.00	0.73	0.26	0.00	0.00	0.00	0.32	0.00	0.32
Avail Cap(c_a), veh/h	985	3274	0	0	3274	1379	0	813	0	997	0	1022
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.3	3.7	0.0	0.0	11.9	9.0	0.0	0.0	0.0	20.0	0.0	19.3
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.6	0.2	0.0	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.6	0.0	0.0	4.6	1.0	0.0	0.0	0.0	1.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	3.8	0.0	0.0	12.6	9.2	0.0	0.0	0.0	20.2	0.0	19.5
LnGrp LOS	C	A	A	A	B	A	A	A	A	C	A	B
Approach Vol, veh/h		611			1340			0			206	
Approach Delay, s/veh		7.0			12.1			0.0			19.9	
Approach LOS		A			B						B	

Timer - Assigned Phs		2		4	5	6		8
Phs Duration (G+Y+Rc), s		39.8		14.0	10.8	29.0		14.0
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5
Max Green Setting (Gmax), s		50.0		35.0	30.0	50.0		25.0
Max Q Clear Time (g_c+I1), s		5.1		6.3	4.9	16.5		0.0
Green Ext Time (p_c), s		2.4		0.7	0.2	8.0		0.0

Intersection Summary			
HCM 6th Ctrl Delay			11.4
HCM 6th LOS			B

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	60	497	37	45	454	10	5	0	1	4	0	14
Future Volume (veh/h)	60	497	37	45	454	10	5	0	1	4	0	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	65	540	40	49	493	11	5	0	1	4	0	15
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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	112	1125	83	90	1149	26	11	0	78	9	0	76
Arrive On Green	0.07	0.36	0.36	0.05	0.35	0.35	0.01	0.00	0.05	0.01	0.00	0.05
Sat Flow, veh/h	1668	3142	232	1668	3328	74	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	65	285	295	49	246	258	5	0	1	4	0	15
Grp Sat Flow(s),veh/h/ln	1668	1664	1710	1668	1664	1738	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.3	4.6	4.6	1.0	4.0	4.0	0.1	0.0	0.0	0.1	0.0	0.3
Cycle Q Clear(g_c), s	1.3	4.6	4.6	1.0	4.0	4.0	0.1	0.0	0.0	0.1	0.0	0.3
Prop In Lane	1.00		0.14	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	112	596	612	90	575	600	11	0	78	9	0	76
V/C Ratio(X)	0.58	0.48	0.48	0.54	0.43	0.43	0.44	0.00	0.01	0.44	0.00	0.20
Avail Cap(c_a), veh/h	720	2155	2214	1200	2873	3001	960	0	1922	720	0	1495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.7	8.6	8.6	16.0	8.7	8.7	17.2	0.0	15.6	17.2	0.0	15.8
Incr Delay (d2), s/veh	1.8	0.2	0.2	1.9	0.2	0.2	9.7	0.0	0.0	11.9	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.9	1.0	0.3	0.8	0.9	0.1	0.0	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.5	8.9	8.9	17.9	8.9	8.9	26.9	0.0	15.6	29.1	0.0	16.3
LnGrp LOS	B	A	A	B	A	A	C	A	B	C	A	B
Approach Vol, veh/h		645			553			6			19	
Approach Delay, s/veh		9.7			9.7			25.0			19.0	
Approach LOS		A			A			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	18.2	4.2	6.4	6.3	17.8	4.2	6.4
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	3.0	6.6	2.1	2.0	3.3	6.0	2.1	2.3
Green Ext Time (p_c), s	0.0	2.0	0.0	0.0	0.0	1.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

HCM 6th Signalized Intersection Summary
6: CHRISMAN RD & GRANT LINE RD

Ex+Background
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰	↱			↰	↱
Traffic Volume (veh/h)	17	380	90	96	469	53	18	0	6	28	0	16
Future Volume (veh/h)	17	380	90	96	469	53	18	0	6	28	0	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	21	475	112	120	586	66	22	0	8	35	0	20
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	68	971	223	277	1795	557	137	0	122	72	0	64
Arrive On Green	0.04	0.25	0.25	0.17	0.38	0.38	0.08	0.00	0.08	0.04	0.00	0.04
Sat Flow, veh/h	1668	3888	892	1668	4782	1485	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	21	387	200	120	586	66	22	0	8	35	0	20
Grp Sat Flow(s),veh/h/ln	1668	1594	1591	1668	1594	1485	1668	0	1485	1668	0	1485
Q Serve(g_s), s	0.6	5.0	5.2	3.1	4.2	1.4	0.6	0.0	0.2	1.0	0.0	0.6
Cycle Q Clear(g_c), s	0.6	5.0	5.2	3.1	4.2	1.4	0.6	0.0	0.2	1.0	0.0	0.6
Prop In Lane	1.00		0.56	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	68	797	398	277	1795	557	137	0	122	72	0	64
V/C Ratio(X)	0.31	0.49	0.50	0.43	0.33	0.12	0.16	0.00	0.07	0.48	0.00	0.31
Avail Cap(c_a), veh/h	278	1925	961	347	3087	958	1251	0	1113	625	0	556
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.4	15.4	15.4	18.0	10.7	9.8	20.5	0.0	20.3	22.4	0.0	22.3
Incr Delay (d2), s/veh	0.9	0.2	0.4	1.1	0.0	0.0	0.2	0.0	0.1	5.0	0.0	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	1.5	1.1	1.1	0.3	0.2	0.0	0.1	0.4	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.3	15.5	15.8	19.0	10.7	9.8	20.7	0.0	20.4	27.4	0.0	25.0
LnGrp LOS	C	B	B	B	B	A	C	A	C	C	A	C
Approach Vol, veh/h		608			772			30			55	
Approach Delay, s/veh		15.9			11.9			20.6			26.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	14.0	18.0		6.1	8.0	24.0		10.0
Change Period (Y+Rc), s	6.0	6.0		4.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	10.0	29.0		18.0	8.0	31.0		36.0
Max Q Clear Time (g_c+I1), s	5.1	7.2		3.0	2.6	6.2		2.6
Green Ext Time (p_c), s	0.1	1.3		0.1	0.0	1.6		0.0

Intersection Summary	
HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	15
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑	↱	↰	↱	
Traffic Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Future Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	2	310	8	3	0	19	36	2	294	6
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	8.8	16.4	9.2	14.6
HCM LOS	A	C	A	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	0%	0%	0%	0%	0%	100%	0%	100%	0%
Vol Thru, %	100%	100%	0%	100%	0%	0%	70%	0%	98%
Vol Right, %	0%	0%	100%	0%	100%	0%	30%	0%	2%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	17	32	0	2	276	10	2	267
LT Vol	0	0	0	0	0	276	0	2	0
Through Vol	0	17	0	0	0	0	7	0	262
RT Vol	0	0	32	0	2	0	3	0	5
Lane Flow Rate	0	19	36	0	2	310	11	2	300
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.035	0.059	0	0.004	0.551	0.018	0.004	0.5
Departure Headway (Hd)	6.643	6.643	5.932	6.766	6.056	6.392	5.678	6.517	5.999
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	539	604	0	591	564	632	550	603
Service Time	4.38	4.38	3.669	4.506	3.795	4.114	3.4	4.243	3.725
HCM Lane V/C Ratio	0	0.035	0.06	0	0.003	0.55	0.017	0.004	0.498
HCM Control Delay	9.4	9.6	9	9.5	8.8	16.7	8.5	9.3	14.6
HCM Lane LOS	N	A	A	N	A	C	A	A	B
HCM 95th-tile Q	0	0.1	0.2	0	0	3.3	0.1	0	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	108	375	66	287	698	31	466	29	487	20	21	21
Future Volume (veh/h)	108	375	66	287	698	31	466	29	487	20	21	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	117	408	72	312	759	34	507	32	0	22	23	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	185	735	328	353	1071	478	529	28		338	330	
Arrive On Green	0.11	0.22	0.22	0.21	0.32	0.32	0.35	0.35	0.00	0.35	0.35	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	1258	79	1485	773	930	1485
Grp Volume(v), veh/h	117	408	72	312	759	34	539	0	0	45	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1337	0	1485	1703	0	1485
Q Serve(g_s), s	5.7	9.2	3.4	15.3	16.9	1.3	28.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.7	9.2	3.4	15.3	16.9	1.3	30.0	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.94		1.00	0.49		1.00
Lane Grp Cap(c), veh/h	185	735	328	353	1071	478	557	0		667	0	
V/C Ratio(X)	0.63	0.56	0.22	0.88	0.71	0.07	0.97	0.00		0.07	0.00	
Avail Cap(c_a), veh/h	986	1968	878	395	1968	878	557	0		667	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.0	29.3	27.0	32.3	25.2	19.9	28.9	0.0	0.0	18.1	0.0	0.0
Incr Delay (d2), s/veh	7.5	1.4	0.7	21.3	1.9	0.1	30.7	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	3.6	1.2	7.7	6.1	0.4	15.2	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.4	30.7	27.7	53.6	27.1	20.0	59.6	0.0	0.0	18.2	0.0	0.0
LnGrp LOS	D	C	C	D	C	C	E	A		B	A	
Approach Vol, veh/h		597			1105			539	A		45	A
Approach Delay, s/veh		32.8			34.4			59.6			18.2	
Approach LOS		C			C			E			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.9	24.7		36.0	15.4	33.2		36.0
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	17.3	11.2		3.4	7.7	18.9		32.0
Green Ext Time (p_c), s	0.6	4.9		0.3	1.0	8.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	39.6
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		⮌		↑↱							↱
Traffic Vol, veh/h	15	487	0	0	0	501	2	0	0	0	0	0	8
Future Vol, veh/h	15	487	0	0	0	501	2	0	0	0	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	0	0	0	10	10	10
Mvmt Flow	16	529	0	0	0	545	2	0	0	0	0	0	9

Major/Minor	Major1			Major2							Minor2		
Conflicting Flow All	547	0	-	386	-	-	0				-	-	274
Stage 1	-	-	-	-	-	-	-				-	-	-
Stage 2	-	-	-	-	-	-	-				-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-				-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-				-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-				-	-	3.4
Pot Cap-1 Maneuver	965	-	0	913	0	-	-				0	0	700
Stage 1	-	-	0	-	0	-	-				0	0	-
Stage 2	-	-	0	-	0	-	-				0	0	-
Platoon blocked, %		-				-	-						
Mov Cap-1 Maneuver	965	-	-	913	-	-	-				-	0	700
Mov Cap-2 Maneuver	-	-	-	-	-	-	-				-	0	-
Stage 1	-	-	-	-	-	-	-				-	0	-
Stage 2	-	-	-	-	-	-	-				-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	965	-	913	-	-	700
HCM Lane V/C Ratio	0.017	-	-	-	-	0.012
HCM Control Delay (s)	8.8	-	0	-	-	10.2
HCM Lane LOS	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣		↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	358	25	47	460	68	0	0	138	14
Future Volume (veh/h)	0	0	0	358	25	47	460	68	0	0	138	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				398	28	52	511	76	0	0	153	16
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				443	31	58	567	947	0	0	198	21
Arrive On Green				0.32	0.32	0.32	0.34	0.54	0.00	0.00	0.13	0.13
Sat Flow, veh/h				1374	97	180	1668	1752	0	0	1559	163
Grp Volume(v), veh/h				478	0	0	511	76	0	0	0	169
Grp Sat Flow(s),veh/h/ln				1651	0	0	1668	1752	0	0	0	1722
Q Serve(g_s), s				18.3	0.0	0.0	19.3	1.4	0.0	0.0	0.0	6.3
Cycle Q Clear(g_c), s				18.3	0.0	0.0	19.3	1.4	0.0	0.0	0.0	6.3
Prop In Lane				0.83		0.11	1.00		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				532	0	0	567	947	0	0	0	219
V/C Ratio(X)				0.90	0.00	0.00	0.90	0.08	0.00	0.00	0.00	0.77
Avail Cap(c_a), veh/h				871	0	0	755	947	0	0	0	649
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				21.4	0.0	0.0	20.8	7.3	0.0	0.0	0.0	28.0
Incr Delay (d2), s/veh				4.6	0.0	0.0	10.8	0.0	0.0	0.0	0.0	2.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.0	0.0	0.0	8.2	0.4	0.0	0.0	0.0	2.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				26.1	0.0	0.0	31.6	7.3	0.0	0.0	0.0	30.2
LnGrp LOS				C	A	A	C	A	A	A	A	C
Approach Vol, veh/h					478			587			169	
Approach Delay, s/veh					26.1			28.5			30.2	
Approach LOS					C			C			C	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		40.8			27.4	13.3		25.6				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		3.4			21.3	8.3		20.3				
Green Ext Time (p_c), s		0.1			1.2	0.1		1.0				
Intersection Summary												
HCM 6th Ctrl Delay			27.8									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	61	159	334	0	0	0	0	467	760	82	414	0
Future Volume (veh/h)	61	159	334	0	0	0	0	467	760	82	414	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	66	173	363				0	508	826	89	450	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	119	313	372				0	965	818	113	1154	0
Arrive On Green	0.25	0.25	0.25				0.00	0.55	0.55	0.07	0.66	0.00
Sat Flow, veh/h	477	1251	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	239	0	363				0	508	826	89	450	0
Grp Sat Flow(s),veh/h/ln	1728	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	12.0	0.0	24.2				0.0	18.3	55.0	5.2	11.8	0.0
Cycle Q Clear(g_c), s	12.0	0.0	24.2				0.0	18.3	55.0	5.2	11.8	0.0
Prop In Lane	0.28		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	433	0	372				0	965	818	113	1154	0
V/C Ratio(X)	0.55	0.00	0.98				0.00	0.53	1.01	0.79	0.39	0.00
Avail Cap(c_a), veh/h	433	0	372				0	965	818	251	1154	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	0.0	37.1				0.0	14.2	22.4	45.8	7.8	0.0
Incr Delay (d2), s/veh	0.9	0.0	40.2				0.0	0.7	34.0	11.5	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	12.6				0.0	6.7	24.3	2.5	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	77.3				0.0	14.9	56.4	57.4	8.1	0.0
LnGrp LOS	C	A	E				A	B	F	E	A	A
Approach Vol, veh/h		602						1334			539	
Approach Delay, s/veh		59.9						40.6			16.3	
Approach LOS		E						D			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.7	59.9		29.2		70.6
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	15.0	55.0		* 25		55.0
Max Q Clear Time (g_c+I1), s	7.2	57.0		26.2		13.8
Green Ext Time (p_c), s	0.1	0.0		0.0		3.1

Intersection Summary			
HCM 6th Ctrl Delay			40.0
HCM 6th LOS			D

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	416	419	59	114	344	253	44	434	69	176	205	266
Future Volume (veh/h)	416	419	59	114	344	253	44	434	69	176	205	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	452	455	64	124	374	275	48	472	75	191	223	289
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	314	1159	517	154	859	362	85	670	299	225	958	453
Arrive On Green	0.18	0.33	0.33	0.09	0.24	0.24	0.05	0.20	0.20	0.13	0.29	0.29
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	452	455	64	124	374	275	48	472	75	191	223	289
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	15.0	8.4	2.4	6.1	7.6	14.5	2.2	11.1	3.6	9.4	4.3	13.5
Cycle Q Clear(g_c), s	15.0	8.4	2.4	6.1	7.6	14.5	2.2	11.1	3.6	9.4	4.3	13.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	314	1159	517	154	859	362	85	670	299	225	958	453
V/C Ratio(X)	1.44	0.39	0.12	0.80	0.44	0.76	0.57	0.70	0.25	0.85	0.23	0.64
Avail Cap(c_a), veh/h	314	1253	559	297	1253	528	314	1183	528	297	1183	559
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.7	21.8	19.8	37.5	27.0	29.6	39.3	31.4	28.4	35.7	22.9	26.2
Incr Delay (d2), s/veh	214.9	0.4	0.2	3.7	0.6	6.0	2.2	2.3	0.7	13.1	0.2	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	24.8	3.3	0.8	2.5	3.0	5.4	1.0	4.5	1.3	4.5	1.6	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	249.6	22.2	20.0	41.2	27.6	35.6	41.5	33.7	29.1	48.8	23.2	28.9
LnGrp LOS	F	C	C	D	C	D	D	C	C	D	C	C
Approach Vol, veh/h		971			773			595			703	
Approach Delay, s/veh		127.9			32.6			33.8			32.5	
Approach LOS		F			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.4	22.5	12.8	32.7	9.1	29.8	20.0	25.6
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	11.4	13.1	8.1	10.4	4.2	15.5	17.0	16.5
Green Ext Time (p_c), s	0.1	3.8	0.1	3.8	0.0	3.3	0.0	4.0

Intersection Summary	
HCM 6th Ctrl Delay	63.2
HCM 6th LOS	E

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱			↑↑	↱		✥			↰	↱
Traffic Volume (veh/h)	176	821	0	0	446	105	0	0	0	201	0	213
Future Volume (veh/h)	176	821	0	0	446	105	0	0	0	201	0	213
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	191	892	0	0	485	114	0	0	0	218	0	232
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	225	2517	0	0	1904	802	0	337	0	330	0	302
Arrive On Green	0.13	0.71	0.00	0.00	0.54	0.54	0.00	0.00	0.00	0.19	0.00	0.19
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	191	892	0	0	485	114	0	0	0	218	0	232
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	10.2	9.3	0.0	0.0	7.0	3.7	0.0	0.0	0.0	15.2	0.0	13.4
Cycle Q Clear(g_c), s	10.2	9.3	0.0	0.0	7.0	3.7	0.0	0.0	0.0	15.2	0.0	13.4
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	225	2517	0	0	1904	802	0	337	0	330	0	302
V/C Ratio(X)	0.85	0.35	0.00	0.00	0.25	0.14	0.00	0.00	0.00	0.66	0.00	0.77
Avail Cap(c_a), veh/h	285	2517	0	0	1904	802	0	520	0	469	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	41.0	5.3	0.0	0.0	11.8	11.0	0.0	0.0	0.0	37.5	0.0	36.7
Incr Delay (d2), s/veh	14.7	0.4	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.8	0.0	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	2.8	0.0	0.0	2.7	1.2	0.0	0.0	0.0	5.0	0.0	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	5.7	0.0	0.0	12.1	11.4	0.0	0.0	0.0	38.3	0.0	38.3
LnGrp LOS	E	A	A	A	B	B	A	A	A	D	A	D
Approach Vol, veh/h		1083			599			0			450	
Approach Delay, s/veh		14.5			12.0			0.0			38.3	
Approach LOS		B			B						D	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		73.0		23.0	16.7	56.3		23.0				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		58.5		28.5	15.5	38.5		28.5				
Max Q Clear Time (g_c+I1), s		11.3		17.2	12.2	9.0		0.0				
Green Ext Time (p_c), s		4.8		1.2	0.1	2.8		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	21	592	32	44	590	4	22	0	37	13	0	52
Future Volume (veh/h)	21	592	32	44	590	4	22	0	37	13	0	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	23	643	35	48	641	4	24	0	40	14	0	57
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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	47	943	51	86	1075	7	49	0	277	30	0	260
Arrive On Green	0.03	0.29	0.29	0.05	0.32	0.32	0.03	0.00	0.19	0.02	0.00	0.18
Sat Flow, veh/h	1668	3210	175	1668	3391	21	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	23	333	345	48	315	330	24	0	40	14	0	57
Grp Sat Flow(s),veh/h/ln	1668	1664	1720	1668	1664	1748	1668	0	1485	1668	0	1485
Q Serve(g_s), s	0.6	7.2	7.2	1.1	6.5	6.5	0.6	0.0	0.9	0.3	0.0	1.3
Cycle Q Clear(g_c), s	0.6	7.2	7.2	1.1	6.5	6.5	0.6	0.0	0.9	0.3	0.0	1.3
Prop In Lane	1.00		0.10	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	489	505	86	528	554	49	0	277	30	0	260
V/C Ratio(X)	0.49	0.68	0.68	0.56	0.60	0.60	0.49	0.00	0.14	0.47	0.00	0.22
Avail Cap(c_a), veh/h	613	1833	1895	1021	2444	2567	817	0	1635	613	0	1272
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.6	12.7	12.7	18.9	11.7	11.8	19.5	0.0	13.9	19.9	0.0	14.4
Incr Delay (d2), s/veh	2.9	0.6	0.6	2.1	0.4	0.4	2.8	0.0	0.1	4.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.9	2.0	0.4	1.7	1.8	0.2	0.0	0.3	0.2	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	13.4	13.4	21.0	12.2	12.1	22.4	0.0	14.0	24.0	0.0	14.6
LnGrp LOS	C	B	B	C	B	B	C	A	B	C	A	B
Approach Vol, veh/h		701			693			64			71	
Approach Delay, s/veh		13.7			12.8			17.1			16.5	
Approach LOS		B			B			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	6.1	17.8	4.7	12.2	5.1	18.8	5.2	11.8				
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6				
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0				
Max Q Clear Time (g_c+I1), s	3.1	9.2	2.3	2.9	2.6	8.5	2.6	3.3				
Green Ext Time (p_c), s	0.0	2.4	0.0	0.1	0.0	2.3	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			13.5									
HCM 6th LOS			B									

HCM 6th Signalized Intersection Summary
6: CHRISMAN RD & GRANT LINE RD

Ex+Background
Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰	↱			↰	↱
Traffic Volume (veh/h)	12	570	52	76	483	44	96	0	28	53	0	40
Future Volume (veh/h)	12	570	52	76	483	44	96	0	28	53	0	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	15	712	65	95	604	55	120	0	35	66	0	50
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	50	964	87	228	1546	480	322	0	287	111	0	99
Arrive On Green	0.03	0.22	0.22	0.14	0.32	0.32	0.19	0.00	0.19	0.07	0.00	0.07
Sat Flow, veh/h	1668	4462	405	1668	4782	1485	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	15	507	270	95	604	55	120	0	35	66	0	50
Grp Sat Flow(s),veh/h/ln	1668	1594	1679	1668	1594	1485	1668	0	1485	1668	0	1485
Q Serve(g_s), s	0.5	8.4	8.5	3.0	5.6	1.5	3.6	0.0	1.1	2.2	0.0	1.8
Cycle Q Clear(g_c), s	0.5	8.4	8.5	3.0	5.6	1.5	3.6	0.0	1.1	2.2	0.0	1.8
Prop In Lane	1.00		0.24	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	50	689	363	228	1546	480	322	0	287	111	0	99
V/C Ratio(X)	0.30	0.74	0.74	0.42	0.39	0.11	0.37	0.00	0.12	0.59	0.00	0.51
Avail Cap(c_a), veh/h	235	1628	858	294	2611	811	1058	0	941	529	0	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	27.0	20.7	20.8	22.4	14.9	13.5	19.9	0.0	18.9	25.7	0.0	25.6
Incr Delay (d2), s/veh	1.3	0.6	1.1	1.2	0.1	0.0	0.3	0.0	0.1	5.0	0.0	3.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.7	2.9	1.1	1.7	0.4	1.2	0.0	0.3	0.9	0.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.2	21.3	21.9	23.6	14.9	13.5	20.2	0.0	19.0	30.7	0.0	29.5
LnGrp LOS	C	C	C	C	B	B	C	A	B	C	A	C
Approach Vol, veh/h		792			754			155			116	
Approach Delay, s/veh		21.7			15.9			19.9			30.2	
Approach LOS		C			B			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	13.8	18.3		7.8	7.7	24.3		17.0				
Change Period (Y+Rc), s	6.0	6.0		4.0	6.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	29.0		18.0	8.0	31.0		36.0				
Max Q Clear Time (g_c+I1), s	5.0	10.5		4.2	2.5	7.6		5.6				
Green Ext Time (p_c), s	0.1	1.8		0.3	0.0	1.7		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	19.7
HCM 6th LOS	B

Intersection	
Intersection Delay, s/veh	45.9
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑	↱	↰	↑↱	
Traffic Vol, veh/h	6	28	0	245	1	2	3	109	306	2	175	5
Future Vol, veh/h	6	28	0	245	1	2	3	109	306	2	175	5
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	9	44	0	383	2	3	5	170	478	3	273	8
Number of Lanes	1	1	0	1	1	0	1	1	1	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	2	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	2	2	2
HCM Control Delay	13.9	59.4	48.2	28
HCM LOS	B	F	E	D

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%
Vol Thru, %	0%	100%	0%	0%	100%	0%	33%	0%	97%
Vol Right, %	0%	0%	100%	0%	0%	0%	67%	0%	3%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	109	306	6	28	245	3	2	180
LT Vol	3	0	0	6	0	245	0	2	0
Through Vol	0	109	0	0	28	0	1	0	175
RT Vol	0	0	306	0	0	0	2	0	5
Lane Flow Rate	5	170	478	9	44	383	5	3	281
Geometry Grp	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.011	0.38	0.97	0.027	0.12	0.937	0.01	0.008	0.681
Departure Headway (Hd)	8.535	8.022	7.303	10.374	9.854	8.815	7.828	9.249	8.711
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	421	450	497	345	364	413	459	387	416
Service Time	6.259	5.745	5.026	8.144	7.624	6.539	5.551	6.999	6.461
HCM Lane V/C Ratio	0.012	0.378	0.962	0.026	0.121	0.927	0.011	0.008	0.675
HCM Control Delay	11.4	15.6	60.2	13.4	14	60	10.6	12.1	28.2
HCM Lane LOS	B	C	F	B	B	F	B	B	D
HCM 95th-tile Q	0	1.8	12.5	0.1	0.4	10.5	0	0	4.9

8: CHRISMAN & ELEVENTH ST.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	62	782	165	392	427	37	69	43	414	34	27	54
Future Volume (veh/h)	62	782	165	392	427	37	69	43	414	34	27	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	67	850	179	426	464	40	75	47	0	37	29	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	164	1283	572	429	1811	808	181	85		165	108	
Arrive On Green	0.10	0.39	0.39	0.26	0.54	0.54	0.13	0.13	0.00	0.13	0.13	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	841	674	1485	737	852	1485
Grp Volume(v), veh/h	67	850	179	426	464	40	122	0	0	66	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1515	0	1485	1588	0	1485
Q Serve(g_s), s	2.9	16.4	6.6	19.8	5.7	1.0	3.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	16.4	6.6	19.8	5.7	1.0	5.7	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.61		1.00	0.56		1.00
Lane Grp Cap(c), veh/h	164	1283	572	429	1811	808	266	0		273	0	
V/C Ratio(X)	0.41	0.66	0.31	0.99	0.26	0.05	0.46	0.00		0.24	0.00	
Avail Cap(c_a), veh/h	1072	2138	954	429	2138	954	639	0		648	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.0	19.7	16.7	28.8	9.4	8.3	32.1	0.0	0.0	30.9	0.0	0.0
Incr Delay (d2), s/veh	3.5	1.3	0.7	41.8	0.2	0.1	4.4	0.0	0.0	1.6	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.8	2.1	11.9	1.6	0.3	2.3	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.4	21.0	17.4	70.6	9.6	8.4	36.5	0.0	0.0	32.5	0.0	0.0
LnGrp LOS	D	C	B	E	A	A	D	A		C	A	
Approach Vol, veh/h		1096			930			122	A		66	A
Approach Delay, s/veh		21.4			37.5			36.5			32.5	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.0	36.0		15.8	13.7	48.3		15.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	21.8	18.4		4.7	4.9	7.7		7.7
Green Ext Time (p_c), s	0.0	11.6		0.5	0.5	5.1		1.1

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		⮌		↑↱							↱
Traffic Vol, veh/h	8	634	0	0	0	618	1	0	0	0	0	0	20
Future Vol, veh/h	8	634	0	0	0	618	1	0	0	0	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	10	10	10	10	10	10	10	0	0	0	10	10	10
Mvmt Flow	9	689	0	0	0	672	1	0	0	0	0	0	22

Major/Minor	Major1			Major2							Minor2		
Conflicting Flow All	673	0	-	503	-	-	0				-	-	337
Stage 1	-	-	-	-	-	-	-				-	-	-
Stage 2	-	-	-	-	-	-	-				-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-				-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-				-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-				-	-	3.4
Pot Cap-1 Maneuver	862	-	0	785	0	-	-				0	0	636
Stage 1	-	-	0	-	0	-	-				0	0	-
Stage 2	-	-	0	-	0	-	-				0	0	-
Platoon blocked, %		-				-	-						
Mov Cap-1 Maneuver	862	-	-	785	-	-	-				-	0	636
Mov Cap-2 Maneuver	-	-	-	-	-	-	-				-	0	-
Stage 1	-	-	-	-	-	-	-				-	0	-
Stage 2	-	-	-	-	-	-	-				-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	862	-	785	-	-	636
HCM Lane V/C Ratio	0.01	-	-	-	-	0.034
HCM Control Delay (s)	9.2	-	0	-	-	10.9
HCM Lane LOS	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	-	0	-	-	0.1

A4. Employee Shift Data

Headcount

	Total
Headcount - Day Shift	754
Headcount - Night Shift	754

Shift Structure

Adjustment below accounts for
mass transit and carpool users.
Adjust as needed for jurisdiction
Net Cars Factor 100%

	Start	End
Day Shift - Inbound Employees	7:00:00 AM	5:30:00 PM
Day Shift - Outbound Employees	7:30:00 AM	6:00:00 PM
Night Shift - Inbound Employees	6:00:00 PM	4:30:00 AM
Night Shift - Outbound Employees	6:30:00 PM	5:00:00 AM

Cars

Average Weekday

Time	In	Out	Total
00:00	3	5	8
01:00	1	3	4
02:00	4	11	15
03:00	6	11	17
04:00	14	144	158
05:00	30	382	412
06:00	22	13	35
06:15	59	14	73
06:30	102	8	110
06:45	137	5	142
07:00	135	7	142
07:15	176	3	179
07:30	26	5	31
07:45	6	4	10
08:00	20	14	34
09:00	13	8	21
10:00	16	14	30
11:00	31	33	64
12:00	9	14	23
13:00	11	11	22
14:00	9	20	29
15:00	24	30	54
16:00	36	26	62
17:00	21	26	47
17:15	40	12	52
17:30	89	103	192
17:45	115	59	174
18:00	143	198	341
18:15	139	133	272
18:30	18	89	107
18:45	4	33	37
19:00	15	28	43
20:00	6	6	12
21:00	12	12	24
22:00	14	17	31
23:00	2	4	6
	1,508	1,508	3,013

Trucks

Average Weekday

Time	In	Out	Total
00:00	10	10	21
01:00	17	17	35
02:00	7	7	14
03:00	14	14	28
04:00	7	7	14
05:00	10	10	21
06:00	2	2	5
06:15	2	2	5
06:30	2	2	5
06:45	2	2	5
07:00	3	3	7
07:15	3	3	7
07:30	3	3	7
07:45	3	3	7
08:00	14	14	28
09:00	24	24	49
10:00	14	14	28
11:00	15	15	30
12:00	15	15	30
13:00	9	9	19
14:00	9	9	19
15:00	9	9	19
16:00	10	10	21
17:00	2	2	5
17:15	2	2	5
17:30	2	2	5
17:45	2	2	5
18:00	2	2	5
18:15	2	2	5
18:30	2	2	5
18:45	2	2	5
19:00	8	8	16
20:00	13	13	25
21:00	9	9	19
22:00	13	13	25
23:00	9	9	19
	280	280	560

Total Vehicles

Cars + Trucks Average Weekday

	In	Out	Total
00:00	13	15	29
01:00	18	20	39
02:00	11	18	29
03:00	20	25	45
04:00	21	151	172
05:00	40	392	433
06:00	24	15	40
06:15	61	16	78
06:30	104	10	115
06:45	139	7	147
07:00	138	10	149
07:15	179	6	186
07:30	29	8	38
07:45	9	7	17
08:00	34	28	62
09:00	37	32	70
10:00	30	28	58
11:00	46	48	94
12:00	24	29	53
13:00	20	20	41
14:00	18	29	48
15:00	33	39	73
16:00	46	36	83
17:00	23	28	52
17:15	42	14	57
17:30	91	105	197
17:45	117	61	179
18:00	145	200	346
18:15	141	135	277
18:30	20	91	112
18:45	6	35	42
19:00	23	36	59
20:00	19	19	37
21:00	21	21	43
22:00	27	30	56
23:00	11	13	25
	1,788	1,785	3,573

Morning Peak Hour of Generator

	Enter	Exit	Total
06:30-07:30	562	35	596

Evening Peak Hour of Generator

	Enter	Exit	Total
17:30-18:30	495	502	998

A5. Existing Plus Background Plus Project Synchro Outputs

HCM 6th Signalized Intersection Summary

Ex+Background+Project

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	702	50	35	222	22	0	0	84	21
Future Volume (veh/h)	0	0	0	702	50	35	222	22	0	0	84	21
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				780	56	39	247	24	0	0	93	23
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				766	55	38	300	612	0	0	132	33
Arrive On Green				0.52	0.52	0.52	0.18	0.35	0.00	0.00	0.10	0.10
Sat Flow, veh/h				1484	107	74	1668	1752	0	0	1356	335
Grp Volume(v), veh/h				875	0	0	247	24	0	0	0	116
Grp Sat Flow(s),veh/h/ln				1664	0	0	1668	1752	0	0	0	1691
Q Serve(g_s), s				35.0	0.0	0.0	9.7	0.6	0.0	0.0	0.0	4.5
Cycle Q Clear(g_c), s				35.0	0.0	0.0	9.7	0.6	0.0	0.0	0.0	4.5
Prop In Lane				0.89		0.04	1.00		0.00	0.00		0.20
Lane Grp Cap(c), veh/h				859	0	0	300	612	0	0	0	165
V/C Ratio(X)				1.02	0.00	0.00	0.82	0.04	0.00	0.00	0.00	0.70
Avail Cap(c_a), veh/h				859	0	0	738	646	0	0	0	624
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				16.4	0.0	0.0	26.8	14.5	0.0	0.0	0.0	29.6
Incr Delay (d2), s/veh				35.3	0.0	0.0	4.3	0.0	0.0	0.0	0.0	2.1
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				19.1	0.0	0.0	3.9	0.2	0.0	0.0	0.0	1.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				51.7	0.0	0.0	31.0	14.6	0.0	0.0	0.0	31.7
LnGrp LOS				F	A	A	C	B	A	A	A	C
Approach Vol, veh/h					875			271			116	
Approach Delay, s/veh					51.7			29.6			31.7	
Approach LOS					D			C			C	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		28.6			17.1	11.5		39.2				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		2.6			11.7	6.5		37.0				
Green Ext Time (p_c), s		0.0			0.6	0.1		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		45.1
HCM 6th LOS		D

HCM 6th Signalized Intersection Summary
Ex+Background+Project

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	17	52	458	0	0	0	0	227	459	36	750	0
Future Volume (veh/h)	17	52	458	0	0	0	0	227	459	36	750	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	18	57	498				0	247	499	39	815	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	144	456	515				0	761	645	63	924	0
Arrive On Green	0.35	0.35	0.35				0.00	0.43	0.43	0.04	0.53	0.00
Sat Flow, veh/h	415	1316	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	75	0	498				0	247	499	39	815	0
Grp Sat Flow(s),veh/h/ln	1731	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	2.1	0.0	23.8				0.0	6.7	20.7	1.7	29.7	0.0
Cycle Q Clear(g_c), s	2.1	0.0	23.8				0.0	6.7	20.7	1.7	29.7	0.0
Prop In Lane	0.24		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	600	0	515				0	761	645	63	924	0
V/C Ratio(X)	0.13	0.00	0.97				0.00	0.32	0.77	0.62	0.88	0.00
Avail Cap(c_a), veh/h	600	0	515				0	1336	1132	347	1336	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	16.1	0.0	23.2				0.0	13.4	17.4	34.2	15.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	31.3				0.0	0.3	2.9	9.7	6.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	0.0	12.0				0.0	2.4	6.5	0.8	10.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.1	0.0	54.5				0.0	13.8	20.3	43.9	21.1	0.0
LnGrp LOS	B	A	D				A	B	C	D	C	A
Approach Vol, veh/h		573						746			854	
Approach Delay, s/veh		49.5						18.1			22.2	
Approach LOS		D						B			C	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	6.7	36.2	29.2	42.9
Change Period (Y+Rc), s	4.0	4.9	* 4.2	4.9
Max Green Setting (Gmax), s	15.0	55.0	* 25	55.0
Max Q Clear Time (g_c+I1), s	3.7	22.7	25.8	31.7
Green Ext Time (p_c), s	0.0	5.7	0.0	6.4

Intersection Summary	
HCM 6th Ctrl Delay	28.0
HCM 6th LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	294	573	48	55	299	159	27	163	135	455	319	440
Future Volume (veh/h)	294	573	48	55	299	159	27	163	135	455	319	440
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	623	52	60	325	173	29	177	147	495	347	478
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	330	1091	487	92	626	264	63	642	286	312	1146	541
Arrive On Green	0.19	0.31	0.31	0.06	0.18	0.18	0.04	0.19	0.19	0.19	0.34	0.34
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	623	52	60	325	173	29	177	147	495	347	478
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	14.4	11.9	1.9	2.8	6.7	8.7	1.3	3.6	7.1	15.0	6.1	23.0
Cycle Q Clear(g_c), s	14.4	11.9	1.9	2.8	6.7	8.7	1.3	3.6	7.1	15.0	6.1	23.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	1091	487	92	626	264	63	642	286	312	1146	541
V/C Ratio(X)	0.97	0.57	0.11	0.65	0.52	0.66	0.46	0.28	0.51	1.59	0.30	0.88
Avail Cap(c_a), veh/h	330	1319	588	312	1319	555	330	1245	555	312	1245	588
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	32.4	23.2	19.8	37.1	29.9	30.7	37.9	27.6	29.0	32.6	19.3	24.8
Incr Delay (d2), s/veh	40.7	0.8	0.2	2.9	1.1	4.7	1.9	0.4	2.4	278.8	0.3	15.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.5	4.7	0.7	1.2	2.7	3.2	0.6	1.4	2.5	29.8	2.2	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.1	24.0	19.9	40.0	31.0	35.4	39.9	28.0	31.4	311.4	19.5	39.7
LnGrp LOS	E	C	B	D	C	D	D	C	C	F	B	D
Approach Vol, veh/h		995			558			353			1320	
Approach Delay, s/veh		39.6			33.3			30.4			136.3	
Approach LOS		D			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	21.0	9.4	29.8	7.9	33.1	20.0	19.3
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	17.0	9.1	4.8	13.9	3.3	25.0	16.4	10.7
Green Ext Time (p_c), s	0.0	2.3	0.0	4.7	0.0	2.6	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	77.1
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Summary
4: ELEVENTH ST. & MACARTHUR DRIVE

Ex+Background+Project
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			↑↑	↱		✣			↰	↱
Traffic Volume (veh/h)	134	467	0	0	1074	162	0	0	0	112	0	83
Future Volume (veh/h)	134	467	0	0	1074	162	0	0	0	112	0	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	146	508	0	0	1167	176	0	0	0	122	0	90
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	229	2338	0	0	1594	671	0	305	0	361	0	274
Arrive On Green	0.13	0.66	0.00	0.00	0.45	0.45	0.00	0.00	0.00	0.17	0.00	0.17
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	146	508	0	0	1167	176	0	0	0	122	0	90
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	4.3	3.1	0.0	0.0	15.0	4.1	0.0	0.0	0.0	4.6	0.0	2.8
Cycle Q Clear(g_c), s	4.3	3.1	0.0	0.0	15.0	4.1	0.0	0.0	0.0	4.6	0.0	2.8
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	229	2338	0	0	1594	671	0	305	0	361	0	274
V/C Ratio(X)	0.64	0.22	0.00	0.00	0.73	0.26	0.00	0.00	0.00	0.34	0.00	0.33
Avail Cap(c_a), veh/h	960	3191	0	0	3191	1344	0	793	0	972	0	996
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.8	3.7	0.0	0.0	12.4	9.4	0.0	0.0	0.0	20.8	0.0	20.0
Incr Delay (d2), s/veh	1.1	0.0	0.0	0.0	0.7	0.2	0.0	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.6	0.0	0.0	4.8	1.1	0.0	0.0	0.0	1.4	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	3.7	0.0	0.0	13.1	9.6	0.0	0.0	0.0	21.0	0.0	20.2
LnGrp LOS	C	A	A	A	B	A	A	A	A	C	A	C
Approach Vol, veh/h		654			1343			0			212	
Approach Delay, s/veh		8.2			12.6			0.0			20.7	
Approach LOS		A			B						C	

Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		41.1		14.1	11.6	29.5		14.1				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		50.0		35.0	30.0	50.0		25.0				
Max Q Clear Time (g_c+I1), s		5.1		6.6	6.3	17.0		0.0				
Green Ext Time (p_c), s		2.4		0.7	0.3	8.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			12.1
HCM 6th LOS			B

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	60	841	133	55	462	10	25	0	1	4	0	14
Future Volume (veh/h)	60	841	133	55	462	10	25	0	1	4	0	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	65	914	145	60	502	11	27	0	1	4	0	15
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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	105	1200	190	99	1377	30	53	0	138	9	0	99
Arrive On Green	0.06	0.42	0.42	0.06	0.41	0.41	0.03	0.00	0.09	0.01	0.00	0.07
Sat Flow, veh/h	1668	2877	456	1668	3330	73	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	65	529	530	60	251	262	27	0	1	4	0	15
Grp Sat Flow(s),veh/h/ln	1668	1664	1670	1668	1664	1739	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.6	11.7	11.8	1.5	4.5	4.5	0.7	0.0	0.0	0.1	0.0	0.4
Cycle Q Clear(g_c), s	1.6	11.7	11.8	1.5	4.5	4.5	0.7	0.0	0.0	0.1	0.0	0.4
Prop In Lane	1.00		0.27	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	105	694	696	99	688	719	53	0	138	9	0	99
V/C Ratio(X)	0.62	0.76	0.76	0.61	0.36	0.36	0.51	0.00	0.01	0.44	0.00	0.15
Avail Cap(c_a), veh/h	578	1730	1736	963	2307	2410	771	0	1543	578	0	1200
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	19.8	10.8	10.8	19.9	8.8	8.8	20.6	0.0	17.8	21.5	0.0	19.0
Incr Delay (d2), s/veh	2.2	0.7	0.7	2.2	0.1	0.1	2.7	0.0	0.0	12.1	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	2.8	2.8	0.5	1.1	1.1	0.3	0.0	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	11.4	11.4	22.1	8.9	8.9	23.3	0.0	17.8	33.5	0.0	19.3
LnGrp LOS	C	B	B	C	A	A	C	A	B	C	A	B
Approach Vol, veh/h		1124			573			28			19	
Approach Delay, s/veh		12.1			10.3			23.1			22.3	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	23.8	4.2	8.6	6.7	23.7	5.4	7.5
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	3.5	13.8	2.1	2.0	3.6	6.5	2.7	2.4
Green Ext Time (p_c), s	0.1	4.3	0.0	0.0	0.0	1.7	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	11.8
HCM 6th LOS	B

6: CHRISMAN RD & GRANT LINE RD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	17	386	90	156	519	53	18	0	6	28	8	19
Future Volume (veh/h)	17	386	90	156	519	53	18	0	6	28	8	19
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	21	482	112	195	649	66	22	0	8	35	10	24
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	68	938	212	312	1852	575	137	272	121	82	164	73
Arrive On Green	0.04	0.24	0.24	0.19	0.39	0.39	0.08	0.00	0.08	0.05	0.05	0.05
Sat Flow, veh/h	1668	3899	882	1668	4782	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	21	392	202	195	649	66	22	0	8	35	10	24
Grp Sat Flow(s),veh/h/ln	1668	1594	1593	1668	1594	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	0.6	5.3	5.5	5.4	4.8	1.4	0.6	0.0	0.2	1.0	0.1	0.8
Cycle Q Clear(g_c), s	0.6	5.3	5.5	5.4	4.8	1.4	0.6	0.0	0.2	1.0	0.1	0.8
Prop In Lane	1.00		0.55	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	68	767	383	312	1852	575	137	272	121	82	164	73
V/C Ratio(X)	0.31	0.51	0.53	0.62	0.35	0.11	0.16	0.00	0.07	0.42	0.06	0.33
Avail Cap(c_a), veh/h	268	1854	926	335	2973	923	1204	2403	1072	602	1201	536
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.2	16.4	16.5	18.7	10.8	9.8	21.3	0.0	21.1	23.0	22.6	22.9
Incr Delay (d2), s/veh	1.0	0.2	0.4	3.3	0.0	0.0	0.2	0.0	0.1	3.4	0.2	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.6	1.7	2.0	1.2	0.3	0.2	0.0	0.1	0.4	0.1	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.2	16.6	16.9	21.9	10.9	9.8	21.5	0.0	21.2	26.5	22.8	25.5
LnGrp LOS	C	B	B	C	B	A	C	A	C	C	C	C
Approach Vol, veh/h		615			910			30			69	
Approach Delay, s/veh		16.9			13.2			21.4			25.6	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.3	18.0		6.5	8.0	25.3		10.1
Change Period (Y+Rc), s	6.0	6.0		4.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	10.0	29.0		18.0	8.0	31.0		36.0
Max Q Clear Time (g_c+I1), s	7.4	7.5		3.0	2.6	6.8		2.6
Green Ext Time (p_c), s	0.2	1.4		0.1	0.0	1.8		0.0

Intersection Summary			
HCM 6th Ctrl Delay			15.3
HCM 6th LOS			B

Intersection	
Intersection Delay, s/veh	14.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑↱		↰	↑	↱
Traffic Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Future Vol, veh/h	0	0	2	276	7	3	0	17	32	2	262	5
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	0	0	2	310	8	3	0	19	36	2	294	6
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	8.8	16.2	9.3	14.3
HCM LOS	A	C	A	B

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	0%	0%	0%	0%	0%	100%	0%	100%	0%	0%
Vol Thru, %	100%	100%	15%	100%	0%	0%	70%	0%	100%	0%
Vol Right, %	0%	0%	85%	0%	100%	0%	30%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	0	11	38	0	2	276	10	2	262	5
LT Vol	0	0	0	0	0	276	0	2	0	0
Through Vol	0	11	6	0	0	0	7	0	262	0
RT Vol	0	0	32	0	2	0	3	0	0	5
Lane Flow Rate	0	13	42	0	2	310	11	2	294	6
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0	0.023	0.071	0	0.004	0.547	0.018	0.004	0.493	0.008
Departure Headway (Hd)	6.638	6.638	6.033	6.718	6.011	6.352	5.641	6.535	6.03	5.323
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	0	539	593	0	595	571	636	551	601	676
Service Time	4.377	4.377	3.772	4.46	3.752	4.075	3.364	4.235	3.73	3.023
HCM Lane V/C Ratio	0	0.024	0.071	0	0.003	0.543	0.017	0.004	0.489	0.009
HCM Control Delay	9.4	9.5	9.2	9.5	8.8	16.5	8.5	9.3	14.5	8.1
HCM Lane LOS	N	A	A	N	A	C	A	A	B	A
HCM 95th-tile Q	0	0.1	0.2	0	0	3.3	0.1	0	2.7	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	108	377	68	287	700	31	468	29	487	20	21	21
Future Volume (veh/h)	108	377	68	287	700	31	468	29	487	20	21	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	117	410	74	312	761	34	509	32	0	22	23	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	184	737	329	353	1073	479	528	28		337	330	
Arrive On Green	0.11	0.22	0.22	0.21	0.32	0.32	0.35	0.35	0.00	0.35	0.35	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	1258	79	1485	773	930	1485
Grp Volume(v), veh/h	117	410	74	312	761	34	541	0	0	45	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1337	0	1485	1703	0	1485
Q Serve(g_s), s	5.7	9.3	3.5	15.4	17.0	1.3	28.6	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	5.7	9.3	3.5	15.4	17.0	1.3	30.0	0.0	0.0	1.4	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.94		1.00	0.49		1.00
Lane Grp Cap(c), veh/h	184	737	329	353	1073	479	557	0		667	0	
V/C Ratio(X)	0.63	0.56	0.23	0.88	0.71	0.07	0.97	0.00		0.07	0.00	
Avail Cap(c_a), veh/h	985	1966	877	394	1966	877	557	0		667	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	36.0	29.3	27.0	32.4	25.2	19.9	29.0	0.0	0.0	18.1	0.0	0.0
Incr Delay (d2), s/veh	7.5	1.4	0.7	21.4	1.9	0.1	31.6	0.0	0.0	0.2	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	3.6	1.2	7.7	6.2	0.4	15.4	0.0	0.0	0.6	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.5	30.7	27.7	53.7	27.1	20.0	60.7	0.0	0.0	18.3	0.0	0.0
LnGrp LOS	D	C	C	D	C	C	E	A		B	A	
Approach Vol, veh/h		601			1107			541	A		45	A
Approach Delay, s/veh		32.8			34.4			60.7			18.3	
Approach LOS		C			C			E			B	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	23.9	24.7		36.0	15.4	33.3		36.0
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	17.4	11.3		3.4	7.7	19.0		32.0
Green Ext Time (p_c), s	0.6	4.9		0.3	1.0	8.3		0.0

Intersection Summary	
HCM 6th Ctrl Delay	39.8
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↱		↰	↑
Traffic Vol, veh/h	0	10	6	0	10	82
Future Vol, veh/h	0	10	6	0	10	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	210	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	10	100	100	10
Mvmt Flow	0	11	7	0	11	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	118	7	0	0	7	0
Stage 1	7	-	-	-	-	-
Stage 2	111	-	-	-	-	-
Critical Hdwy	7.4	7.2	-	-	5.1	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	-	-	3.1	-
Pot Cap-1 Maneuver	689	849	-	-	1153	-
Stage 1	812	-	-	-	-	-
Stage 2	718	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	682	849	-	-	1153	-
Mov Cap-2 Maneuver	644	-	-	-	-	-
Stage 1	812	-	-	-	-	-
Stage 2	711	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.3	0	0.9
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	849	1153	-
HCM Lane V/C Ratio	-	-	-	0.013	0.009	-
HCM Control Delay (s)	-	-	0	9.3	8.2	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	0	-

12: SKYLARK WAY & Driveway #2

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	0	10	16	0	97	92
Future Vol, veh/h	0	10	16	0	97	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	3	3	10	3	3	10
Mvmt Flow	0	11	17	0	105	100

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	327	17	0	0	17	0
Stage 1	17	-	-	-	-	-
Stage 2	310	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	665	1059	-	-	1594	-
Stage 1	1003	-	-	-	-	-
Stage 2	741	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	618	1059	-	-	1594	-
Mov Cap-2 Maneuver	619	-	-	-	-	-
Stage 1	1003	-	-	-	-	-
Stage 2	689	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	8.4	0	3.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	1059	1594	-
HCM Lane V/C Ratio	-	-	0.01	0.066	-
HCM Control Delay (s)	-	-	8.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0.2	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	652	193	0	527	0	1
Future Vol, veh/h	652	193	0	527	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	709	210	0	573	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	460
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	467
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	467
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	467	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s)	12.7	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

HCM 6th Signalized Intersection Summary
14: Driveway #4/FEMA Driveway & GRANT LINE RD

Ex+Background+Project
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	15	531	107	42	512	2	8	0	2	1	0	7
Future Volume (veh/h)	15	531	107	42	512	2	8	0	2	1	0	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1752	1752	1856	1856	1856	1752	1752	1752
Adj Flow Rate, veh/h	16	577	116	46	557	2	9	0	2	1	0	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
Percent Heavy Veh, %	10	10	10	3	10	10	3	3	3	10	10	10
Cap, veh/h	34	1100	217	87	1033	4	21	0	464	4	0	423
Arrive On Green	0.02	0.27	0.27	0.05	0.30	0.30	0.01	0.00	0.30	0.00	0.00	0.28
Sat Flow, veh/h	1668	4007	791	1767	3402	12	1767	0	1572	1668	0	1485
Grp Volume(v), veh/h	16	457	236	46	272	287	9	0	2	1	0	8
Grp Sat Flow(s),veh/h/ln	1668	1594	1609	1767	1664	1750	1767	0	1572	1668	0	1485
Q Serve(g_s), s	0.4	5.1	5.3	1.1	5.7	5.7	0.2	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.4	5.1	5.3	1.1	5.7	5.7	0.2	0.0	0.0	0.0	0.0	0.2
Prop In Lane	1.00		0.49	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	34	876	442	87	506	531	21	0	464	4	0	423
V/C Ratio(X)	0.47	0.52	0.53	0.53	0.54	0.54	0.43	0.00	0.00	0.25	0.00	0.02
Avail Cap(c_a), veh/h	198	2495	1260	251	1342	1411	210	0	746	198	0	704
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.4	12.9	13.0	19.6	12.2	12.2	20.7	0.0	10.5	21.0	0.0	10.8
Incr Delay (d2), s/veh	9.9	0.5	1.0	4.9	0.9	0.9	13.3	0.0	0.0	30.5	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	1.5	0.5	1.6	1.7	0.2	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.4	13.4	14.0	24.4	13.1	13.1	34.0	0.0	10.5	51.5	0.0	10.9
LnGrp LOS	C	B	B	C	B	B	C	A	B	D	A	B
Approach Vol, veh/h		709			605			11			9	
Approach Delay, s/veh		14.0			14.0			29.7			15.4	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.1	16.4	6.1	15.6	4.5	16.0	4.9	16.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	20.0	6.0	33.0	5.0	20.0	5.0	34.0
Max Q Clear Time (g_c+I1), s	2.0	2.0	3.1	7.3	2.2	2.2	2.4	7.7
Green Ext Time (p_c), s	0.0	0.0	0.0	4.3	0.0	0.0	0.0	3.1

Intersection Summary	
HCM 6th Ctrl Delay	14.1
HCM 6th LOS	B

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑↑		↱
Traffic Vol, veh/h	491	43	0	556	0	2
Future Vol, veh/h	491	43	0	556	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	534	47	0	604	0	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	291
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	599
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	599
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB		WB		NB	
HCM Control Delay, s	0		0		11	
HCM LOS					B	

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	599	-	-	-
HCM Lane V/C Ratio	0.004	-	-	-
HCM Control Delay (s)	11	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑↱	
Traffic Vol, veh/h	0	0	0	24	186	68
Future Vol, veh/h	0	0	0	24	186	68
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	3	3	10	10	10	3
Mvmt Flow	0	0	0	26	202	74

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	138	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	750	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	750	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	-	-	-

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰	↑			↳	
Traffic Volume (veh/h)	0	0	0	414	25	47	537	68	0	0	138	14
Future Volume (veh/h)	0	0	0	414	25	47	537	68	0	0	138	14
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				460	28	52	597	76	0	0	153	16
Peak Hour Factor				0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				493	30	56	601	947	0	0	189	20
Arrive On Green				0.35	0.35	0.35	0.36	0.54	0.00	0.00	0.12	0.12
Sat Flow, veh/h				1408	86	159	1668	1752	0	0	1559	163
Grp Volume(v), veh/h				540	0	0	597	76	0	0	0	169
Grp Sat Flow(s),veh/h/ln				1653	0	0	1668	1752	0	0	0	1722
Q Serve(g_s), s				26.2	0.0	0.0	29.7	1.7	0.0	0.0	0.0	8.0
Cycle Q Clear(g_c), s				26.2	0.0	0.0	29.7	1.7	0.0	0.0	0.0	8.0
Prop In Lane				0.85		0.10	1.00		0.00	0.00		0.09
Lane Grp Cap(c), veh/h				578	0	0	601	947	0	0	0	209
V/C Ratio(X)				0.93	0.00	0.00	0.99	0.08	0.00	0.00	0.00	0.81
Avail Cap(c_a), veh/h				695	0	0	601	947	0	0	0	517
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				26.1	0.0	0.0	26.5	9.2	0.0	0.0	0.0	35.6
Incr Delay (d2), s/veh				16.6	0.0	0.0	34.7	0.0	0.0	0.0	0.0	2.8
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.2	0.0	0.0	16.4	0.6	0.0	0.0	0.0	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				42.7	0.0	0.0	61.2	9.2	0.0	0.0	0.0	38.5
LnGrp LOS				D	A	A	E	A	A	A	A	D
Approach Vol, veh/h					540			673			169	
Approach Delay, s/veh					42.7			55.3			38.5	
Approach LOS					D			E			D	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		49.9			34.9	15.0		33.3				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.0			30.0	25.0		35.0				
Max Q Clear Time (g_c+I1), s		3.7			31.7	10.0		28.2				
Green Ext Time (p_c), s		0.1			0.0	0.1		0.9				

Intersection Summary			
HCM 6th Ctrl Delay			48.3
HCM 6th LOS			D

HCM 6th Signalized Intersection Summary

Ex+Background+Project

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	61	159	410	0	0	0	0	544	817	82	470	0
Future Volume (veh/h)	61	159	410	0	0	0	0	544	817	82	470	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	66	173	446				0	591	888	89	511	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	119	313	372				0	965	818	113	1154	0
Arrive On Green	0.25	0.25	0.25				0.00	0.55	0.55	0.07	0.66	0.00
Sat Flow, veh/h	477	1251	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	239	0	446				0	591	888	89	511	0
Grp Sat Flow(s),veh/h/ln	1728	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	12.0	0.0	25.0				0.0	22.8	55.0	5.2	14.0	0.0
Cycle Q Clear(g_c), s	12.0	0.0	25.0				0.0	22.8	55.0	5.2	14.0	0.0
Prop In Lane	0.28		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	433	0	372				0	965	818	113	1154	0
V/C Ratio(X)	0.55	0.00	1.20				0.00	0.61	1.09	0.79	0.44	0.00
Avail Cap(c_a), veh/h	433	0	372				0	965	818	251	1154	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	0.0	37.4				0.0	15.2	22.4	45.8	8.2	0.0
Incr Delay (d2), s/veh	0.9	0.0	113.1				0.0	1.4	57.4	11.5	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	20.4				0.0	8.5	29.6	2.5	4.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	150.5				0.0	16.6	79.8	57.4	8.6	0.0
LnGrp LOS	C	A	F				A	B	F	E	A	A
Approach Vol, veh/h		685						1479			600	
Approach Delay, s/veh		109.7						54.5			15.8	
Approach LOS		F						D			B	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	10.7	59.9	29.2	70.6
Change Period (Y+Rc), s	4.0	4.9	* 4.2	4.9
Max Green Setting (Gmax), s	15.0	55.0	* 25	55.0
Max Q Clear Time (g_c+I1), s	7.2	57.0	27.0	16.0
Green Ext Time (p_c), s	0.1	0.0	0.0	3.6

Intersection Summary	
HCM 6th Ctrl Delay	59.8
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Summary
3: MACARTHUR DRIVE (N) & GRANT LINE RD

Ex+Background+Project
Timing Plan: PM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	416	638	59	152	566	386	44	434	106	307	205	266
Future Volume (veh/h)	416	638	59	152	566	386	44	434	106	307	205	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	452	693	64	165	615	420	48	472	115	334	223	289
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	266	1178	525	195	1058	445	78	641	286	252	995	470
Arrive On Green	0.15	0.33	0.33	0.12	0.30	0.30	0.04	0.19	0.19	0.15	0.30	0.30
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	452	693	64	165	615	420	48	472	115	334	223	289
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	15.0	16.2	2.8	9.6	14.7	27.5	2.7	13.3	6.7	15.0	5.0	15.7
Cycle Q Clear(g_c), s	15.0	16.2	2.8	9.6	14.7	27.5	2.7	13.3	6.7	15.0	5.0	15.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	266	1178	525	195	1058	445	78	641	286	252	995	470
V/C Ratio(X)	1.70	0.59	0.12	0.85	0.58	0.94	0.61	0.74	0.40	1.33	0.22	0.61
Avail Cap(c_a), veh/h	266	1178	525	252	1063	448	266	1004	448	252	1004	474
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.2	27.5	23.0	43.1	29.5	34.0	46.7	37.8	35.2	42.2	26.2	30.0
Incr Delay (d2), s/veh	329.1	1.0	0.2	15.4	1.1	29.0	2.9	2.8	1.6	172.4	0.2	3.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.7	6.7	1.0	4.6	6.0	12.8	1.2	5.5	2.5	18.0	1.9	6.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	371.4	28.5	23.2	58.4	30.6	63.0	49.6	40.7	36.7	214.6	26.4	33.0
LnGrp LOS	F	C	C	E	C	E	D	D	D	F	C	C
Approach Vol, veh/h		1209			1200			635			846	
Approach Delay, s/veh		156.4			45.8			40.6			103.0	
Approach LOS		F			D			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	24.6	16.6	38.2	9.4	35.2	20.0	34.8
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	17.0	15.3	11.6	18.2	4.7	17.7	17.0	29.5
Green Ext Time (p_c), s	0.0	3.9	0.1	4.5	0.0	3.0	0.0	0.4

Intersection Summary	
HCM 6th Ctrl Delay	91.8
HCM 6th LOS	F

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱			↑↑	↱		✣			↰	↱
Traffic Volume (veh/h)	210	821	0	0	446	108	0	0	0	204	0	248
Future Volume (veh/h)	210	821	0	0	446	108	0	0	0	204	0	248
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	0	1856	1752	1752	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	228	892	0	0	485	117	0	0	0	222	0	270
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, %	3	3	3	0	3	10	10	10	10	10	10	3
Cap, veh/h	261	2489	0	0	1803	759	0	351	0	341	0	315
Arrive On Green	0.15	0.71	0.00	0.00	0.51	0.51	0.00	0.00	0.00	0.20	0.00	0.20
Sat Flow, veh/h	1767	3618	0	0	3618	1485	0	1752	0	1328	0	1572
Grp Volume(v), veh/h	228	892	0	0	485	117	0	0	0	222	0	270
Grp Sat Flow(s),veh/h/ln	1767	1763	0	0	1763	1485	0	1752	0	1328	0	1572
Q Serve(g_s), s	12.1	9.6	0.0	0.0	7.5	4.0	0.0	0.0	0.0	15.4	0.0	15.9
Cycle Q Clear(g_c), s	12.1	9.6	0.0	0.0	7.5	4.0	0.0	0.0	0.0	15.4	0.0	15.9
Prop In Lane	1.00		0.00	0.00		1.00	0.00		0.00	1.00		1.00
Lane Grp Cap(c), veh/h	261	2489	0	0	1803	759	0	351	0	341	0	315
V/C Ratio(X)	0.87	0.36	0.00	0.00	0.27	0.15	0.00	0.00	0.00	0.65	0.00	0.86
Avail Cap(c_a), veh/h	285	2489	0	0	1803	759	0	520	0	469	0	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	40.0	5.6	0.0	0.0	13.3	12.4	0.0	0.0	0.0	36.9	0.0	37.1
Incr Delay (d2), s/veh	21.9	0.4	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.8	0.0	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	3.0	0.0	0.0	2.9	1.3	0.0	0.0	0.0	5.0	0.0	6.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	6.0	0.0	0.0	13.6	12.9	0.0	0.0	0.0	37.6	0.0	44.0
LnGrp LOS	E	A	A	A	B	B	A	A	A	D	A	D
Approach Vol, veh/h		1120			602			0			492	
Approach Delay, s/veh		17.4			13.5			0.0			41.1	
Approach LOS		B			B						D	
Timer - Assigned Phs		2		4	5	6		8				
Phs Duration (G+Y+Rc), s		72.3		23.7	18.7	53.6		23.7				
Change Period (Y+Rc), s		4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s		58.5		28.5	15.5	38.5		28.5				
Max Q Clear Time (g_c+I1), s		11.6		17.9	14.1	9.5		0.0				
Green Ext Time (p_c), s		4.8		1.3	0.1	2.8		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			21.6
HCM 6th LOS			C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	21	895	116	51	763	4	241	0	47	13	0	52
Future Volume (veh/h)	21	895	116	51	763	4	241	0	47	13	0	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	23	973	126	55	829	4	262	0	51	14	0	57
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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	43	1147	149	77	1386	7	305	0	435	28	0	189
Arrive On Green	0.03	0.39	0.39	0.05	0.41	0.41	0.18	0.00	0.29	0.02	0.00	0.13
Sat Flow, veh/h	1668	2963	384	1668	3397	16	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	23	546	553	55	406	427	262	0	51	14	0	57
Grp Sat Flow(s),veh/h/ln	1668	1664	1683	1668	1664	1749	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.0	21.5	21.5	2.3	13.7	13.7	10.9	0.0	1.8	0.6	0.0	2.5
Cycle Q Clear(g_c), s	1.0	21.5	21.5	2.3	13.7	13.7	10.9	0.0	1.8	0.6	0.0	2.5
Prop In Lane	1.00		0.23	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	43	644	651	77	679	713	305	0	435	28	0	189
V/C Ratio(X)	0.54	0.85	0.85	0.71	0.60	0.60	0.86	0.00	0.12	0.49	0.00	0.30
Avail Cap(c_a), veh/h	349	1045	1056	582	1393	1464	465	0	932	349	0	725
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	34.5	20.0	20.0	33.7	16.6	16.6	28.4	0.0	18.6	34.9	0.0	28.4
Incr Delay (d2), s/veh	3.9	1.9	1.9	4.4	0.3	0.3	6.5	0.0	0.0	4.9	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	7.4	7.5	1.0	4.5	4.7	4.7	0.0	0.6	0.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.4	21.9	21.9	38.1	16.9	16.9	34.9	0.0	18.6	39.8	0.0	28.7
LnGrp LOS	D	C	C	D	B	B	C	A	B	D	A	C
Approach Vol, veh/h		1122			888			313			71	
Approach Delay, s/veh		22.2			18.2			32.2			30.9	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.3	33.6	5.2	25.6	5.8	35.0	17.1	13.7
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	4.3	23.5	2.6	3.8	3.0	15.7	12.9	4.5
Green Ext Time (p_c), s	0.0	4.3	0.0	0.2	0.0	3.1	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	22.3
HCM 6th LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑↱		↰	↑↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	22	659	52	129	527	44	96	0	28	53	7	43
Future Volume (veh/h)	22	659	52	129	527	44	96	0	28	53	7	43
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	28	824	65	161	659	55	120	0	35	66	9	54
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	83	1070	84	256	1627	505	304	607	271	112	223	100
Arrive On Green	0.05	0.24	0.24	0.15	0.34	0.34	0.18	0.00	0.18	0.07	0.07	0.07
Sat Flow, veh/h	1668	4521	355	1668	4782	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	28	580	309	161	659	55	120	0	35	66	9	54
Grp Sat Flow(s),veh/h/ln	1668	1594	1688	1668	1594	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	1.0	10.4	10.4	5.5	6.4	1.5	3.9	0.0	1.2	2.3	0.2	2.1
Cycle Q Clear(g_c), s	1.0	10.4	10.4	5.5	6.4	1.5	3.9	0.0	1.2	2.3	0.2	2.1
Prop In Lane	1.00		0.21	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	83	754	399	256	1627	505	304	607	271	112	223	100
V/C Ratio(X)	0.34	0.77	0.77	0.63	0.40	0.11	0.39	0.00	0.13	0.59	0.04	0.54
Avail Cap(c_a), veh/h	219	1515	802	273	2430	754	984	1964	876	492	982	438
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	28.0	21.7	21.8	24.2	15.4	13.8	22.0	0.0	20.9	27.6	26.6	27.6
Incr Delay (d2), s/veh	0.9	0.6	1.2	4.2	0.1	0.0	0.3	0.0	0.1	4.9	0.1	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	3.4	3.7	2.2	1.9	0.4	1.4	0.0	0.4	1.0	0.1	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	28.9	22.4	23.0	28.4	15.5	13.8	22.3	0.0	21.0	32.5	26.7	32.1
LnGrp LOS	C	C	C	C	B	B	C	A	C	C	C	C
Approach Vol, veh/h		917			875			155			129	
Approach Delay, s/veh		22.8			17.7			22.0			31.9	
Approach LOS		C			B			C			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	15.3	20.4		8.1	9.0	26.8		17.1
Change Period (Y+Rc), s	6.0	6.0		4.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	10.0	29.0		18.0	8.0	31.0		36.0
Max Q Clear Time (g_c+I1), s	7.5	12.4		4.3	3.0	8.4		5.9
Green Ext Time (p_c), s	0.1	2.0		0.3	0.0	1.8		0.1

Intersection Summary	
HCM 6th Ctrl Delay	21.2
HCM 6th LOS	C

Intersection	
Intersection Delay, s/veh	57
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↑↑↱		↰	↑	↱
Traffic Vol, veh/h	6	28	0	245	1	2	3	109	306	12	175	5
Future Vol, veh/h	6	28	0	245	1	2	3	109	306	12	175	5
Peak Hour Factor	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	9	44	0	383	2	3	5	170	478	19	273	8
Number of Lanes	1	1	0	1	1	0	1	2	0	1	1	1

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	2	3	3
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	3	3	2	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	3	3	2	2
HCM Control Delay	13.6	52.7	77.9	24.6
HCM LOS	B	F	F	C

Lane	NBLn1	NBLn2	NBLn3	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2	SBLn3
Vol Left, %	100%	0%	0%	100%	0%	100%	0%	100%	0%	0%
Vol Thru, %	0%	100%	11%	0%	100%	0%	33%	0%	100%	0%
Vol Right, %	0%	0%	89%	0%	0%	0%	67%	0%	0%	100%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	3	73	342	6	28	245	3	12	175	5
LT Vol	3	0	0	6	0	245	0	12	0	0
Through Vol	0	73	36	0	28	0	1	0	175	0
RT Vol	0	0	306	0	0	0	2	0	0	5
Lane Flow Rate	5	114	535	9	44	383	5	19	273	8
Geometry Grp	8	8	8	8	8	8	8	8	8	8
Degree of Util (X)	0.011	0.251	1.086	0.026	0.115	0.903	0.01	0.047	0.641	0.017
Departure Headway (Hd)	8.466	7.951	7.308	10.247	9.733	8.768	7.792	9.28	8.762	8.037
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cap	425	454	503	351	371	417	462	388	416	448
Service Time	6.169	5.655	5.011	7.947	7.433	6.468	5.492	6.98	6.462	5.737
HCM Lane V/C Ratio	0.012	0.251	1.064	0.026	0.119	0.918	0.011	0.049	0.656	0.018
HCM Control Delay	11.3	13.3	92.2	13.2	13.7	53.2	10.6	12.4	25.8	10.9
HCM Lane LOS	B	B	F	B	B	F	B	B	D	B
HCM 95th-tile Q	0	1	17.1	0.1	0.4	9.6	0	0.1	4.3	0.1

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱		↰↑	↱		↰↑	↱
Traffic Volume (veh/h)	62	783	166	392	428	37	70	43	414	34	27	54
Future Volume (veh/h)	62	783	166	392	428	37	70	43	414	34	27	54
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	67	851	180	426	465	40	76	47	0	37	29	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, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	164	1284	573	428	1812	808	182	84		165	107	
Arrive On Green	0.10	0.39	0.39	0.26	0.54	0.54	0.13	0.13	0.00	0.13	0.13	0.00
Sat Flow, veh/h	1668	3328	1485	1668	3328	1485	849	665	1485	736	851	1485
Grp Volume(v), veh/h	67	851	180	426	465	40	123	0	0	66	0	0
Grp Sat Flow(s),veh/h/ln	1668	1664	1485	1668	1664	1485	1514	0	1485	1586	0	1485
Q Serve(g_s), s	2.9	16.4	6.6	19.8	5.8	1.0	3.1	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.9	16.4	6.6	19.8	5.8	1.0	5.8	0.0	0.0	2.7	0.0	0.0
Prop In Lane	1.00		1.00	1.00		1.00	0.62		1.00	0.56		1.00
Lane Grp Cap(c), veh/h	164	1284	573	428	1812	808	266	0		272	0	
V/C Ratio(X)	0.41	0.66	0.31	0.99	0.26	0.05	0.46	0.00		0.24	0.00	
Avail Cap(c_a), veh/h	1071	2137	953	428	2137	953	638	0		647	0	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	33.0	19.7	16.7	28.9	9.4	8.3	32.1	0.0	0.0	30.9	0.0	0.0
Incr Delay (d2), s/veh	3.5	1.3	0.7	42.0	0.2	0.1	4.5	0.0	0.0	1.7	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.3	5.8	2.1	11.9	1.6	0.3	2.4	0.0	0.0	1.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	36.5	21.0	17.4	70.8	9.6	8.4	36.6	0.0	0.0	32.6	0.0	0.0
LnGrp LOS	D	C	B	E	A	A	D	A		C	A	
Approach Vol, veh/h		1098			931			123	A		66	A
Approach Delay, s/veh		21.3			37.5			36.6			32.6	
Approach LOS		C			D			D			C	

Timer - Assigned Phs	1	2		4	5	6		8
Phs Duration (G+Y+Rc), s	26.0	36.0		15.8	13.7	48.4		15.8
Change Period (Y+Rc), s	6.0	6.0		6.0	6.0	6.0		6.0
Max Green Setting (Gmax), s	20.0	50.0		30.0	50.0	50.0		30.0
Max Q Clear Time (g_c+I1), s	21.8	18.4		4.7	4.9	7.8		7.8
Green Ext Time (p_c), s	0.0	11.6		0.5	0.5	5.1		1.1

Intersection Summary	
HCM 6th Ctrl Delay	29.3
HCM 6th LOS	C

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↱		↰	↑
Traffic Vol, veh/h	0	8	59	0	8	76
Future Vol, veh/h	0	8	59	0	8	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	210	-	-	200	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	100	100	10	100	100	10
Mvmt Flow	0	9	64	0	9	83

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	165	64	0	0	64	0
Stage 1	64	-	-	-	-	-
Stage 2	101	-	-	-	-	-
Critical Hdwy	7.4	7.2	-	-	5.1	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	-	-	3.1	-
Pot Cap-1 Maneuver	644	783	-	-	1090	-
Stage 1	759	-	-	-	-	-
Stage 2	727	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	639	783	-	-	1090	-
Mov Cap-2 Maneuver	628	-	-	-	-	-
Stage 1	759	-	-	-	-	-
Stage 2	721	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	0.8
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	-	783	1090	-
HCM Lane V/C Ratio	-	-	-	0.011	0.008	-
HCM Control Delay (s)	-	-	0	9.6	8.3	-
HCM Lane LOS	-	-	A	A	A	-
HCM 95th %tile Q(veh)	-	-	-	0	0	-

Intersection	
Int Delay, s/veh	6.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	0	221	67	0	86	84
Future Vol, veh/h	0	221	67	0	86	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	3	3	10	3	3	10
Mvmt Flow	0	240	73	0	93	91

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	350	73	0	0	73	0
Stage 1	73	-	-	-	-	-
Stage 2	277	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	645	986	-	-	1520	-
Stage 1	947	-	-	-	-	-
Stage 2	767	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	604	986	-	-	1520	-
Mov Cap-2 Maneuver	629	-	-	-	-	-
Stage 1	947	-	-	-	-	-
Stage 2	718	-	-	-	-	-

Approach	WB		NB		SB
HCM Control Delay, s	9.8		0		3.8
HCM LOS	A				

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	986	1520	-
HCM Lane V/C Ratio	-	-	0.244	0.061	-
HCM Control Delay (s)	-	-	9.8	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	1	0.2	-

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	782	170	0	818	0	15
Future Vol, veh/h	782	170	0	818	0	15
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, %	10	3	10	10	3	3
Mvmt Flow	850	185	0	889	0	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	518
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	428
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	428
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	428	-	-	-
HCM Lane V/C Ratio	0.038	-	-	-
HCM Control Delay (s)	13.7	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.1	-	-	-

14: Driveway #4/FEMA Driveway & GRANT LINE RD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	8	694	95	37	628	1	173	0	44	3	0	17
Future Volume (veh/h)	8	694	95	37	628	1	173	0	44	3	0	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1752	1752	1856	1856	1856	1752	1752	1752
Adj Flow Rate, veh/h	9	754	103	40	683	1	188	0	48	3	0	18
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, %	10	10	10	3	10	10	3	3	3	10	10	10
Cap, veh/h	20	1244	169	74	1100	2	236	0	562	7	0	339
Arrive On Green	0.01	0.29	0.29	0.04	0.32	0.32	0.13	0.00	0.36	0.00	0.00	0.23
Sat Flow, veh/h	1668	4259	577	1767	3410	5	1767	0	1572	1668	0	1485
Grp Volume(v), veh/h	9	563	294	40	333	351	188	0	48	3	0	18
Grp Sat Flow(s),veh/h/ln	1668	1594	1648	1767	1664	1751	1767	0	1572	1668	0	1485
Q Serve(g_s), s	0.3	8.0	8.1	1.2	8.9	8.9	5.4	0.0	1.1	0.1	0.0	0.5
Cycle Q Clear(g_c), s	0.3	8.0	8.1	1.2	8.9	8.9	5.4	0.0	1.1	0.1	0.0	0.5
Prop In Lane	1.00		0.35	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	20	931	481	74	537	565	236	0	562	7	0	339
V/C Ratio(X)	0.46	0.60	0.61	0.54	0.62	0.62	0.80	0.00	0.09	0.44	0.00	0.05
Avail Cap(c_a), veh/h	159	1940	1002	168	1012	1065	302	0	658	159	0	508
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	25.8	16.0	16.0	24.7	15.1	15.1	22.1	0.0	11.2	26.1	0.0	15.9
Incr Delay (d2), s/veh	15.9	0.6	1.3	5.9	1.2	1.1	10.9	0.0	0.1	39.1	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	2.4	2.6	0.5	2.8	3.0	2.8	0.0	0.3	0.1	0.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.8	16.6	17.3	30.6	16.3	16.2	33.0	0.0	11.3	65.2	0.0	15.9
LnGrp LOS	D	B	B	C	B	B	C	A	B	E	A	B
Approach Vol, veh/h		866			724			236			21	
Approach Delay, s/veh		17.1			17.0			28.6			23.0	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.2	22.8	6.2	19.4	11.0	16.0	4.6	21.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	22.0	5.0	32.0	9.0	18.0	5.0	32.0
Max Q Clear Time (g_c+I1), s	2.1	3.1	3.2	10.1	7.4	2.5	2.3	10.9
Green Ext Time (p_c), s	0.0	0.2	0.0	5.3	0.1	0.0	0.0	3.7

Intersection Summary			
HCM 6th Ctrl Delay			18.6
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑↑		↱
Traffic Vol, veh/h	703	38	0	666	0	30
Future Vol, veh/h	703	38	0	666	0	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	764	41	0	724	0	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	403
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	508
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	508
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	508	-	-	-
HCM Lane V/C Ratio	0.064	-	-	-
HCM Control Delay (s)	12.6	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.2	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑↱	
Traffic Vol, veh/h	0	10	0	124	128	60
Future Vol, veh/h	0	10	0	124	128	60
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	3	3	10	10	10	3
Mvmt Flow	0	11	0	135	139	65

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	102	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	790	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	790	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	9.6	0	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	790	-	-
HCM Lane V/C Ratio	-	0.014	-	-
HCM Control Delay (s)	-	9.6	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	0	-	-

HCM 6th Signalized Intersection Summary
3: MACARTHUR DRIVE (N) & GRANT LINE RD

Ex+Background+Project (without Alliance)
Timing Plan: AM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	294	538	48	39	282	146	27	163	97	425	319	440
Future Volume (veh/h)	294	538	48	39	282	146	27	163	97	425	319	440
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	585	52	42	307	159	29	177	105	462	347	478
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	336	1100	491	76	591	249	63	640	285	317	1154	545
Arrive On Green	0.19	0.31	0.31	0.05	0.17	0.17	0.04	0.19	0.19	0.19	0.35	0.35
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	585	52	42	307	159	29	177	105	462	347	478
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	14.1	10.8	1.9	1.9	6.3	7.9	1.3	3.6	4.9	15.0	6.0	22.5
Cycle Q Clear(g_c), s	14.1	10.8	1.9	1.9	6.3	7.9	1.3	3.6	4.9	15.0	6.0	22.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	336	1100	491	76	591	249	63	640	285	317	1154	545
V/C Ratio(X)	0.95	0.53	0.11	0.55	0.52	0.64	0.46	0.28	0.37	1.46	0.30	0.88
Avail Cap(c_a), veh/h	336	1341	598	317	1341	565	336	1266	565	317	1266	598
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.6	22.4	19.3	36.8	29.9	30.6	37.3	27.2	27.7	31.9	18.8	24.2
Incr Delay (d2), s/veh	36.3	0.7	0.2	2.3	1.2	4.6	1.9	0.4	1.4	222.1	0.2	14.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.0	4.2	0.6	0.8	2.6	2.9	0.6	1.4	1.7	25.2	2.2	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.9	23.1	19.5	39.1	31.1	35.2	39.2	27.6	29.1	254.1	19.0	38.2
LnGrp LOS	E	C	B	D	C	D	D	C	C	F	B	D
Approach Vol, veh/h		957			508			311			1287	
Approach Delay, s/veh		37.9			33.1			29.2			110.5	
Approach LOS		D			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	20.7	8.6	29.6	7.8	32.8	20.0	18.2
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	17.0	6.9	3.9	12.8	3.3	24.5	16.1	9.9
Green Ext Time (p_c), s	0.0	2.0	0.0	4.6	0.0	2.8	0.0	3.3

Intersection Summary			
HCM 6th Ctrl Delay			66.7
HCM 6th LOS			E

Notes

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

HCM 6th Signalized Intersection Summary Ex+Background+Project (without Alliance)

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑	↱	↰	↑	
Traffic Volume (veh/h)	61	159	394	0	0	0	0	508	788	82	456	0
Future Volume (veh/h)	61	159	394	0	0	0	0	508	788	82	456	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	66	173	428				0	552	857	89	496	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	119	313	372				0	965	818	113	1154	0
Arrive On Green	0.25	0.25	0.25				0.00	0.55	0.55	0.07	0.66	0.00
Sat Flow, veh/h	477	1251	1485				0	1752	1485	1668	1752	0
Grp Volume(v), veh/h	239	0	428				0	552	857	89	496	0
Grp Sat Flow(s),veh/h/ln	1728	0	1485				0	1752	1485	1668	1752	0
Q Serve(g_s), s	12.0	0.0	25.0				0.0	20.6	55.0	5.2	13.5	0.0
Cycle Q Clear(g_c), s	12.0	0.0	25.0				0.0	20.6	55.0	5.2	13.5	0.0
Prop In Lane	0.28		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	433	0	372				0	965	818	113	1154	0
V/C Ratio(X)	0.55	0.00	1.15				0.00	0.57	1.05	0.79	0.43	0.00
Avail Cap(c_a), veh/h	433	0	372				0	965	818	251	1154	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	32.6	0.0	37.4				0.0	14.7	22.4	45.8	8.1	0.0
Incr Delay (d2), s/veh	0.9	0.0	94.7				0.0	1.0	44.8	11.5	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	0.0	18.5				0.0	7.6	26.8	2.5	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	0.0	132.1				0.0	15.7	67.2	57.4	8.5	0.0
LnGrp LOS	C	A	F				A	B	F	E	A	A
Approach Vol, veh/h		667						1409			585	
Approach Delay, s/veh		96.7						47.0			15.9	
Approach LOS		F						D			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	10.7	59.9		29.2		70.6
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	15.0	55.0		* 25		55.0
Max Q Clear Time (g_c+I1), s	7.2	57.0		27.0		15.5
Green Ext Time (p_c), s	0.1	0.0		0.0		3.5

Intersection Summary			
HCM 6th Ctrl Delay			52.7
HCM 6th LOS			D

Notes

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

3: MACARTHUR DRIVE (N) & GRANT LINE RD

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	416	616	59	108	518	354	44	434	86	293	205	266
Future Volume (veh/h)	416	616	59	108	518	354	44	434	86	293	205	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	452	670	64	117	563	385	48	472	93	318	223	289
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	271	1263	563	144	1027	433	79	640	285	256	1002	473
Arrive On Green	0.15	0.36	0.36	0.09	0.29	0.29	0.04	0.19	0.19	0.15	0.30	0.30
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	452	670	64	117	563	385	48	472	93	318	223	289
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	15.0	14.7	2.7	6.7	13.2	24.3	2.6	13.1	5.3	15.0	4.9	15.4
Cycle Q Clear(g_c), s	15.0	14.7	2.7	6.7	13.2	24.3	2.6	13.1	5.3	15.0	4.9	15.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	271	1263	563	144	1027	433	79	640	285	256	1002	473
V/C Ratio(X)	1.67	0.53	0.11	0.81	0.55	0.89	0.61	0.74	0.33	1.24	0.22	0.61
Avail Cap(c_a), veh/h	271	1263	563	256	1081	455	271	1021	455	256	1021	482
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.4	24.9	21.0	43.9	29.2	33.2	45.9	37.2	34.0	41.4	25.6	29.3
Incr Delay (d2), s/veh	316.2	0.7	0.2	4.1	0.8	19.5	2.8	2.9	1.1	137.8	0.2	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	30.1	5.9	0.9	2.8	5.4	10.5	1.2	5.4	1.9	15.7	1.9	5.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	357.6	25.5	21.1	48.0	30.1	52.6	48.7	40.0	35.2	179.2	25.8	32.2
LnGrp LOS	F	C	C	D	C	D	D	D	D	F	C	C
Approach Vol, veh/h		1186			1065			613			830	
Approach Delay, s/veh		151.9			40.2			40.0			86.8	
Approach LOS		F			D			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	20.0	24.3	13.5	40.0	9.4	34.9	20.0	33.5
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	15.0	30.0	15.0	30.0	15.0	30.0	15.0	30.0
Max Q Clear Time (g_c+I1), s	17.0	15.1	8.7	16.7	4.6	17.4	17.0	26.3
Green Ext Time (p_c), s	0.0	3.7	0.1	4.7	0.0	3.1	0.0	2.2

Intersection Summary	
HCM 6th Ctrl Delay	86.5
HCM 6th LOS	F

Notes

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

A6. Existing Plus Background Plus Project With Improvement Synchro Outputs

HCM 6th Signalized Intersection Summary Ex+Back+Project (without Alliance) - With Improvement

3: MACARTHUR DRIVE (N) & GRANT LINE RD

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	294	538	48	39	282	146	27	163	97	425	319	440
Future Volume (veh/h)	294	538	48	39	282	146	27	163	97	425	319	440
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	585	52	42	307	159	29	177	105	462	347	478
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	356	1066	476	73	510	655	61	411	183	495	1282	606
Arrive On Green	0.20	0.30	0.30	0.04	0.14	0.14	0.03	0.12	0.12	0.30	0.39	0.39
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	585	52	42	307	159	29	177	105	462	347	478
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	15.5	12.2	2.1	2.2	7.1	5.9	1.4	4.3	5.8	23.6	6.3	23.5
Cycle Q Clear(g_c), s	15.5	12.2	2.1	2.2	7.1	5.9	1.4	4.3	5.8	23.6	6.3	23.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	356	1066	476	73	510	655	61	411	183	495	1282	606
V/C Ratio(X)	0.90	0.55	0.11	0.57	0.60	0.24	0.47	0.43	0.57	0.93	0.27	0.79
Avail Cap(c_a), veh/h	504	1971	879	171	1328	999	121	1234	551	742	2488	1175
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	25.6	22.1	41.1	35.1	15.3	41.5	35.6	36.2	30.0	18.5	23.8
Incr Delay (d2), s/veh	11.7	0.8	0.2	2.6	2.0	0.3	2.1	1.2	4.8	11.4	0.2	4.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.4	4.9	0.7	0.9	3.0	1.8	0.6	1.8	2.2	10.4	2.3	8.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.8	26.3	22.2	43.7	37.1	15.6	43.6	36.8	41.0	41.4	18.7	27.8
LnGrp LOS	D	C	C	D	D	B	D	D	D	D	B	C
Approach Vol, veh/h		957			508			311			1287	
Approach Delay, s/veh		32.6			30.9			38.9			30.2	
Approach LOS		C			C			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	31.0	16.3	8.8	31.5	8.0	39.3	22.7	17.7
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	39.0	32.5	9.0	49.0	6.0	65.5	25.0	33.0
Max Q Clear Time (g_c+I1), s	25.6	7.8	4.2	14.2	3.4	25.5	17.5	9.1
Green Ext Time (p_c), s	0.4	2.1	0.0	5.7	0.0	8.2	0.2	3.5

Intersection Summary	
HCM 6th Ctrl Delay	32.0
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Summary Ex+Back+Project (without Alliance) - With Improvement
3: MACARTHUR DRIVE (N) & GRANT LINE RD

Timing Plan: PM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	416	616	59	108	518	354	44	434	86	293	205	266
Future Volume (veh/h)	416	616	59	108	518	354	44	434	86	293	205	266
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	452	670	64	117	563	385	48	472	93	318	223	289
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, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	454	1419	633	139	806	626	64	582	260	322	1104	521
Arrive On Green	0.26	0.40	0.40	0.08	0.23	0.23	0.04	0.17	0.17	0.19	0.33	0.33
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	452	670	64	117	563	385	48	472	93	318	223	289
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	35.7	19.6	3.5	9.7	20.5	28.4	3.8	19.1	7.7	26.6	6.7	21.1
Cycle Q Clear(g_c), s	35.7	19.6	3.5	9.7	20.5	28.4	3.8	19.1	7.7	26.6	6.7	21.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	454	1419	633	139	806	626	64	582	260	322	1104	521
V/C Ratio(X)	0.99	0.47	0.10	0.84	0.70	0.62	0.75	0.81	0.36	0.99	0.20	0.55
Avail Cap(c_a), veh/h	454	1419	633	226	831	636	114	797	355	322	1225	579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	51.9	30.8	26.0	63.3	49.6	31.6	66.8	55.5	50.8	56.3	33.5	38.3
Incr Delay (d2), s/veh	40.7	0.4	0.1	7.0	3.0	2.3	6.4	6.0	1.4	46.7	0.2	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	20.6	8.3	1.3	4.3	9.2	10.2	1.8	8.4	2.9	15.2	2.7	8.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.6	31.3	26.2	70.2	52.6	33.9	73.2	61.6	52.3	103.1	33.7	39.9
LnGrp LOS	F	C	C	E	D	C	E	E	D	F	C	D
Approach Vol, veh/h		1186			1065			613			830	
Approach Delay, s/veh		54.4			47.8			61.1			62.4	
Approach LOS		D			D			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	32.0	30.0	16.7	61.3	10.1	51.9	41.0	37.0
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	27.0	33.5	19.0	50.0	9.0	51.5	36.0	33.0
Max Q Clear Time (g_c+I1), s	28.6	21.1	11.7	21.6	5.8	23.1	37.7	30.4
Green Ext Time (p_c), s	0.0	3.4	0.1	6.5	0.0	4.3	0.0	1.6

Intersection Summary	
HCM 6th Ctrl Delay	55.4
HCM 6th LOS	E

Notes

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

A7. Peak Hour Signal Warrants

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2010 MUTCD)

MAJOR STREET: **Chrisman Road** NB SB # OF APPROACH LANES: **3**

MINOR STREET: **Paradise Road** SB # OF APPROACH LANES: **1**

CITY, STATE: **Tracy, CA**

COMMENTS: **Ex+Back+Project**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N) **N**

85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

			MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	Ped Count CROSSING MAJOR ST	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
						MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES						**600**	**150**		**900**	**75**		**480**	**120**		**720**	**60**		**60**	**75**
06:00 AM	TO	07:00 AM																	
07:00 AM	TO	08:00 AM																	
08:00 AM	TO	09:00 AM	318	286			Y			Y			Y			Y			
09:00 AM	TO	10:00 AM																	
10:00 AM	TO	11:00 AM																	
11:00 AM	TO	12:00 PM																	
12:00 PM	TO	01:00 PM																	
01:00 PM	TO	02:00 PM																	
02:00 PM	TO	03:00 PM																	
03:00 PM	TO	04:00 PM																	
04:00 PM	TO	05:00 PM																	
05:00 PM	TO	06:00 PM	610	248		Y	Y	**Y**		Y		Y	Y	**Y**		Y			
06:00 PM	TO	07:00 PM																	
07:00 PM	TO	08:00 PM																	
08:00 PM	TO	09:00 PM																	
09:00 PM	TO	10:00 PM																	
			928	534		1	2	**1**	0	2	**0**	1	2	**1**	0	2	**0**	**0**	**0**
						8 HOURS NEEDED			8 HOURS NEEDED			8 HOURS NEEDED for both Condition A & B						4 HRS NEEDED	1 HR NEEDED
						NOT SATISFIED			**NOT SATISFIED**			**NOT SATISFIED**						**NOT SATISFIED**	**NOT SATISFIED**

09/09/20

Kimley-Horn and Associates

TRAFFIC SIGNAL VOLUME WARRANT ANALYSIS (2010 MUTCD)

MAJOR STREET: **Grantline Road** NB SB # OF APPROACH LANES: **3**

MINOR STREET: **Project Driveway #4** SB # OF APPROACH LANES: **1**

CITY, STATE: **Tracy, CA**

COMMENTS: **Ex+Back+Project**

ISOLATED COMMUNITY WITH POPULATION LESS THAN 10,000 (Y OR N) **N**
85TH PERCENTILE SPEED GREATER THAN 40 MPH ON MAJOR STREET (Y OR N) **N**

	MAJOR ST TWO-WAY TRAFFIC	MINOR ST TRAFFIC HEAVY LEG	Ped Count CROSSING MAJOR ST	WARRANT 1 - Condition A, Part 1			WARRANT 1 - Condition B, Part 1			WARRANT 1 - Condition A, Part 2			WARRANT 1 - Condition B, Part 2			WARRANT 2 Four-Hour	WARRANT 3 Peak Hour
				MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET	MAIN LINE	SIDE STREET	BOTH MET		
THRESHOLD VALUES				**600**	**150**		**900**	**75**		**480**	**120**		**720**	**60**		**60**	**75**
06:00 AM TO 07:00 AM																	
07:00 AM TO 08:00 AM																	
08:00 AM TO 09:00 AM	1,209	10		Y			Y			Y			Y				
09:00 AM TO 10:00 AM																	
10:00 AM TO 11:00 AM																	
11:00 AM TO 12:00 PM																	
12:00 PM TO 01:00 PM																	
01:00 PM TO 02:00 PM																	
02:00 PM TO 03:00 PM																	
03:00 PM TO 04:00 PM																	
04:00 PM TO 05:00 PM																	
05:00 PM TO 06:00 PM	1,463	217		Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	Y	Y	**Y**	**Y**	**Y**
06:00 PM TO 07:00 PM																	
07:00 PM TO 08:00 PM																	
08:00 PM TO 09:00 PM																	
09:00 PM TO 10:00 PM																	
	2,672	227		2	1	**1**	2	1	**1**	2	1	**1**	2	1	**1**	**1**	**1**
				8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED **NOT SATISFIED**			8 HOURS NEEDED for both Condition A & B **NOT SATISFIED**						4 HRS NEEDED **NOT SATISFIED**	1 HR NEEDED **SATISFIED**

09/09/20
Kimley-Horn and Associates

A8. Cumulative Synchro Outputs

HCM 6th Signalized Intersection Summary
Cumulative Conditions

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	160	0	70	413	40	0	0	50	20
Future Volume (veh/h)	0	0	0	160	0	70	413	40	0	0	50	20
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				160	0	70	413	40	0	0	50	20
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				199	0	87	632	914	0	0	196	79
Arrive On Green				0.18	0.00	0.18	0.20	0.52	0.00	0.00	0.16	0.16
Sat Flow, veh/h				1118	0	489	3237	1752	0	0	1190	476
Grp Volume(v), veh/h				230	0	0	413	40	0	0	0	70
Grp Sat Flow(s),veh/h/ln				1608	0	0	1618	1752	0	0	0	1666
Q Serve(g_s), s				4.2	0.0	0.0	3.6	0.3	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s				4.2	0.0	0.0	3.6	0.3	0.0	0.0	0.0	1.1
Prop In Lane				0.70		0.30	1.00		0.00	0.00		0.29
Lane Grp Cap(c), veh/h				286	0	0	632	914	0	0	0	275
V/C Ratio(X)				0.80	0.00	0.00	0.65	0.04	0.00	0.00	0.00	0.25
Avail Cap(c_a), veh/h				467	0	0	972	1277	0	0	0	445
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				12.0	0.0	0.0	11.2	3.5	0.0	0.0	0.0	11.0
Incr Delay (d2), s/veh				2.0	0.0	0.0	0.9	0.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.0	0.0	0.0	12.1	3.6	0.0	0.0	0.0	11.2
LnGrp LOS				B	A	A	B	A	A	A	A	B
Approach Vol, veh/h					230			453			70	
Approach Delay, s/veh					14.0			11.3			11.2	
Approach LOS					B			B			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		20.7			10.8	9.9		9.6				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		22.1			9.1	8.1		8.8				
Max Q Clear Time (g_c+I1), s		2.3			5.6	3.1		6.2				
Green Ext Time (p_c), s		0.0			0.5	0.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay			12.1									
HCM 6th LOS			B									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑↑	↱	↰	↑↑	
Traffic Volume (veh/h)	15	0	380	0	0	0	0	450	360	10	200	0
Future Volume (veh/h)	15	0	380	0	0	0	0	450	360	10	200	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	15	0	380				0	450	360	10	200	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	506	0	450				0	1161	518	22	1545	0
Arrive On Green	0.30	0.00	0.30				0.00	0.35	0.35	0.01	0.46	0.00
Sat Flow, veh/h	1668	0	1485				0	3416	1485	1668	3416	0
Grp Volume(v), veh/h	15	0	380				0	450	360	10	200	0
Grp Sat Flow(s),veh/h/ln	1668	0	1485				0	1664	1485	1668	1664	0
Q Serve(g_s), s	0.2	0.0	9.4				0.0	4.0	8.2	0.2	1.3	0.0
Cycle Q Clear(g_c), s	0.2	0.0	9.4				0.0	4.0	8.2	0.2	1.3	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	506	0	450				0	1161	518	22	1545	0
V/C Ratio(X)	0.03	0.00	0.84				0.00	0.39	0.70	0.46	0.13	0.00
Avail Cap(c_a), veh/h	768	0	683				0	1608	717	213	2374	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	9.6	0.0	12.8				0.0	9.6	10.9	19.2	6.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	3.8				0.0	0.3	2.4	14.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.8				0.0	1.0	2.1	0.2	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	0.0	16.5				0.0	9.9	13.4	33.2	6.0	0.0
LnGrp LOS	A	A	B				A	A	B	C	A	A
Approach Vol, veh/h		395						810			210	
Approach Delay, s/veh		16.3						11.4			7.3	
Approach LOS		B						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.5	18.5		16.1		23.1
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	5.0	18.9		* 18		27.9
Max Q Clear Time (g_c+I1), s	2.2	10.2		11.4		3.3
Green Ext Time (p_c), s	0.0	3.5		0.6		1.2

Intersection Summary			
HCM 6th Ctrl Delay			12.2
HCM 6th LOS			B

Notes

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

3: MACARTHUR DRIVE (N) & GRANT LINE RD

	↰	→	↘	↙	←	↖	↰	↑	↱	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	300	229	80	50	296	58	80	520	40	99	400	250
Future Volume (veh/h)	300	229	80	50	296	58	80	520	40	99	400	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	300	229	80	50	296	58	80	520	40	99	400	250
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	348	1042	465	92	543	229	126	824	368	130	846	400
Arrive On Green	0.20	0.30	0.30	0.06	0.15	0.15	0.07	0.25	0.25	0.08	0.25	0.25
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	300	229	80	50	296	58	80	520	40	99	400	250
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	10.4	3.1	2.4	1.9	4.9	2.2	2.8	8.8	1.3	3.7	6.5	8.9
Cycle Q Clear(g_c), s	10.4	3.1	2.4	1.9	4.9	2.2	2.8	8.8	1.3	3.7	6.5	8.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	348	1042	465	92	543	229	126	824	368	130	846	400
V/C Ratio(X)	0.86	0.22	0.17	0.54	0.54	0.25	0.63	0.63	0.11	0.76	0.47	0.63
Avail Cap(c_a), veh/h	474	2280	1017	237	1835	773	167	1759	785	158	1759	831
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	16.8	16.6	29.2	24.8	23.6	28.6	21.3	18.4	28.6	20.0	21.0
Incr Delay (d2), s/veh	9.2	0.2	0.3	1.8	1.5	1.0	1.9	1.4	0.2	12.3	0.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	1.1	0.8	0.8	2.1	0.8	1.2	3.2	0.4	1.8	2.3	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.8	17.0	16.9	31.0	26.2	24.6	30.6	22.6	18.7	40.9	20.7	23.7
LnGrp LOS	C	B	B	C	C	C	C	C	B	D	C	C
Approach Vol, veh/h		609			404			640			749	
Approach Delay, s/veh		25.3			26.6			23.4			24.4	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	10.0	21.2	8.5	23.7	9.5	21.6	17.5	14.8
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	6.0	33.5	9.0	41.0	6.0	33.5	17.0	33.0
Max Q Clear Time (g_c+I1), s	5.7	10.8	3.9	5.1	4.8	10.9	12.4	6.9
Green Ext Time (p_c), s	0.0	4.5	0.0	2.5	0.0	5.2	0.1	2.9

Intersection Summary	
HCM 6th Ctrl Delay	24.7
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Summary
4: ELEVENTH ST. & MACARTHUR DRIVE

Cumulative Conditions
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	130	977	50	20	1400	240	120	120	131	200	40	220
Future Volume (veh/h)	130	977	50	20	1400	240	120	120	131	200	40	220
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	130	977	50	20	1400	240	120	120	131	200	40	220
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	10
Cap, veh/h	161	1828	94	29	1610	678	149	199	177	236	294	262
Arrive On Green	0.09	0.54	0.54	0.02	0.46	0.46	0.08	0.12	0.12	0.14	0.18	0.18
Sat Flow, veh/h	1767	3412	175	1668	3526	1485	1767	1664	1485	1668	1664	1485
Grp Volume(v), veh/h	130	505	522	20	1400	240	120	120	131	200	40	220
Grp Sat Flow(s),veh/h/ln	1767	1763	1824	1668	1763	1485	1767	1664	1485	1668	1664	1485
Q Serve(g_s), s	6.6	17.0	17.0	1.1	32.7	9.6	6.1	6.3	7.8	10.7	1.9	13.1
Cycle Q Clear(g_c), s	6.6	17.0	17.0	1.1	32.7	9.6	6.1	6.3	7.8	10.7	1.9	13.1
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	161	944	977	29	1610	678	149	199	177	236	294	262
V/C Ratio(X)	0.81	0.53	0.53	0.69	0.87	0.35	0.80	0.60	0.74	0.85	0.14	0.84
Avail Cap(c_a), veh/h	188	1022	1058	91	1844	776	155	401	357	329	583	520
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.8	13.8	13.8	44.7	22.4	16.1	41.1	38.2	38.9	38.3	31.7	36.4
Incr Delay (d2), s/veh	17.3	0.5	0.5	25.0	4.3	0.3	25.1	1.1	2.3	13.6	0.1	2.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.6	6.3	6.5	0.6	13.4	3.2	3.7	2.6	2.9	5.2	0.8	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.0	14.3	14.3	69.7	26.7	16.4	66.2	39.3	41.1	51.8	31.8	39.1
LnGrp LOS	E	B	B	E	C	B	E	D	D	D	C	D
Approach Vol, veh/h		1157			1660			371			460	
Approach Delay, s/veh		19.2			25.7			48.7			44.0	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.6	53.5	11.7	20.6	12.8	46.2	16.9	15.4				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.5	4.5	4.0	4.5				
Max Green Setting (Gmax), s	5.0	53.0	8.0	32.0	9.7	47.8	18.0	22.0				
Max Q Clear Time (g_c+I1), s	3.1	19.0	8.1	15.1	8.6	34.7	12.7	9.8				
Green Ext Time (p_c), s	0.0	4.9	0.0	1.0	0.0	7.0	0.3	0.8				
Intersection Summary												
HCM 6th Ctrl Delay			28.3									
HCM 6th LOS			C									

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	60	575	37	45	468	10	5	0	1	4	0	14
Future Volume (veh/h)	60	575	37	45	468	10	5	0	1	4	0	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	60	575	37	45	468	10	5	0	1	4	0	14
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	221	1273	82	83	1061	23	22	0	83	9	0	71
Arrive On Green	0.13	0.40	0.40	0.05	0.32	0.32	0.01	0.00	0.06	0.01	0.00	0.05
Sat Flow, veh/h	1668	3175	204	1668	3332	71	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	60	301	311	45	234	244	5	0	1	4	0	14
Grp Sat Flow(s),veh/h/ln	1668	1664	1715	1668	1664	1739	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.2	5.0	5.0	1.0	4.2	4.2	0.1	0.0	0.0	0.1	0.0	0.3
Cycle Q Clear(g_c), s	1.2	5.0	5.0	1.0	4.2	4.2	0.1	0.0	0.0	0.1	0.0	0.3
Prop In Lane	1.00		0.12	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	221	667	688	83	530	554	22	0	83	9	0	71
V/C Ratio(X)	0.27	0.45	0.45	0.54	0.44	0.44	0.23	0.00	0.01	0.44	0.00	0.20
Avail Cap(c_a), veh/h	664	1987	2047	1106	2649	2768	885	0	1772	664	0	1378
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	14.7	8.3	8.3	17.5	10.2	10.2	18.4	0.0	16.8	18.7	0.0	17.3
Incr Delay (d2), s/veh	0.2	0.2	0.2	2.0	0.2	0.2	1.9	0.0	0.0	12.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	1.0	1.1	0.3	1.0	1.1	0.0	0.0	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.0	8.4	8.4	19.5	10.4	10.4	20.3	0.0	16.8	30.7	0.0	17.7
LnGrp LOS	B	A	A	B	B	B	C	A	B	C	A	B
Approach Vol, veh/h		672			523			6			18	
Approach Delay, s/veh		9.0			11.2			19.7			20.6	
Approach LOS		A			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.9	20.9	4.2	6.7	9.0	17.8	4.5	6.4
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	3.0	7.0	2.1	2.0	3.2	6.2	2.1	2.3
Green Ext Time (p_c), s	0.0	2.1	0.0	0.0	0.0	1.6	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	124	320	121	128	417	25	78	400	132	25	330	22
Future Volume (veh/h)	124	320	121	128	417	25	78	400	132	25	330	22
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	124	320	121	128	417	25	78	400	132	25	330	22
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	375	949	295	473	762	340	161	671	299	95	538	240
Arrive On Green	0.12	0.20	0.20	0.15	0.23	0.23	0.10	0.20	0.20	0.06	0.16	0.16
Sat Flow, veh/h	3237	4782	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	124	320	121	128	417	25	78	400	132	25	330	22
Grp Sat Flow(s),veh/h/ln	1618	1594	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	2.1	3.5	4.3	2.1	6.7	0.8	2.7	6.6	4.7	0.9	5.6	0.8
Cycle Q Clear(g_c), s	2.1	3.5	4.3	2.1	6.7	0.8	2.7	6.6	4.7	0.9	5.6	0.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	375	949	295	473	762	340	161	671	299	95	538	240
V/C Ratio(X)	0.33	0.34	0.41	0.27	0.55	0.07	0.48	0.60	0.44	0.26	0.61	0.09
Avail Cap(c_a), veh/h	643	2374	737	535	1542	688	221	1982	884	276	2203	982
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	24.6	20.8	21.1	22.9	20.5	18.3	25.9	21.9	21.1	27.3	23.6	21.6
Incr Delay (d2), s/veh	0.2	0.1	0.3	0.3	0.2	0.0	0.8	0.3	0.4	1.5	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	1.1	1.4	0.7	2.3	0.2	1.0	2.3	1.5	0.4	2.0	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	24.8	20.9	21.5	23.2	20.8	18.3	26.7	22.2	21.5	28.8	24.7	21.7
LnGrp LOS	C	C	C	C	C	B	C	C	C	C	C	C
Approach Vol, veh/h		565			570			610			377	
Approach Delay, s/veh		21.9			21.2			22.6			24.8	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	14.8	18.0	11.8	15.8	13.0	19.8	9.4	18.2
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	30.0	8.0	* 40	12.0	28.0	10.0	36.0
Max Q Clear Time (g_c+I1), s	4.1	6.3	4.7	7.6	4.1	8.7	2.9	8.6
Green Ext Time (p_c), s	0.2	1.1	0.0	2.2	0.1	1.0	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	22.4
HCM 6th LOS	C

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑↑	↱
Traffic Volume (veh/h)	10	10	10	50	10	10	10	540	100	100	444	6
Future Volume (veh/h)	10	10	10	50	10	10	10	540	100	100	444	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	10	10	10	50	10	10	10	540	100	100	444	6
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	44	100	100	138	146	146	35	1103	200	267	1961	609
Arrive On Green	0.03	0.12	0.12	0.08	0.18	0.18	0.02	0.27	0.27	0.16	0.41	0.41
Sat Flow, veh/h	1668	804	804	1668	804	804	1668	4068	739	1668	4782	1485
Grp Volume(v), veh/h	10	0	20	50	0	20	10	421	219	100	444	6
Grp Sat Flow(s),veh/h/ln	1668	0	1607	1668	0	1607	1668	1594	1619	1668	1594	1485
Q Serve(g_s), s	0.3	0.0	0.5	1.3	0.0	0.5	0.3	4.9	5.0	2.4	2.7	0.1
Cycle Q Clear(g_c), s	0.3	0.0	0.5	1.3	0.0	0.5	0.3	4.9	5.0	2.4	2.7	0.1
Prop In Lane	1.00		0.50	1.00		0.50	1.00		0.46	1.00		1.00
Lane Grp Cap(c), veh/h	44	0	200	138	0	292	35	864	439	267	1961	609
V/C Ratio(X)	0.23	0.00	0.10	0.36	0.00	0.07	0.29	0.49	0.50	0.37	0.23	0.01
Avail Cap(c_a), veh/h	377	0	1561	339	0	1525	302	2305	1170	377	3673	1140
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.1	0.0	17.2	19.2	0.0	15.0	21.3	13.5	13.6	16.6	8.5	7.7
Incr Delay (d2), s/veh	2.6	0.0	0.2	1.6	0.0	0.1	4.4	0.4	0.9	0.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.2	0.5	0.0	0.1	0.1	1.4	1.5	0.8	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	0.0	17.4	20.8	0.0	15.1	25.8	14.0	14.5	17.5	8.5	7.7
LnGrp LOS	C	A	B	C	A	B	C	B	B	B	A	A
Approach Vol, veh/h		30			70			650			550	
Approach Delay, s/veh		19.5			19.2			14.3			10.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	16.0	7.7	9.5	4.9	22.2	5.2	12.0
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	32.0	9.0	43.0	8.0	34.0	10.0	42.0
Max Q Clear Time (g_c+I1), s	4.4	7.0	3.3	2.5	2.3	4.7	2.3	2.5
Green Ext Time (p_c), s	0.1	4.1	0.0	0.1	0.0	3.0	0.0	0.1

Intersection Summary		
HCM 6th Ctrl Delay		12.9
HCM 6th LOS		B

HCM 6th Signalized Intersection Summary
8: CHRISMAN & ELEVENTH ST.

Cumulative Conditions
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	408	820	100	490	960	83	210	550	630	31	203	460
Future Volume (veh/h)	408	820	100	490	960	83	210	550	630	31	203	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	408	820	100	490	960	83	210	550	0	31	203	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	472	901	604	520	1453	682	227	730		38	353	
Arrive On Green	0.15	0.27	0.27	0.31	0.44	0.44	0.14	0.22	0.00	0.02	0.11	0.00
Sat Flow, veh/h	3237	3328	1485	1668	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	408	820	100	490	960	83	210	550	0	31	203	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1668	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	15.4	29.8	5.4	35.8	28.6	4.0	15.6	19.3	0.0	2.3	7.3	0.0
Cycle Q Clear(g_c), s	15.4	29.8	5.4	35.8	28.6	4.0	15.6	19.3	0.0	2.3	7.3	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	472	901	604	520	1453	682	227	730		38	353	
V/C Ratio(X)	0.87	0.91	0.17	0.94	0.66	0.12	0.93	0.75		0.82	0.57	
Avail Cap(c_a), veh/h	517	931	617	547	1489	698	227	1090		80	798	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	52.3	44.2	23.6	42.0	27.9	19.4	53.5	45.7	0.0	60.9	53.2	0.0
Incr Delay (d2), s/veh	15.2	13.3	0.3	25.5	1.5	0.2	40.1	5.7	0.0	32.5	5.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	13.5	1.9	17.5	10.8	1.4	8.9	8.3	0.0	1.3	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	67.4	57.4	23.9	67.5	29.4	19.5	93.5	51.4	0.0	93.4	58.5	0.0
LnGrp LOS	E	E	C	E	C	B	F	D		F	E	
Approach Vol, veh/h		1328			1533			760	A		234	A
Approach Delay, s/veh		58.0			41.0			63.0			63.1	
Approach LOS		E			D			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	45.0	39.9	21.0	19.3	24.2	60.6	6.9	33.4
Change Period (Y+Rc), s	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	41.0	35.0	17.0	30.0	20.0	56.0	6.0	41.0
Max Q Clear Time (g_c+I1), s	37.8	31.8	17.6	9.3	17.4	30.6	4.3	21.3
Green Ext Time (p_c), s	1.2	2.0	0.0	2.1	0.8	10.6	0.0	6.1

Intersection Summary	
HCM 6th Ctrl Delay	52.5
HCM 6th LOS	D

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱		↑↑↱			↑↑↱	
Traffic Volume (veh/h)	0	0	0	314	0	10	0	242	298	0	173	460
Future Volume (veh/h)	0	0	0	314	0	10	0	242	298	0	173	460
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1752	1752	1752	0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h				314	0	10	0	242	298	0	173	460
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				10	10	10	0	10	10	0	10	10
Cap, veh/h				624	0	555	0	1483	690	0	1483	690
Arrive On Green				0.19	0.00	0.19	0.00	0.47	0.47	0.00	0.47	0.47
Sat Flow, veh/h				3337	0	2969	0	3346	1485	0	3346	1485
Grp Volume(v), veh/h				314	0	10	0	242	298	0	173	460
Grp Sat Flow(s),veh/h/ln				1668	0	1485	0	1594	1485	0	1594	1485
Q Serve(g_s), s				1.9	0.0	0.1	0.0	1.0	3.1	0.0	0.7	5.5
Cycle Q Clear(g_c), s				1.9	0.0	0.1	0.0	1.0	3.1	0.0	0.7	5.5
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				624	0	555	0	1483	690	0	1483	690
V/C Ratio(X)				0.50	0.00	0.02	0.00	0.16	0.43	0.00	0.12	0.67
Avail Cap(c_a), veh/h				2612	0	2325	0	2635	1227	0	2635	1227
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				8.4	0.0	7.6	0.0	3.6	4.1	0.0	3.5	4.8
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.0	0.1	0.4	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	0.0
%ile BackOfQ(50%),veh/ln				0.5	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				9.0	0.0	7.6	0.0	3.6	4.5	0.0	3.5	5.9
LnGrp LOS				A	A	A	A	A	A	A	A	A
Approach Vol, veh/h					324			540			633	
Approach Delay, s/veh					9.0			4.1			5.2	
Approach LOS					A			A			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		14.7				14.7		8.3				
Change Period (Y+Rc), s		4.0				4.0		4.0				
Max Green Setting (Gmax), s		19.0				19.0		18.0				
Max Q Clear Time (g_c+I1), s		5.1				7.5		3.9				
Green Ext Time (p_c), s		3.1				3.2		1.0				

Intersection Summary			
HCM 6th Ctrl Delay			5.6
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱					↑↑↑	↱↱		↑↑↱	
Traffic Volume (veh/h)	310	0	315	0	0	0	0	230	646	0	477	10
Future Volume (veh/h)	310	0	315	0	0	0	0	230	646	0	477	10
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	0	1752				0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h	310	0	315				0	230	646	0	477	10
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	10				0	10	10	0	10	10
Cap, veh/h	766	0	619				0	2073	1133	0	2090	44
Arrive On Green	0.24	0.00	0.24				0.00	0.43	0.43	0.00	0.43	0.43
Sat Flow, veh/h	3237	0	2613				0	4940	2613	0	4979	101
Grp Volume(v), veh/h	310	0	315				0	230	646	0	315	172
Grp Sat Flow(s),veh/h/ln	1618	0	1306				0	1594	1306	0	1594	1734
Q Serve(g_s), s	2.0	0.0	2.5				0.0	0.7	4.5	0.0	1.5	1.5
Cycle Q Clear(g_c), s	2.0	0.0	2.5				0.0	0.7	4.5	0.0	1.5	1.5
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.06
Lane Grp Cap(c), veh/h	766	0	619				0	2073	1133	0	1382	752
V/C Ratio(X)	0.40	0.00	0.51				0.00	0.11	0.57	0.00	0.23	0.23
Avail Cap(c_a), veh/h	1334	0	1077				0	4337	2369	0	2891	1572
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	8.0				0.0	4.1	5.2	0.0	4.3	4.3
Incr Delay (d2), s/veh	0.3	0.0	0.7				0.0	0.0	0.5	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.5				0.0	0.1	0.5	0.0	0.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.2	0.0	8.7				0.0	4.1	5.6	0.0	4.4	4.5
LnGrp LOS	A	A	A				A	A	A	A	A	A
Approach Vol, veh/h		625						876			487	
Approach Delay, s/veh		8.4						5.2			4.4	
Approach LOS		A						A			A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		14.5		9.7		14.5
Change Period (Y+Rc), s		4.0		4.0		4.0
Max Green Setting (Gmax), s		22.0		10.0		22.0
Max Q Clear Time (g_c+I1), s		6.5		4.5		3.5
Green Ext Time (p_c), s		4.0		1.3		2.7

Intersection Summary			
HCM 6th Ctrl Delay			6.0
HCM 6th LOS			A

14: DWY 4/FEMA Driveway & GRANT LINE RD

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		⤺		↑↱							↱
Traffic Vol, veh/h	15	565	0	0	0	515	2	0	0	0	0	0	8
Future Vol, veh/h	15	565	0	0	0	515	2	0	0	0	0	0	8
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	15	565	0	0	0	515	2	0	0	0	0	0	8

Major/Minor	Major1			Major2							Minor2		
Conflicting Flow All	517	0	-	412	-	-	0				-	-	259
Stage 1	-	-	-	-	-	-	-				-	-	-
Stage 2	-	-	-	-	-	-	-				-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-				-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-				-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-				-	-	3.4
Pot Cap-1 Maneuver	991	-	0	883	0	-	-				0	0	716
Stage 1	-	-	0	-	0	-	-				0	0	-
Stage 2	-	-	0	-	0	-	-				0	0	-
Platoon blocked, %		-				-	-						
Mov Cap-1 Maneuver	991	-	-	883	-	-	-				-	0	716
Mov Cap-2 Maneuver	-	-	-	-	-	-	-				-	0	-
Stage 1	-	-	-	-	-	-	-				-	0	-
Stage 2	-	-	-	-	-	-	-				-	0	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	991	-	883	-	-	716
HCM Lane V/C Ratio	0.015	-	-	-	-	0.011
HCM Control Delay (s)	8.7	-	0	-	-	10.1
HCM Lane LOS	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	-	0	-	-	0

HCM 6th Signalized Intersection Summary
Cumulative Conditions

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP
Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	180	0	20	640	75	0	0	220	20
Future Volume (veh/h)	0	0	0	180	0	20	640	75	0	0	220	20
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				180	0	20	640	75	0	0	220	20
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				221	0	25	843	1035	0	0	301	27
Arrive On Green				0.15	0.00	0.15	0.26	0.59	0.00	0.00	0.19	0.19
Sat Flow, veh/h				1483	0	165	3237	1752	0	0	1582	144
Grp Volume(v), veh/h				200	0	0	640	75	0	0	0	240
Grp Sat Flow(s),veh/h/ln				1648	0	0	1618	1752	0	0	0	1726
Q Serve(g_s), s				4.1	0.0	0.0	6.4	0.6	0.0	0.0	0.0	4.6
Cycle Q Clear(g_c), s				4.1	0.0	0.0	6.4	0.6	0.0	0.0	0.0	4.6
Prop In Lane				0.90		0.10	1.00		0.00	0.00		0.08
Lane Grp Cap(c), veh/h				245	0	0	843	1035	0	0	0	329
V/C Ratio(X)				0.82	0.00	0.00	0.76	0.07	0.00	0.00	0.00	0.73
Avail Cap(c_a), veh/h				245	0	0	1028	1288	0	0	0	479
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				14.4	0.0	0.0	11.9	3.1	0.0	0.0	0.0	13.3
Incr Delay (d2), s/veh				17.7	0.0	0.0	2.4	0.0	0.0	0.0	0.0	1.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.4	0.0	0.0	1.8	0.1	0.0	0.0	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				32.1	0.0	0.0	14.3	3.1	0.0	0.0	0.0	14.5
LnGrp LOS				C	A	A	B	A	A	A	A	B
Approach Vol, veh/h					200			715			240	
Approach Delay, s/veh					32.1			13.2			14.5	
Approach LOS					C			B			B	
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		25.6			14.0	11.6		9.4				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.7			11.1	9.7		5.2				
Max Q Clear Time (g_c+I1), s		2.6			8.4	6.6		6.1				
Green Ext Time (p_c), s		0.1			0.7	0.1		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	16.7
HCM 6th LOS	B

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑↑	↱	↰	↑↑	
Traffic Volume (veh/h)	20	0	293	0	0	0	0	730	470	100	300	0
Future Volume (veh/h)	20	0	293	0	0	0	0	730	470	100	300	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	20	0	293				0	730	470	100	300	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	395	0	351				0	1355	604	129	1896	0
Arrive On Green	0.24	0.00	0.24				0.00	0.41	0.41	0.08	0.57	0.00
Sat Flow, veh/h	1668	0	1485				0	3416	1485	1668	3416	0
Grp Volume(v), veh/h	20	0	293				0	730	470	100	300	0
Grp Sat Flow(s),veh/h/ln	1668	0	1485				0	1664	1485	1668	1664	0
Q Serve(g_s), s	0.4	0.0	8.8				0.0	7.8	12.9	2.8	2.0	0.0
Cycle Q Clear(g_c), s	0.4	0.0	8.8				0.0	7.8	12.9	2.8	2.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	395	0	351				0	1355	604	129	1896	0
V/C Ratio(X)	0.05	0.00	0.83				0.00	0.54	0.78	0.77	0.16	0.00
Avail Cap(c_a), veh/h	639	0	568				0	1550	691	248	2329	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.9	0.0	17.1				0.0	10.6	12.1	21.3	4.8	0.0
Incr Delay (d2), s/veh	0.0	0.0	2.7				0.0	0.5	5.5	9.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	2.8				0.0	2.1	3.9	1.3	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.9	0.0	19.8				0.0	11.1	17.6	30.7	4.8	0.0
LnGrp LOS	B	A	B				A	B	B	C	A	A
Approach Vol, veh/h		313						1200			400	
Approach Delay, s/veh		19.4						13.6			11.3	
Approach LOS		B						B			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	7.6	24.0		15.3		31.7
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	7.6	21.9		* 18		32.9
Max Q Clear Time (g_c+I1), s	4.8	14.9		10.8		4.0
Green Ext Time (p_c), s	0.1	4.2		0.5		2.0

Intersection Summary			
HCM 6th Ctrl Delay			14.1
HCM 6th LOS			B

Notes

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

3: MACARTHUR DRIVE (N) & GRANT LINE RD

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	320	1388	120	20	181	53	110	610	60	33	580	170
Future Volume (veh/h)	320	1388	120	20	181	53	110	610	60	33	580	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	1388	120	20	181	53	110	610	60	33	580	170
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	335	1587	708	43	1010	425	130	903	403	61	780	369
Arrive On Green	0.19	0.45	0.45	0.03	0.29	0.29	0.07	0.27	0.27	0.04	0.23	0.23
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	1388	120	20	181	53	110	610	60	33	580	170
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	17.0	33.9	4.3	1.1	3.7	2.5	5.8	15.5	2.9	1.8	15.3	8.8
Cycle Q Clear(g_c), s	17.0	33.9	4.3	1.1	3.7	2.5	5.8	15.5	2.9	1.8	15.3	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	1587	708	43	1010	425	130	903	403	61	780	369
V/C Ratio(X)	0.96	0.87	0.17	0.46	0.18	0.12	0.84	0.68	0.15	0.54	0.74	0.46
Avail Cap(c_a), veh/h	335	1670	745	105	1225	516	130	1139	508	105	1104	522
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.1	23.7	15.5	45.6	25.5	25.1	43.5	30.9	26.3	45.0	33.7	31.2
Incr Delay (d2), s/veh	37.1	5.7	0.2	2.8	0.1	0.2	35.6	1.7	0.3	2.7	2.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.5	14.0	1.5	0.5	1.5	0.9	3.8	6.2	1.1	0.8	6.2	3.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.2	29.3	15.7	48.5	25.6	25.3	79.0	32.6	26.6	47.7	36.3	32.8
LnGrp LOS	E	C	B	D	C	C	E	C	C	D	D	C
Approach Vol, veh/h		1828			254			780			783	
Approach Delay, s/veh		36.5			27.4			38.7			36.0	
Approach LOS		D			C			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	31.3	7.5	47.8	12.0	27.8	23.0	32.2
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.5	6.0	45.0	7.0	31.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	3.8	17.5	3.1	35.9	7.8	17.3	19.0	5.7
Green Ext Time (p_c), s	0.0	4.5	0.0	6.8	0.0	4.9	0.0	1.8

Intersection Summary			
HCM 6th Ctrl Delay			36.2
HCM 6th LOS			D

Notes

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

4: ELEVENTH ST. & MACARTHUR DRIVE

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	275	1303	140	43	1025	370	90	525	30	130	190	360
Future Volume (veh/h)	275	1303	140	43	1025	370	90	525	30	130	190	360
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1856	1856	1752	1856	1856	1856	1752	1856	1856
Adj Flow Rate, veh/h	275	1303	140	43	1025	370	90	525	30	130	190	360
Peak Hour 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
Percent Heavy Veh, %	3	3	3	3	3	10	3	3	3	10	3	3
Cap, veh/h	299	1439	154	54	1069	450	103	767	44	162	467	417
Arrive On Green	0.17	0.45	0.45	0.03	0.30	0.30	0.06	0.23	0.23	0.10	0.27	0.27
Sat Flow, veh/h	1767	3213	344	1767	3526	1485	1767	3390	193	1668	1763	1572
Grp Volume(v), veh/h	275	712	731	43	1025	370	90	273	282	130	190	360
Grp Sat Flow(s),veh/h/ln	1767	1763	1794	1767	1763	1485	1767	1763	1821	1668	1763	1572
Q Serve(g_s), s	13.1	32.1	32.5	2.1	24.5	19.8	4.3	12.1	12.2	6.5	7.6	18.7
Cycle Q Clear(g_c), s	13.1	32.1	32.5	2.1	24.5	19.8	4.3	12.1	12.2	6.5	7.6	18.7
Prop In Lane	1.00		0.19	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	299	789	803	54	1069	450	103	399	412	162	467	417
V/C Ratio(X)	0.92	0.90	0.91	0.80	0.96	0.82	0.87	0.68	0.69	0.80	0.41	0.86
Avail Cap(c_a), veh/h	299	789	803	82	1069	450	103	473	488	272	658	587
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.0	21.9	22.1	41.3	29.3	27.7	40.0	30.4	30.4	37.9	25.9	30.0
Incr Delay (d2), s/veh	31.5	13.6	14.3	25.9	18.4	11.6	50.9	2.1	2.1	8.8	0.2	7.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	15.0	15.6	1.3	12.5	8.2	3.3	5.2	5.4	3.1	3.2	7.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.6	35.6	36.4	67.2	47.7	39.3	91.0	32.5	32.5	46.7	26.2	37.1
LnGrp LOS	E	D	D	E	D	D	F	C	C	D	C	D
Approach Vol, veh/h		1718			1438			645			680	
Approach Delay, s/veh		40.9			46.1			40.6			35.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.6	42.9	9.0	27.2	19.0	30.5	12.3	23.9
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	4.0	37.0	5.0	32.0	14.5	26.0	14.0	23.0
Max Q Clear Time (g_c+I1), s	4.1	34.5	6.3	20.7	15.1	26.5	8.5	14.2
Green Ext Time (p_c), s	0.0	1.6	0.0	2.0	0.0	0.0	0.2	1.5

Intersection Summary	
HCM 6th Ctrl Delay	41.8
HCM 6th LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	21	1853	32	44	483	4	22	0	37	13	0	52
Future Volume (veh/h)	21	1853	32	44	483	4	22	0	37	13	0	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	21	1853	32	44	483	4	22	0	37	13	0	52
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	105	1896	33	65	1836	15	84	0	218	26	0	167
Arrive On Green	0.06	0.57	0.57	0.04	0.54	0.54	0.05	0.00	0.15	0.02	0.00	0.11
Sat Flow, veh/h	1668	3348	58	1668	3383	28	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	21	919	966	44	238	249	22	0	37	13	0	52
Grp Sat Flow(s),veh/h/ln	1668	1664	1741	1668	1664	1747	1668	0	1485	1668	0	1485
Q Serve(g_s), s	0.9	42.4	42.9	2.1	6.0	6.1	1.0	0.0	1.7	0.6	0.0	2.6
Cycle Q Clear(g_c), s	0.9	42.4	42.9	2.1	6.0	6.1	1.0	0.0	1.7	0.6	0.0	2.6
Prop In Lane	1.00		0.03	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	105	943	986	65	903	948	84	0	218	26	0	167
V/C Ratio(X)	0.20	0.97	0.98	0.67	0.26	0.26	0.26	0.00	0.17	0.50	0.00	0.31
Avail Cap(c_a), veh/h	315	943	987	525	1257	1320	420	0	841	315	0	654
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	35.3	16.7	16.8	37.7	9.7	9.7	36.3	0.0	29.6	38.8	0.0	32.4
Incr Delay (d2), s/veh	0.3	23.1	23.6	4.4	0.1	0.1	0.6	0.0	0.1	5.3	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	18.4	19.5	0.9	1.8	1.9	0.4	0.0	0.6	0.3	0.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.7	39.7	40.4	42.1	9.7	9.7	36.9	0.0	29.8	44.1	0.0	32.8
LnGrp LOS	D	D	D	D	A	A	D	A	C	D	A	C
Approach Vol, veh/h		1906			531			59			65	
Approach Delay, s/veh		40.0			12.4			32.4			35.0	
Approach LOS		D			B			C			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.1	50.8	5.2	16.3	9.0	48.9	8.0	13.5
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	4.1	44.9	2.6	3.7	2.9	8.1	3.0	4.6
Green Ext Time (p_c), s	0.0	0.1	0.0	0.1	0.0	1.6	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	34.0
HCM 6th LOS	C

6: CHRISMAN RD & GRANT LINE RD

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	661	986	248	160	275	25	193	1280	117	25	260	44
Future Volume (veh/h)	661	986	248	160	275	25	193	1280	117	25	260	44
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	661	986	248	160	275	25	193	1280	117	25	260	44
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	685	1145	355	296	396	177	223	1330	593	81	1047	467
Arrive On Green	0.21	0.24	0.24	0.09	0.12	0.12	0.13	0.40	0.40	0.05	0.31	0.31
Sat Flow, veh/h	3237	4782	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	661	986	248	160	275	25	193	1280	117	25	260	44
Grp Sat Flow(s),veh/h/ln	1618	1594	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	22.0	21.5	16.6	5.1	8.6	1.6	12.3	40.8	5.6	1.6	6.3	2.3
Cycle Q Clear(g_c), s	22.0	21.5	16.6	5.1	8.6	1.6	12.3	40.8	5.6	1.6	6.3	2.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	685	1145	355	296	396	177	223	1330	593	81	1047	467
V/C Ratio(X)	0.96	0.86	0.70	0.54	0.69	0.14	0.87	0.96	0.20	0.31	0.25	0.09
Avail Cap(c_a), veh/h	685	1409	437	298	582	260	353	1348	601	154	1047	467
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	39.6	37.7	47.2	45.9	42.9	46.1	31.8	21.3	49.9	27.7	26.3
Incr Delay (d2), s/veh	25.6	4.1	2.3	2.0	0.8	0.1	7.7	16.1	0.1	2.1	0.1	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.8	8.5	6.1	2.1	3.5	0.6	5.4	18.4	1.9	0.7	2.5	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	68.0	43.7	40.1	49.1	46.8	43.0	53.8	47.9	21.3	52.0	27.8	26.4
LnGrp LOS	E	D	D	D	D	D	D	D	C	D	C	C
Approach Vol, veh/h		1895			460			1590			329	
Approach Delay, s/veh		51.7			47.4			46.7			29.4	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.9	32.0	20.5	40.2	29.0	18.9	11.3	49.4
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	32.0	23.0	* 33	23.0	19.0	10.0	44.0
Max Q Clear Time (g_c+I1), s	7.1	23.5	14.3	8.3	24.0	10.6	3.6	42.8
Green Ext Time (p_c), s	0.1	2.6	0.2	1.7	0.0	0.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	47.7
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary
7: CHRISMAN RD & Paradise Rd

Cumulative Conditions
Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑↑	↱
Traffic Volume (veh/h)	10	28	10	100	10	100	3	1450	60	10	600	10
Future Volume (veh/h)	10	28	10	100	10	100	3	1450	60	10	600	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	10	28	10	100	10	100	3	1450	60	10	600	10
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	43	154	55	190	29	291	11	2101	87	43	2225	691
Arrive On Green	0.03	0.12	0.12	0.11	0.21	0.21	0.01	0.45	0.45	0.03	0.47	0.47
Sat Flow, veh/h	1668	1232	440	1668	137	1369	1668	4710	195	1668	4782	1485
Grp Volume(v), veh/h	10	0	38	100	0	110	3	982	528	10	600	10
Grp Sat Flow(s),veh/h/ln	1668	0	1673	1668	0	1505	1668	1594	1717	1668	1594	1485
Q Serve(g_s), s	0.3	0.0	1.1	3.1	0.0	3.4	0.1	13.6	13.6	0.3	4.2	0.2
Cycle Q Clear(g_c), s	0.3	0.0	1.1	3.1	0.0	3.4	0.1	13.6	13.6	0.3	4.2	0.2
Prop In Lane	1.00		0.26	1.00		0.91	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	43	0	208	190	0	320	11	1422	766	43	2225	691
V/C Ratio(X)	0.23	0.00	0.18	0.53	0.00	0.34	0.28	0.69	0.69	0.23	0.27	0.01
Avail Cap(c_a), veh/h	302	0	1273	302	0	1145	242	1848	995	302	2946	914
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.4	0.0	21.6	23.1	0.0	18.5	27.3	12.2	12.2	26.4	9.0	7.9
Incr Delay (d2), s/veh	2.7	0.0	0.4	2.3	0.0	0.6	13.1	0.7	1.4	2.7	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.4	1.2	0.0	1.1	0.1	3.8	4.2	0.1	1.1	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.1	0.0	22.1	25.3	0.0	19.1	40.4	13.0	13.6	29.1	9.1	8.0
LnGrp LOS	C	A	C	C	A	B	D	B	B	C	A	A
Approach Vol, veh/h		48			210			1513			620	
Approach Delay, s/veh		23.5			22.1			13.3			9.4	
Approach LOS		C			C			B			A	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	5.4	28.6	10.3	10.9	4.4	29.7	5.4	15.7
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	32.0	10.0	42.0	8.0	34.0	10.0	42.0
Max Q Clear Time (g_c+I1), s	2.3	15.6	5.1	3.1	2.1	6.2	2.3	5.4
Green Ext Time (p_c), s	0.0	9.0	0.1	0.2	0.0	4.2	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	13.2
HCM 6th LOS	B

8: CHRISMAN & ELEVENTH ST.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	502	870	90	290	510	45	90	1065	510	22	474	834
Future Volume (veh/h)	502	870	90	290	510	45	90	1065	510	22	474	834
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	502	870	90	290	510	45	90	1065	0	22	474	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	572	919	486	273	875	418	85	1055		31	946	
Arrive On Green	0.18	0.28	0.28	0.16	0.26	0.26	0.05	0.32	0.00	0.02	0.28	0.00
Sat Flow, veh/h	3237	3328	1485	1668	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	502	870	90	290	510	45	90	1065	0	22	474	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1668	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	14.8	25.1	4.2	16.0	13.0	2.2	5.0	31.0	0.0	1.3	11.6	0.0
Cycle Q Clear(g_c), s	14.8	25.1	4.2	16.0	13.0	2.2	5.0	31.0	0.0	1.3	11.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	919	486	273	875	418	85	1055		31	946	
V/C Ratio(X)	0.88	0.95	0.19	1.06	0.58	0.11	1.06	1.01		0.72	0.50	
Avail Cap(c_a), veh/h	596	919	486	273	875	418	85	1055		68	1021	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.2	34.7	23.6	40.9	31.4	26.0	46.4	33.4	0.0	47.7	29.2	0.0
Incr Delay (d2), s/veh	14.8	18.5	0.4	71.9	1.6	0.2	113.3	30.0	0.0	26.5	1.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	11.8	1.5	11.6	5.0	0.8	4.7	16.0	0.0	0.8	4.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.0	53.2	24.0	112.8	32.9	26.3	159.7	63.4	0.0	74.3	30.7	0.0
LnGrp LOS	D	D	C	F	C	C	F	F		E	C	
Approach Vol, veh/h		1462			845			1155	A		496	A
Approach Delay, s/veh		51.7			60.0			70.9			32.6	
Approach LOS		D			E			E			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	33.0	9.0	33.8	23.3	31.7	5.8	37.0
Change Period (Y+Rc), s	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	16.0	27.0	5.0	30.0	18.0	25.0	4.0	31.0
Max Q Clear Time (g_c+I1), s	18.0	27.1	7.0	13.6	16.8	15.0	3.3	33.0
Green Ext Time (p_c), s	0.0	0.0	0.0	4.8	0.5	3.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	56.7
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↱		↑↑↱			↑↑↱	
Traffic Volume (veh/h)	0	0	0	89	0	10	0	2015	417	0	202	520
Future Volume (veh/h)	0	0	0	89	0	10	0	2015	417	0	202	520
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1752	1752	1752	0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h				89	0	10	0	2015	417	0	202	520
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				10	10	10	0	10	10	0	10	10
Cap, veh/h				219	0	195	0	2963	595	0	2365	1101
Arrive On Green				0.07	0.00	0.07	0.00	0.74	0.74	0.00	0.74	0.74
Sat Flow, veh/h				3337	0	2969	0	4151	802	0	3346	1485
Grp Volume(v), veh/h				89	0	10	0	1597	835	0	202	520
Grp Sat Flow(s),veh/h/ln				1668	0	1485	0	1594	1607	0	1594	1485
Q Serve(g_s), s				1.1	0.0	0.1	0.0	10.8	11.6	0.0	0.7	5.8
Cycle Q Clear(g_c), s				1.1	0.0	0.1	0.0	10.8	11.6	0.0	0.7	5.8
Prop In Lane				1.00		1.00	0.00		0.50	0.00		1.00
Lane Grp Cap(c), veh/h				219	0	195	0	2365	1192	0	2365	1101
V/C Ratio(X)				0.41	0.00	0.05	0.00	0.67	0.70	0.00	0.09	0.47
Avail Cap(c_a), veh/h				1446	0	1287	0	2609	1316	0	2609	1215
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				18.6	0.0	18.2	0.0	2.8	2.9	0.0	1.5	2.1
Incr Delay (d2), s/veh				1.2	0.0	0.1	0.0	0.6	1.5	0.0	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	0.0
%ile BackOfQ(50%),veh/ln				0.4	0.0	0.0	0.0	0.4	0.7	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				19.8	0.0	18.3	0.0	3.4	4.4	0.0	1.5	2.4
LnGrp LOS				B	A	B	A	A	A	A	A	A
Approach Vol, veh/h					99			2432			722	
Approach Delay, s/veh					19.7			3.7			2.2	
Approach LOS					B			A			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		34.8				34.8		6.7				
Change Period (Y+Rc), s		4.0				4.0		4.0				
Max Green Setting (Gmax), s		34.0				34.0		18.0				
Max Q Clear Time (g_c+I1), s		13.6				7.8		3.1				
Green Ext Time (p_c), s		17.2				5.2		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	3.9
HCM 6th LOS	A

Notes

User approved volume balancing among the lanes for turning movement.

HCM 6th Signalized Intersection Summary

10: Chrisman Rd & I-205 EB Off Ramp/I-205 EB On Ramp

Cumulative Conditions

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱					↑↑↑	↱↱		↑↑↱	
Traffic Volume (veh/h)	910	0	360	0	0	0	0	1522	1090	0	281	10
Future Volume (veh/h)	910	0	360	0	0	0	0	1522	1090	0	281	10
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	0	1752				0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h	910	0	360				0	1522	1090	0	281	10
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	10				0	10	10	0	10	10
Cap, veh/h	1093	0	882				0	2192	1198	0	2174	77
Arrive On Green	0.34	0.00	0.34				0.00	0.46	0.46	0.00	0.46	0.46
Sat Flow, veh/h	3237	0	2613				0	4940	2613	0	4900	168
Grp Volume(v), veh/h	910	0	360				0	1522	1090	0	188	103
Grp Sat Flow(s),veh/h/ln	1618	0	1306				0	1594	1306	0	1594	1722
Q Serve(g_s), s	10.2	0.0	4.1				0.0	9.9	15.2	0.0	1.3	1.3
Cycle Q Clear(g_c), s	10.2	0.0	4.1				0.0	9.9	15.2	0.0	1.3	1.3
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.10
Lane Grp Cap(c), veh/h	1093	0	882				0	2192	1198	0	1461	789
V/C Ratio(X)	0.83	0.00	0.41				0.00	0.69	0.91	0.00	0.13	0.13
Avail Cap(c_a), veh/h	1156	0	933				0	2197	1200	0	1464	791
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	0.0	10.0				0.0	8.4	9.9	0.0	6.1	6.1
Incr Delay (d2), s/veh	5.1	0.0	0.3				0.0	1.0	10.4	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	0.9				0.0	2.4	4.6	0.0	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	10.3				0.0	9.4	20.2	0.0	6.1	6.2
LnGrp LOS	B	A	B				A	A	C	A	A	A
Approach Vol, veh/h		1270						2612			291	
Approach Delay, s/veh		15.2						13.9			6.2	
Approach LOS		B						B			A	
Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		22.0		17.2		22.0						
Change Period (Y+Rc), s		4.0		4.0		4.0						
Max Green Setting (Gmax), s		18.0		14.0		18.0						
Max Q Clear Time (g_c+I1), s		17.2		12.2		3.3						
Green Ext Time (p_c), s		0.8		1.1		1.4						
Intersection Summary												
HCM 6th Ctrl Delay			13.8									
HCM 6th LOS			B									

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑		⋂		↑↱							↱
Traffic Vol, veh/h	8	1895	0	0	0	511	1	0	0	0	0	0	20
Future Vol, veh/h	8	1895	0	0	0	511	1	0	0	0	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	-	None	-	-	None	-	-	None
Storage Length	400	-	-	-	205	-	-	-	-	-	-	-	0
Veh in Median Storage, #	-	0	-	-	-	0	-	-	16983	-	-	0	-
Grade, %	-	0	-	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	10	10	10	10	10	10	10	10	10	10	10	10	10
Mvmt Flow	8	1895	0	0	0	511	1	0	0	0	0	0	20

Major/Minor	Major1			Major2							Minor2		
Conflicting Flow All	512	0	-	1383	-	-	0				-	-	256
Stage 1	-	-	-	-	-	-	-				-	-	-
Stage 2	-	-	-	-	-	-	-				-	-	-
Critical Hdwy	4.3	-	-	5.8	-	-	-				-	-	7.1
Critical Hdwy Stg 1	-	-	-	-	-	-	-				-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-				-	-	-
Follow-up Hdwy	2.3	-	-	2.4	-	-	-				-	-	3.4
Pot Cap-1 Maneuver	996	-	0	247	0	-	-				0	0	719
Stage 1	-	-	0	-	0	-	-				0	0	-
Stage 2	-	-	0	-	0	-	-				0	0	-
Platoon blocked, %		-				-	-						
Mov Cap-1 Maneuver	996	-	-	247	-	-	-				-	0	719
Mov Cap-2 Maneuver	-	-	-	-	-	-	-				-	0	-
Stage 1	-	-	-	-	-	-	-				-	0	-
Stage 2	-	-	-	-	-	-	-				-	0	-

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

Minor Lane/Major Mvmt	EBL	EBT	WBU	WBT	WBR	SBLn1
Capacity (veh/h)	996	-	247	-	-	719
HCM Lane V/C Ratio	0.008	-	-	-	-	0.028
HCM Control Delay (s)	8.6	-	0	-	-	10.2
HCM Lane LOS	A	-	A	-	-	B
HCM 95th %tile Q(veh)	0	-	0	-	-	0.1

A9. Cumulative Plus Project Synchro Outputs

1: MACARTHUR DRIVE (N) & I-205 WEST ON RAMP/I-205 WEST OFF RAMP

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✣		↰↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	160	0	70	422	40	0	0	50	20
Future Volume (veh/h)	0	0	0	160	0	70	422	40	0	0	50	20
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				160	0	70	422	40	0	0	50	20
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				199	0	87	641	917	0	0	195	78
Arrive On Green				0.18	0.00	0.18	0.20	0.52	0.00	0.00	0.16	0.16
Sat Flow, veh/h				1118	0	489	3237	1752	0	0	1190	476
Grp Volume(v), veh/h				230	0	0	422	40	0	0	0	70
Grp Sat Flow(s),veh/h/ln				1608	0	0	1618	1752	0	0	0	1666
Q Serve(g_s), s				4.2	0.0	0.0	3.7	0.3	0.0	0.0	0.0	1.1
Cycle Q Clear(g_c), s				4.2	0.0	0.0	3.7	0.3	0.0	0.0	0.0	1.1
Prop In Lane				0.70		0.30	1.00		0.00	0.00		0.29
Lane Grp Cap(c), veh/h				286	0	0	641	917	0	0	0	274
V/C Ratio(X)				0.80	0.00	0.00	0.66	0.04	0.00	0.00	0.00	0.26
Avail Cap(c_a), veh/h				465	0	0	967	1272	0	0	0	443
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				12.0	0.0	0.0	11.3	3.5	0.0	0.0	0.0	11.1
Incr Delay (d2), s/veh				2.0	0.0	0.0	0.9	0.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln				1.2	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				14.0	0.0	0.0	12.1	3.5	0.0	0.0	0.0	11.3
LnGrp LOS				B	A	A	B	A	A	A	A	B
Approach Vol, veh/h					230			462			70	
Approach Delay, s/veh					14.0			11.4			11.3	
Approach LOS					B			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		20.8			10.9	9.9		9.6				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		22.1			9.1	8.1		8.8				
Max Q Clear Time (g_c+I1), s		2.3			5.7	3.1		6.2				
Green Ext Time (p_c), s		0.0			0.5	0.0		0.1				

Intersection Summary			
HCM 6th Ctrl Delay			12.2
HCM 6th LOS			B

HCM 6th Signalized Intersection Summary Cumulative Plus Project Conditions
2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑↑	↱	↰	↑↑	
Traffic Volume (veh/h)	15	0	537	0	0	0	0	459	360	10	200	0
Future Volume (veh/h)	15	0	537	0	0	0	0	459	360	10	200	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	15	0	537				0	459	360	10	200	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	642	0	571				0	1073	479	22	1401	0
Arrive On Green	0.38	0.00	0.38				0.00	0.32	0.32	0.01	0.42	0.00
Sat Flow, veh/h	1668	0	1485				0	3416	1485	1668	3416	0
Grp Volume(v), veh/h	15	0	537				0	459	360	10	200	0
Grp Sat Flow(s),veh/h/ln	1668	0	1485				0	1664	1485	1668	1664	0
Q Serve(g_s), s	0.3	0.0	16.3				0.0	5.1	10.2	0.3	1.7	0.0
Cycle Q Clear(g_c), s	0.3	0.0	16.3				0.0	5.1	10.2	0.3	1.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	642	0	571				0	1073	479	22	1401	0
V/C Ratio(X)	0.02	0.00	0.94				0.00	0.43	0.75	0.46	0.14	0.00
Avail Cap(c_a), veh/h	642	0	571				0	1344	600	178	1985	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	8.9	0.0	13.9				0.0	12.5	14.2	22.9	8.3	0.0
Incr Delay (d2), s/veh	0.0	0.0	23.5				0.0	0.4	4.9	14.4	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	7.8				0.0	1.5	3.3	0.2	0.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.9	0.0	37.4				0.0	12.8	19.1	37.3	8.4	0.0
LnGrp LOS	A	A	D				A	B	B	D	A	A
Approach Vol, veh/h		552						819			210	
Approach Delay, s/veh		36.7						15.6			9.8	
Approach LOS		D						B			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	4.6	20.0		22.2		24.6
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	5.0	18.9		* 18		27.9
Max Q Clear Time (g_c+I1), s	2.3	12.2		18.3		3.7
Green Ext Time (p_c), s	0.0	2.9		0.0		1.2

Intersection Summary	
HCM 6th Ctrl Delay	22.2
HCM 6th LOS	C

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	300	356	80	52	301	67	80	520	84	256	400	250
Future Volume (veh/h)	300	356	80	52	301	67	80	520	84	256	400	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	300	356	80	52	301	67	80	520	84	256	400	250
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	346	1040	464	94	546	230	124	812	362	153	883	417
Arrive On Green	0.20	0.29	0.29	0.06	0.15	0.15	0.07	0.24	0.24	0.09	0.27	0.27
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	300	356	80	52	301	67	80	520	84	256	400	250
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	10.8	5.2	2.5	2.0	5.2	2.6	2.9	9.2	3.0	6.0	6.6	9.1
Cycle Q Clear(g_c), s	10.8	5.2	2.5	2.0	5.2	2.6	2.9	9.2	3.0	6.0	6.6	9.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	1040	464	94	546	230	124	812	362	153	883	417
V/C Ratio(X)	0.87	0.34	0.17	0.56	0.55	0.29	0.64	0.64	0.23	1.67	0.45	0.60
Avail Cap(c_a), veh/h	459	2210	986	230	1779	749	162	1705	760	153	1705	805
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.5	18.1	17.1	30.1	25.5	24.5	29.6	22.2	19.8	29.7	20.1	21.0
Incr Delay (d2), s/veh	10.4	0.3	0.3	1.9	1.5	1.2	2.1	1.5	0.6	329.5	0.6	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	1.9	0.9	0.8	2.2	0.9	1.2	3.4	1.0	16.2	2.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.8	18.4	17.4	32.0	27.0	25.6	31.7	23.6	20.4	359.2	20.7	23.3
LnGrp LOS	D	B	B	C	C	C	C	C	C	F	C	C
Approach Vol, veh/h		736			420			684			906	
Approach Delay, s/veh		25.4			27.4			24.2			117.1	
Approach LOS		C			C			C			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	21.5	8.7	24.3	9.6	22.9	17.8	15.1
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	6.0	33.5	9.0	41.0	6.0	33.5	17.0	33.0
Max Q Clear Time (g_c+I1), s	8.0	11.2	4.0	7.2	4.9	11.1	12.8	7.2
Green Ext Time (p_c), s	0.0	4.8	0.0	3.6	0.0	5.2	0.1	3.0

Intersection Summary	
HCM 6th Ctrl Delay	55.6
HCM 6th LOS	E

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	169	977	50	20	1400	240	120	126	131	200	40	222
Future Volume (veh/h)	169	977	50	20	1400	240	120	126	131	200	40	222
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	169	977	50	20	1400	240	120	126	131	200	40	222
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	10
Cap, veh/h	181	1849	95	29	1591	670	149	200	178	235	294	263
Arrive On Green	0.10	0.54	0.54	0.02	0.45	0.45	0.08	0.12	0.12	0.14	0.18	0.18
Sat Flow, veh/h	1767	3412	175	1668	3526	1485	1767	1664	1485	1668	1664	1485
Grp Volume(v), veh/h	169	505	522	20	1400	240	120	126	131	200	40	222
Grp Sat Flow(s),veh/h/ln	1767	1763	1824	1668	1763	1485	1767	1664	1485	1668	1664	1485
Q Serve(g_s), s	9.0	17.4	17.4	1.1	34.2	10.0	6.3	6.8	8.1	11.1	1.9	13.7
Cycle Q Clear(g_c), s	9.0	17.4	17.4	1.1	34.2	10.0	6.3	6.8	8.1	11.1	1.9	13.7
Prop In Lane	1.00		0.10	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	181	955	989	29	1591	670	149	200	178	235	294	263
V/C Ratio(X)	0.93	0.53	0.53	0.69	0.88	0.36	0.81	0.63	0.73	0.85	0.14	0.85
Avail Cap(c_a), veh/h	181	988	1022	88	1782	750	149	387	345	318	563	502
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.1	13.9	13.9	46.2	23.6	17.0	42.6	39.6	40.1	39.7	32.8	37.7
Incr Delay (d2), s/veh	47.1	0.5	0.5	25.7	5.0	0.3	26.8	1.2	2.2	15.0	0.1	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	6.5	6.7	0.7	14.2	3.4	3.8	2.8	3.0	5.5	0.8	5.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.2	14.4	14.4	71.9	28.6	17.3	69.3	40.8	42.3	54.7	32.9	40.6
LnGrp LOS	F	B	B	E	C	B	E	D	D	D	C	D
Approach Vol, veh/h		1196			1660			377			462	
Approach Delay, s/veh		25.0			27.5			50.4			46.0	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.6	55.8	12.0	21.2	14.2	47.2	17.3	15.9				
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.5	4.5	4.0	4.5				
Max Green Setting (Gmax), s	5.0	53.0	8.0	32.0	9.7	47.8	18.0	22.0				
Max Q Clear Time (g_c+I1), s	3.1	19.4	8.3	15.7	11.0	36.2	13.1	10.1				
Green Ext Time (p_c), s	0.0	4.9	0.0	1.0	0.0	6.5	0.3	0.8				
Intersection Summary												
HCM 6th Ctrl Delay			31.3									
HCM 6th LOS			C									

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	60	823	117	53	474	10	15	0	3	4	0	14
Future Volume (veh/h)	60	823	117	53	474	10	15	0	3	4	0	14
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	60	823	117	53	474	10	15	0	3	4	0	14
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	216	1131	161	94	1044	22	45	0	112	9	0	79
Arrive On Green	0.13	0.39	0.39	0.06	0.31	0.31	0.03	0.00	0.08	0.01	0.00	0.05
Sat Flow, veh/h	1668	2925	416	1668	3333	70	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	60	468	472	53	236	248	15	0	3	4	0	14
Grp Sat Flow(s),veh/h/ln	1668	1664	1677	1668	1664	1739	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.3	9.3	9.3	1.2	4.4	4.4	0.3	0.0	0.1	0.1	0.0	0.3
Cycle Q Clear(g_c), s	1.3	9.3	9.3	1.2	4.4	4.4	0.3	0.0	0.1	0.1	0.0	0.3
Prop In Lane	1.00		0.25	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	216	644	648	94	522	545	45	0	112	9	0	79
V/C Ratio(X)	0.28	0.73	0.73	0.57	0.45	0.45	0.33	0.00	0.03	0.44	0.00	0.18
Avail Cap(c_a), veh/h	648	1939	1954	1080	2586	2702	864	0	1730	648	0	1346
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	15.2	10.1	10.1	17.8	10.6	10.6	18.4	0.0	16.5	19.1	0.0	17.5
Incr Delay (d2), s/veh	0.3	0.6	0.6	2.0	0.2	0.2	1.6	0.0	0.0	12.0	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	2.1	2.1	0.4	1.1	1.1	0.1	0.0	0.0	0.1	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	15.4	10.7	10.7	19.8	10.8	10.8	20.0	0.0	16.6	31.1	0.0	17.9
LnGrp LOS	B	B	B	B	B	B	B	A	B	C	A	B
Approach Vol, veh/h		1000			537			18			18	
Approach Delay, s/veh		11.0			11.7			19.4			20.8	
Approach LOS		B			B			B			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	20.7	4.2	7.5	9.0	17.9	5.1	6.7
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	3.2	11.3	2.1	2.1	3.3	6.4	2.3	2.3
Green Ext Time (p_c), s	0.0	3.7	0.0	0.0	0.0	1.6	0.0	0.0

Intersection Summary			
HCM 6th Ctrl Delay			11.4
HCM 6th LOS			B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	130	322	121	158	442	25	90	401	132	25	380	85
Future Volume (veh/h)	130	322	121	158	442	25	90	401	132	25	380	85
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	130	322	121	158	442	25	90	401	132	25	380	85
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	368	909	282	481	748	334	168	749	334	94	602	268
Arrive On Green	0.11	0.19	0.19	0.15	0.22	0.22	0.10	0.23	0.23	0.06	0.18	0.18
Sat Flow, veh/h	3237	4782	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	130	322	121	158	442	25	90	401	132	25	380	85
Grp Sat Flow(s),veh/h/ln	1618	1594	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	2.3	3.7	4.5	2.8	7.5	0.8	3.2	6.7	4.8	0.9	6.7	3.1
Cycle Q Clear(g_c), s	2.3	3.7	4.5	2.8	7.5	0.8	3.2	6.7	4.8	0.9	6.7	3.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	368	909	282	481	748	334	168	749	334	94	602	268
V/C Ratio(X)	0.35	0.35	0.43	0.33	0.59	0.07	0.54	0.54	0.39	0.27	0.63	0.32
Avail Cap(c_a), veh/h	615	2272	705	513	1476	658	211	1898	846	264	2109	940
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	25.8	22.2	22.5	24.1	21.9	19.3	27.0	21.6	20.8	28.5	23.9	22.5
Incr Delay (d2), s/veh	0.2	0.1	0.4	0.4	0.3	0.0	1.0	0.2	0.3	1.5	1.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	1.2	1.5	1.0	2.6	0.3	1.2	2.4	1.5	0.4	2.5	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	26.0	22.3	22.9	24.5	22.2	19.3	28.0	21.8	21.1	30.0	25.0	23.1
LnGrp LOS	C	C	C	C	C	B	C	C	C	C	C	C
Approach Vol, veh/h		573			625			623			490	
Approach Delay, s/veh		23.3			22.6			22.5			24.9	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	15.4	18.0	12.3	17.4	13.2	20.2	9.5	20.2
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	30.0	8.0	* 40	12.0	28.0	10.0	36.0
Max Q Clear Time (g_c+I1), s	4.3	6.5	5.2	8.7	4.3	9.5	2.9	8.7
Green Ext Time (p_c), s	0.2	1.1	0.0	2.8	0.1	1.1	0.0	1.0

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Summary
7: CHRISMAN RD & Paradise Rd

Cumulative Plus Project Conditions
Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑↑	↱
Traffic Volume (veh/h)	11	10	14	50	10	10	61	552	100	100	446	6
Future Volume (veh/h)	11	10	14	50	10	10	61	552	100	100	446	6
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	11	10	14	50	10	10	61	552	100	100	446	6
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	48	86	121	138	149	149	159	1098	195	266	1592	494
Arrive On Green	0.03	0.13	0.13	0.08	0.19	0.19	0.10	0.27	0.27	0.16	0.33	0.33
Sat Flow, veh/h	1668	661	925	1668	804	804	1668	4083	726	1668	4782	1485
Grp Volume(v), veh/h	11	0	24	50	0	20	61	429	223	100	446	6
Grp Sat Flow(s),veh/h/ln	1668	0	1585	1668	0	1607	1668	1594	1621	1668	1594	1485
Q Serve(g_s), s	0.3	0.0	0.6	1.3	0.0	0.5	1.5	5.1	5.2	2.4	3.1	0.1
Cycle Q Clear(g_c), s	0.3	0.0	0.6	1.3	0.0	0.5	1.5	5.1	5.2	2.4	3.1	0.1
Prop In Lane	1.00		0.58	1.00		0.50	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	48	0	207	138	0	297	159	857	436	266	1592	494
V/C Ratio(X)	0.23	0.00	0.12	0.36	0.00	0.07	0.38	0.50	0.51	0.38	0.28	0.01
Avail Cap(c_a), veh/h	374	0	1527	336	0	1512	299	2285	1162	374	3642	1131
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	17.1	19.4	0.0	15.0	19.0	13.8	13.8	16.8	11.0	10.0
Incr Delay (d2), s/veh	2.4	0.0	0.2	1.6	0.0	0.1	1.5	0.5	0.9	0.9	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.2	0.5	0.0	0.1	0.6	1.5	1.6	0.8	0.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.6	0.0	17.4	20.9	0.0	15.1	20.5	14.2	14.8	17.7	11.0	10.0
LnGrp LOS	C	A	B	C	A	B	C	B	B	B	B	A
Approach Vol, veh/h		35			70			713			552	
Approach Delay, s/veh		19.3			19.3			14.9			12.2	
Approach LOS		B			B			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.1	16.0	7.7	9.8	8.2	18.9	5.3	12.3
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	32.0	9.0	43.0	8.0	34.0	10.0	42.0
Max Q Clear Time (g_c+I1), s	4.4	7.2	3.3	2.6	3.5	5.1	2.3	2.5
Green Ext Time (p_c), s	0.1	4.2	0.0	0.1	0.0	3.0	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	14.2
HCM 6th LOS	B

HCM 6th Signalized Intersection Summary
8: CHRISMAN & ELEVENTH ST.

Cumulative Plus Project Conditions
Timing Plan: AM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	408	820	100	490	960	85	210	613	630	33	208	460
Future Volume (veh/h)	408	820	100	490	960	85	210	613	630	33	208	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	408	820	100	490	960	85	210	613	0	33	208	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	464	879	585	513	1425	672	217	784		41	431	
Arrive On Green	0.14	0.26	0.26	0.31	0.43	0.43	0.13	0.24	0.00	0.02	0.13	0.00
Sat Flow, veh/h	3237	3328	1485	1668	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	408	820	100	490	960	85	210	613	0	33	208	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1668	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	16.1	31.4	5.7	37.6	30.3	4.3	16.4	22.5	0.0	2.6	7.6	0.0
Cycle Q Clear(g_c), s	16.1	31.4	5.7	37.6	30.3	4.3	16.4	22.5	0.0	2.6	7.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	464	879	585	513	1425	672	217	784		41	431	
V/C Ratio(X)	0.88	0.93	0.17	0.96	0.67	0.13	0.97	0.78		0.81	0.48	
Avail Cap(c_a), veh/h	496	892	591	524	1428	673	217	1045		77	765	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	54.8	46.9	25.7	44.3	30.0	20.7	56.5	46.8	0.0	63.4	52.7	0.0
Incr Delay (d2), s/veh	17.2	16.7	0.3	28.7	1.7	0.2	51.4	6.4	0.0	29.9	3.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	14.6	2.0	18.7	11.6	1.5	9.8	9.8	0.0	1.4	3.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.0	63.6	26.0	73.0	31.7	20.9	107.9	53.2	0.0	93.3	55.8	0.0
LnGrp LOS	E	E	C	E	C	C	F	D		F	E	
Approach Vol, veh/h		1328			1535			823	A		241	A
Approach Delay, s/veh		63.4			44.3			67.1			60.9	
Approach LOS		E			D			E			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	46.1	40.5	21.0	22.9	24.7	61.9	7.2	36.7
Change Period (Y+Rc), s	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	41.0	35.0	17.0	30.0	20.0	56.0	6.0	41.0
Max Q Clear Time (g_c+I1), s	39.6	33.4	18.4	9.6	18.1	32.3	4.6	24.5
Green Ext Time (p_c), s	0.5	1.1	0.0	2.1	0.6	10.3	0.0	6.2

Intersection Summary		
HCM 6th Ctrl Delay		56.5
HCM 6th LOS		E

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰↰	↱	↗		↑↑↱			↑↑↱	
Traffic Volume (veh/h)	0	0	0	378	0	10	0	242	300	0	184	460
Future Volume (veh/h)	0	0	0	378	0	10	0	242	300	0	184	460
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1752	1752	1752	0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h				378	0	10	0	242	300	0	184	460
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				10	10	10	0	10	10	0	10	10
Cap, veh/h				717	0	638	0	1455	677	0	1455	677
Arrive On Green				0.21	0.00	0.21	0.00	0.46	0.46	0.00	0.46	0.46
Sat Flow, veh/h				3337	0	2969	0	3346	1485	0	3346	1485
Grp Volume(v), veh/h				378	0	10	0	242	300	0	184	460
Grp Sat Flow(s),veh/h/ln				1668	0	1485	0	1594	1485	0	1594	1485
Q Serve(g_s), s				2.4	0.0	0.1	0.0	1.1	3.3	0.0	0.8	5.9
Cycle Q Clear(g_c), s				2.4	0.0	0.1	0.0	1.1	3.3	0.0	0.8	5.9
Prop In Lane				1.00		1.00	0.00		1.00	0.00		1.00
Lane Grp Cap(c), veh/h				717	0	638	0	1455	677	0	1455	677
V/C Ratio(X)				0.53	0.00	0.02	0.00	0.17	0.44	0.00	0.13	0.68
Avail Cap(c_a), veh/h				2470	0	2198	0	2491	1160	0	2491	1160
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				8.5	0.0	7.5	0.0	3.9	4.5	0.0	3.8	5.2
Incr Delay (d2), s/veh				0.6	0.0	0.0	0.0	0.1	0.5	0.0	0.0	1.2
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				0.6	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				9.1	0.0	7.5	0.0	3.9	5.0	0.0	3.9	6.4
LnGrp LOS				A	A	A	A	A	A	A	A	A
Approach Vol, veh/h					388			542			644	
Approach Delay, s/veh					9.0			4.5			5.7	
Approach LOS					A			A			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		15.1				15.1		9.2				
Change Period (Y+Rc), s		4.0				4.0		4.0				
Max Green Setting (Gmax), s		19.0				19.0		18.0				
Max Q Clear Time (g_c+I1), s		5.3				7.9		4.4				
Green Ext Time (p_c), s		3.1				3.2		1.2				

Intersection Summary			
HCM 6th Ctrl Delay			6.1
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱					↑↑↑	↱↱		↑↑↱	
Traffic Volume (veh/h)	310	0	354	0	0	0	0	232	652	0	552	10
Future Volume (veh/h)	310	0	354	0	0	0	0	232	652	0	552	10
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	0	1752				0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h	310	0	354				0	232	652	0	552	10
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	10				0	10	10	0	10	10
Cap, veh/h	803	0	649				0	2060	1126	0	2084	38
Arrive On Green	0.25	0.00	0.25				0.00	0.43	0.43	0.00	0.43	0.43
Sat Flow, veh/h	3237	0	2613				0	4940	2613	0	4995	87
Grp Volume(v), veh/h	310	0	354				0	232	652	0	363	199
Grp Sat Flow(s),veh/h/ln	1618	0	1306				0	1594	1306	0	1594	1736
Q Serve(g_s), s	2.0	0.0	2.9				0.0	0.7	4.7	0.0	1.8	1.8
Cycle Q Clear(g_c), s	2.0	0.0	2.9				0.0	0.7	4.7	0.0	1.8	1.8
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.05
Lane Grp Cap(c), veh/h	803	0	649				0	2060	1126	0	1374	748
V/C Ratio(X)	0.39	0.00	0.55				0.00	0.11	0.58	0.00	0.26	0.27
Avail Cap(c_a), veh/h	1298	0	1048				0	4221	2306	0	2814	1532
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	7.8	0.0	8.1				0.0	4.2	5.4	0.0	4.6	4.6
Incr Delay (d2), s/veh	0.3	0.0	0.7				0.0	0.0	0.5	0.0	0.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.0	0.5				0.0	0.1	0.5	0.0	0.1	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	8.1	0.0	8.9				0.0	4.3	5.9	0.0	4.7	4.7
LnGrp LOS	A	A	A				A	A	A	A	A	A
Approach Vol, veh/h		664						884			562	
Approach Delay, s/veh		8.5						5.4			4.7	
Approach LOS		A						A			A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		14.7		10.2		14.7
Change Period (Y+Rc), s		4.0		4.0		4.0
Max Green Setting (Gmax), s		22.0		10.0		22.0
Max Q Clear Time (g_c+I1), s		6.7		4.9		3.8
Green Ext Time (p_c), s		4.0		1.3		3.1

Intersection Summary			
HCM 6th Ctrl Delay			6.2
HCM 6th LOS			A

HCM 6th TWSC
11: Skylark Rd & DWY 1

Cumulative Plus Project Conditions
Timing Plan: AM Peak

Intersection	
Int Delay, s/veh	1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↑↱			↰↑
Traffic Vol, veh/h	5	5	54	3	7	83
Future Vol, veh/h	5	5	54	3	7	83
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	100	100	10	100	100	10
Mvmt Flow	5	5	54	3	7	83

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	153	56	0	0	57	0
Stage 1	56	-	-	-	-	-
Stage 2	97	-	-	-	-	-
Critical Hdwy	7.4	7.2	-	-	5.1	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	-	-	3.1	-
Pot Cap-1 Maneuver	655	792	-	-	1098	-
Stage 1	766	-	-	-	-	-
Stage 2	730	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	650	792	-	-	1098	-
Mov Cap-2 Maneuver	635	-	-	-	-	-
Stage 1	766	-	-	-	-	-
Stage 2	725	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	10.2		0		0.6	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	705	1098	-
HCM Lane V/C Ratio	-	-	0.014	0.006	-
HCM Control Delay (s)	-	-	10.2	8.3	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

12: Skylark Rd & DWY 2

Intersection	
Int Delay, s/veh	2.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	1	8	11	48	83	89
Future Vol, veh/h	1	8	11	48	83	89
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	10	3	3	10
Mvmt Flow	1	8	11	48	83	89

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	290	35	0	0	59	0
Stage 1	35	-	-	-	-	-
Stage 2	255	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	699	1035	-	-	1538	-
Stage 1	985	-	-	-	-	-
Stage 2	785	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	659	1035	-	-	1538	-
Mov Cap-2 Maneuver	661	-	-	-	-	-
Stage 1	985	-	-	-	-	-
Stage 2	740	-	-	-	-	-

Approach	WB		NB		SB	
HCM Control Delay, s	8.7		0		3.6	
HCM LOS	A					

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	974	1538	-
HCM Lane V/C Ratio	-	-	0.009	0.054	-
HCM Control Delay (s)	-	-	8.7	7.5	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0	0.2	-

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	687	142	0	537	0	1
Future Vol, veh/h	687	142	0	537	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	687	142	0	537	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	415
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	499
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	499
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	499	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s)	12.2	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

HCM 6th Signalized Intersection Summary
14: DWY 4/FEMA Driveway & GRANT LINE RD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	15	593	80	91	524	2	6	0	4	1	0	7
Future Volume (veh/h)	15	593	80	91	524	2	6	0	4	1	0	7
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1752	1752	1856	1856	1856	1752	1752	1752
Adj Flow Rate, veh/h	15	593	80	91	524	2	6	0	4	1	0	7
Peak Hour 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
Percent Heavy Veh, %	10	10	10	3	10	10	3	3	3	10	10	10
Cap, veh/h	32	1123	150	136	1092	4	14	0	450	4	0	415
Arrive On Green	0.02	0.26	0.26	0.08	0.32	0.32	0.01	0.00	0.29	0.00	0.00	0.28
Sat Flow, veh/h	1668	4269	569	1767	3401	13	1767	0	1572	1668	0	1485
Grp Volume(v), veh/h	15	441	232	91	256	270	6	0	4	1	0	7
Grp Sat Flow(s),veh/h/ln	1668	1594	1649	1767	1664	1749	1767	0	1572	1668	0	1485
Q Serve(g_s), s	0.4	5.1	5.2	2.2	5.3	5.3	0.1	0.0	0.1	0.0	0.0	0.1
Cycle Q Clear(g_c), s	0.4	5.1	5.2	2.2	5.3	5.3	0.1	0.0	0.1	0.0	0.0	0.1
Prop In Lane	1.00		0.34	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	32	839	434	136	534	562	14	0	450	4	0	415
V/C Ratio(X)	0.47	0.53	0.53	0.67	0.48	0.48	0.42	0.00	0.01	0.26	0.00	0.02
Avail Cap(c_a), veh/h	194	2375	1229	370	1395	1466	206	0	659	194	0	622
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.9	13.5	13.6	19.3	11.7	11.7	21.2	0.0	11.0	21.4	0.0	11.2
Incr Delay (d2), s/veh	10.4	0.5	1.0	5.5	0.7	0.6	18.7	0.0	0.0	31.7	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	1.4	1.5	0.9	1.5	1.5	0.1	0.0	0.0	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	31.3	14.1	14.6	24.8	12.4	12.3	39.9	0.0	11.0	53.1	0.0	11.2
LnGrp LOS	C	B	B	C	B	B	D	A	B	D	A	B
Approach Vol, veh/h		688			617			10			8	
Approach Delay, s/veh		14.6			14.2			28.3			16.5	
Approach LOS		B			B			C			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.1	16.3	7.3	15.3	4.3	16.0	4.8	17.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	18.0	9.0	32.0	5.0	18.0	5.0	36.0
Max Q Clear Time (g_c+I1), s	2.0	2.1	4.2	7.2	2.1	2.1	2.4	7.3
Green Ext Time (p_c), s	0.0	0.0	0.1	4.1	0.0	0.0	0.0	2.9

Intersection Summary			
HCM 6th Ctrl Delay			14.5
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	0

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	572	26	0	617	0	1
Future Vol, veh/h	572	26	0	617	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	572	26	0	617	0	1

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	299
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	592
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	592
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	592	-	-	-
HCM Lane V/C Ratio	0.002	-	-	-
HCM Control Delay (s)	11.1	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-

16: CHRISMAN RD & DWY 6

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑↱	
Traffic Vol, veh/h	0	2	0	623	579	80
Future Vol, veh/h	0	2	0	623	579	80
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	10	10	10	3
Mvmt Flow	0	2	0	623	579	80

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	330	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	566	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	566	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	566	-	-
HCM Lane V/C Ratio	-	0.004	-	-
HCM Control Delay (s)	-	11.4	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					✥		↰↰	↑			↱	
Traffic Volume (veh/h)	0	0	0	180	0	20	781	75	0	0	220	20
Future Volume (veh/h)	0	0	0	180	0	20	781	75	0	0	220	20
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1900	1752	1900	1752	1752	0	0	1752	1752
Adj Flow Rate, veh/h				180	0	20	781	75	0	0	220	20
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				0	10	0	10	10	0	0	10	10
Cap, veh/h				210	0	23	935	1069	0	0	297	27
Arrive On Green				0.14	0.00	0.14	0.29	0.61	0.00	0.00	0.19	0.19
Sat Flow, veh/h				1483	0	165	3237	1752	0	0	1582	144
Grp Volume(v), veh/h				200	0	0	781	75	0	0	0	240
Grp Sat Flow(s),veh/h/ln				1648	0	0	1618	1752	0	0	0	1726
Q Serve(g_s), s				4.4	0.0	0.0	8.3	0.6	0.0	0.0	0.0	4.8
Cycle Q Clear(g_c), s				4.4	0.0	0.0	8.3	0.6	0.0	0.0	0.0	4.8
Prop In Lane				0.90		0.10	1.00		0.00	0.00		0.08
Lane Grp Cap(c), veh/h				234	0	0	935	1069	0	0	0	324
V/C Ratio(X)				0.86	0.00	0.00	0.83	0.07	0.00	0.00	0.00	0.74
Avail Cap(c_a), veh/h				234	0	0	979	1227	0	0	0	456
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh				15.4	0.0	0.0	12.2	2.9	0.0	0.0	0.0	14.1
Incr Delay (d2), s/veh				24.5	0.0	0.0	6.0	0.0	0.0	0.0	0.0	2.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				2.9	0.0	0.0	2.8	0.1	0.0	0.0	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				39.9	0.0	0.0	18.2	2.9	0.0	0.0	0.0	16.1
LnGrp LOS				D	A	A	B	A	A	A	A	B
Approach Vol, veh/h					200			856			240	
Approach Delay, s/veh					39.9			16.8			16.1	
Approach LOS					D			B			B	

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		27.3			15.5	11.8		9.4				
Change Period (Y+Rc), s		4.9			4.9	4.9		4.2				
Max Green Setting (Gmax), s		25.7			11.1	9.7		5.2				
Max Q Clear Time (g_c+I1), s		2.6			10.3	6.8		6.4				
Green Ext Time (p_c), s		0.1			0.3	0.1		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			20.3
HCM 6th LOS			C

HCM 6th Signalized Intersection Summary | Cumulative Plus Project Conditions

2: MACARTHUR DRIVE (N) & I-205 EAST OFF RAMP/I-205 EAST ON RAMP | Timing Plan: PM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱					↑↑	↱	↰	↑↑	
Traffic Volume (veh/h)	20	0	432	0	0	0	0	871	470	100	300	0
Future Volume (veh/h)	20	0	432	0	0	0	0	871	470	100	300	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752				0	1752	1752	1752	1752	0
Adj Flow Rate, veh/h	20	0	432				0	871	470	100	300	0
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	10	10				0	10	10	10	10	0
Cap, veh/h	529	0	470				0	1243	554	126	1732	0
Arrive On Green	0.32	0.00	0.32				0.00	0.37	0.37	0.08	0.52	0.00
Sat Flow, veh/h	1668	0	1485				0	3416	1485	1668	3416	0
Grp Volume(v), veh/h	20	0	432				0	871	470	100	300	0
Grp Sat Flow(s),veh/h/ln	1668	0	1485				0	1664	1485	1668	1664	0
Q Serve(g_s), s	0.5	0.0	15.7				0.0	12.4	16.2	3.3	2.7	0.0
Cycle Q Clear(g_c), s	0.5	0.0	15.7				0.0	12.4	16.2	3.3	2.7	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	529	0	470				0	1243	554	126	1732	0
V/C Ratio(X)	0.04	0.00	0.92				0.00	0.70	0.85	0.80	0.17	0.00
Avail Cap(c_a), veh/h	537	0	478				0	1304	582	209	1959	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	13.2	0.0	18.4				0.0	14.9	16.1	25.4	7.1	0.0
Incr Delay (d2), s/veh	0.0	0.0	22.1				0.0	1.8	11.4	10.8	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	7.4				0.0	4.1	6.2	1.6	0.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	13.2	0.0	40.5				0.0	16.7	27.4	36.3	7.1	0.0
LnGrp LOS	B	A	D				A	B	C	D	A	A
Approach Vol, veh/h		452						1341			400	
Approach Delay, s/veh		39.3						20.4			14.4	
Approach LOS		D						C			B	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	8.2	25.8		21.9		34.0
Change Period (Y+Rc), s	4.0	4.9		* 4.2		4.9
Max Green Setting (Gmax), s	7.8	21.9		* 18		32.9
Max Q Clear Time (g_c+I1), s	5.3	18.2		17.7		4.7
Green Ext Time (p_c), s	0.0	2.7		0.1		2.0

Intersection Summary	
HCM 6th Ctrl Delay	23.2
HCM 6th LOS	C

Notes

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

3: MACARTHUR DRIVE (N) & GRANT LINE RD

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	320	1500	120	56	294	194	110	610	99	172	580	170
Future Volume (veh/h)	320	1500	120	56	294	194	110	610	99	172	580	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	1500	120	56	294	194	110	610	99	172	580	170
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	318	1578	704	79	1110	467	124	799	356	100	765	362
Arrive On Green	0.18	0.45	0.45	0.05	0.31	0.31	0.07	0.24	0.24	0.06	0.23	0.23
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	1500	120	56	294	194	110	610	99	172	580	170
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	18.0	40.9	4.6	3.3	6.2	10.3	6.2	17.0	5.4	6.0	16.2	9.3
Cycle Q Clear(g_c), s	18.0	40.9	4.6	3.3	6.2	10.3	6.2	17.0	5.4	6.0	16.2	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	318	1578	704	79	1110	467	124	799	356	100	765	362
V/C Ratio(X)	1.01	0.95	0.17	0.71	0.26	0.42	0.89	0.76	0.28	1.72	0.76	0.47
Avail Cap(c_a), veh/h	318	1587	708	100	1164	490	124	1082	483	100	1049	496
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.0	26.5	16.5	46.9	25.6	27.0	46.1	35.3	30.9	47.0	35.9	33.2
Incr Delay (d2), s/veh	51.8	12.9	0.2	9.8	0.2	1.0	47.5	3.2	0.7	361.3	3.1	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	18.5	1.7	1.6	2.6	3.7	4.3	7.0	2.0	12.5	6.7	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	92.8	39.5	16.7	56.7	25.8	28.0	93.5	38.5	31.7	408.2	39.0	34.9
LnGrp LOS	F	D	B	E	C	C	F	D	C	F	D	C
Approach Vol, veh/h		1940			544			819			922	
Approach Delay, s/veh		46.9			29.8			45.1			107.1	
Approach LOS		D			C			D			F	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	11.0	29.5	9.7	49.7	12.0	28.5	23.0	36.5
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	6.0	32.5	6.0	45.0	7.0	31.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	8.0	19.0	5.3	42.9	8.2	18.2	20.0	12.3
Green Ext Time (p_c), s	0.0	4.5	0.0	1.8	0.0	4.7	0.0	3.8

Intersection Summary			
HCM 6th Ctrl Delay			57.5
HCM 6th LOS			E

Notes

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

4: ELEVENTH ST. & MACARTHUR DRIVE

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↑	↱	↰	↑↱		↰	↑↱	
Traffic Volume (veh/h)	309	1303	140	46	1025	370	90	530	30	130	192	395
Future Volume (veh/h)	309	1303	140	46	1025	370	90	530	30	130	192	395
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	309	1303	140	46	1025	370	90	530	30	130	192	395
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	10
Cap, veh/h	286	1362	146	57	1024	431	99	819	46	161	493	440
Arrive On Green	0.16	0.42	0.42	0.03	0.29	0.29	0.06	0.26	0.26	0.10	0.30	0.30
Sat Flow, veh/h	1767	3213	344	1668	3526	1485	1767	3202	181	1668	1664	1485
Grp Volume(v), veh/h	309	712	731	46	1025	370	90	275	285	130	192	395
Grp Sat Flow(s),veh/h/ln	1767	1763	1794	1668	1763	1485	1767	1664	1719	1668	1664	1485
Q Serve(g_s), s	14.5	35.0	35.4	2.5	26.0	21.1	4.5	13.2	13.2	6.8	8.2	22.8
Cycle Q Clear(g_c), s	14.5	35.0	35.4	2.5	26.0	21.1	4.5	13.2	13.2	6.8	8.2	22.8
Prop In Lane	1.00		0.19	1.00		1.00	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	286	747	760	57	1024	431	99	425	439	161	493	440
V/C Ratio(X)	1.08	0.95	0.96	0.81	1.00	0.86	0.91	0.65	0.65	0.81	0.39	0.90
Avail Cap(c_a), veh/h	286	747	760	75	1024	431	99	427	442	261	595	531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	37.5	24.9	25.1	43.0	31.8	30.0	42.1	29.7	29.7	39.6	25.1	30.2
Incr Delay (d2), s/veh	76.1	22.2	23.4	38.2	28.5	15.8	63.0	2.6	2.6	9.1	0.2	14.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.1	18.0	18.8	1.6	14.5	9.2	3.7	5.5	5.7	3.2	3.2	9.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	113.6	47.1	48.5	81.2	60.2	45.8	105.0	32.3	32.3	48.7	25.2	44.6
LnGrp LOS	F	D	D	F	F	D	F	C	C	D	C	D
Approach Vol, veh/h		1752			1441			650			717	
Approach Delay, s/veh		59.4			57.2			42.4			40.2	
Approach LOS		E			E			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.0	42.5	9.0	31.0	19.0	30.5	12.7	27.4
Change Period (Y+Rc), s	4.0	4.5	4.0	4.5	4.5	4.5	4.0	4.5
Max Green Setting (Gmax), s	4.0	37.0	5.0	32.0	14.5	26.0	14.0	23.0
Max Q Clear Time (g_c+I1), s	4.5	37.4	6.5	24.8	16.5	28.0	8.8	15.2
Green Ext Time (p_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.2	1.5

Intersection Summary	
HCM 6th Ctrl Delay	53.3
HCM 6th LOS	D

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	21	2072	103	49	612	4	184	0	49	13	0	52
Future Volume (veh/h)	21	2072	103	49	612	4	184	0	49	13	0	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	21	2072	103	49	612	4	184	0	49	13	0	52
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	95	1653	82	66	1678	11	220	0	331	26	0	159
Arrive On Green	0.06	0.51	0.51	0.04	0.49	0.49	0.13	0.00	0.22	0.02	0.00	0.11
Sat Flow, veh/h	1668	3228	159	1668	3390	22	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	21	1060	1115	49	300	316	184	0	49	13	0	52
Grp Sat Flow(s),veh/h/ln	1668	1664	1723	1668	1664	1748	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.1	45.0	45.0	2.6	9.8	9.8	9.5	0.0	2.3	0.7	0.0	2.8
Cycle Q Clear(g_c), s	1.1	45.0	45.0	2.6	9.8	9.8	9.5	0.0	2.3	0.7	0.0	2.8
Prop In Lane	1.00		0.09	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	95	852	883	66	824	865	220	0	331	26	0	159
V/C Ratio(X)	0.22	1.24	1.26	0.74	0.36	0.36	0.84	0.00	0.15	0.50	0.00	0.33
Avail Cap(c_a), veh/h	285	852	883	475	1137	1194	380	0	760	285	0	591
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	39.6	21.4	21.4	41.7	13.7	13.7	37.2	0.0	27.4	42.9	0.0	36.3
Incr Delay (d2), s/veh	0.4	119.3	127.8	5.9	0.1	0.1	3.2	0.0	0.1	5.5	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	42.8	46.4	1.1	3.2	3.4	4.0	0.0	0.8	0.3	0.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.0	140.7	149.2	47.6	13.8	13.8	40.4	0.0	27.5	48.5	0.0	36.8
LnGrp LOS	D	F	F	D	B	B	D	A	C	D	A	D
Approach Vol, veh/h		2196			665			233			65	
Approach Delay, s/veh		144.1			16.3			37.7			39.1	
Approach LOS		F			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	7.5	50.8	5.4	24.2	9.0	49.3	15.6	14.0
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	25.0	45.0	15.0	45.0	15.0	60.0	20.0	35.0
Max Q Clear Time (g_c+I1), s	14.6	47.0	2.7	4.3	3.1	11.8	11.5	4.8
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	2.1	0.2	0.2

Intersection Summary	
HCM 6th Ctrl Delay	107.2
HCM 6th LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	756	1030	248	187	297	25	204	1281	117	25	304	100
Future Volume (veh/h)	756	1030	248	187	297	25	204	1281	117	25	304	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	756	1030	248	187	297	25	204	1281	117	25	304	100
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	674	1180	366	292	428	191	233	1322	590	81	1018	454
Arrive On Green	0.21	0.25	0.25	0.09	0.13	0.13	0.14	0.40	0.40	0.05	0.31	0.31
Sat Flow, veh/h	3237	4782	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	756	1030	248	187	297	25	204	1281	117	25	304	100
Grp Sat Flow(s),veh/h/ln	1618	1594	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	23.0	22.8	16.7	6.2	9.4	1.6	13.2	41.6	5.7	1.6	7.7	5.5
Cycle Q Clear(g_c), s	23.0	22.8	16.7	6.2	9.4	1.6	13.2	41.6	5.7	1.6	7.7	5.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	674	1180	366	292	428	191	233	1322	590	81	1018	454
V/C Ratio(X)	1.12	0.87	0.68	0.64	0.69	0.13	0.87	0.97	0.20	0.31	0.30	0.22
Avail Cap(c_a), veh/h	674	1386	430	293	573	255	348	1326	592	151	1018	454
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	43.7	39.9	37.6	48.5	46.0	42.6	46.5	32.6	21.8	50.7	29.3	28.5
Incr Delay (d2), s/veh	73.0	5.1	2.2	4.6	1.1	0.1	10.8	17.7	0.1	2.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.7	9.1	6.1	2.6	3.8	0.6	6.0	19.0	1.9	0.7	3.0	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	116.7	45.0	39.8	53.1	47.1	42.7	57.3	50.3	21.8	52.9	29.4	28.8
LnGrp LOS	F	D	D	D	D	D	E	D	C	D	C	C
Approach Vol, veh/h		2034			509			1602			429	
Approach Delay, s/veh		71.0			49.1			49.1			30.7	
Approach LOS		E			D			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	33.2	21.4	39.8	29.0	20.2	11.4	49.8
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	32.0	23.0	* 33	23.0	19.0	10.0	44.0
Max Q Clear Time (g_c+I1), s	18.2	24.8	15.2	9.7	25.0	11.4	3.6	43.6
Green Ext Time (p_c), s	0.1	2.4	0.2	2.1	0.0	0.5	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	57.1
HCM 6th LOS	E

Notes

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

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱		↰	↑↑↱		↰	↑↑↑	↱
Traffic Volume (veh/h)	11	28	29	100	10	100	49	1461	60	20	641	10
Future Volume (veh/h)	11	28	29	100	10	100	49	1461	60	20	641	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	11	28	29	100	10	100	49	1461	60	20	641	10
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	47	97	100	185	28	282	126	2072	85	79	1969	611
Arrive On Green	0.03	0.12	0.12	0.11	0.21	0.21	0.08	0.44	0.44	0.05	0.41	0.41
Sat Flow, veh/h	1668	788	816	1668	137	1369	1668	4712	193	1668	4782	1485
Grp Volume(v), veh/h	11	0	57	100	0	110	49	989	532	20	641	10
Grp Sat Flow(s),veh/h/ln	1668	0	1605	1668	0	1505	1668	1594	1717	1668	1594	1485
Q Serve(g_s), s	0.4	0.0	1.9	3.3	0.0	3.6	1.6	14.5	14.5	0.7	5.2	0.2
Cycle Q Clear(g_c), s	0.4	0.0	1.9	3.3	0.0	3.6	1.6	14.5	14.5	0.7	5.2	0.2
Prop In Lane	1.00		0.51	1.00		0.91	1.00		0.11	1.00		1.00
Lane Grp Cap(c), veh/h	47	0	197	185	0	310	126	1402	755	79	1969	611
V/C Ratio(X)	0.24	0.00	0.29	0.54	0.00	0.35	0.39	0.71	0.71	0.25	0.33	0.02
Avail Cap(c_a), veh/h	291	0	1174	291	0	1101	232	1777	957	291	2832	879
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	27.3	0.0	22.9	24.1	0.0	19.5	25.3	13.1	13.1	26.4	11.5	10.0
Incr Delay (d2), s/veh	2.5	0.0	0.8	2.4	0.0	0.7	1.9	0.9	1.7	1.6	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.7	1.3	0.0	1.2	0.6	4.2	4.7	0.3	1.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	23.7	26.6	0.0	20.2	27.2	14.0	14.8	28.0	11.6	10.0
LnGrp LOS	C	A	C	C	A	C	C	B	B	C	B	B
Approach Vol, veh/h		68			210			1570			671	
Approach Delay, s/veh		24.7			23.2			14.7			12.0	
Approach LOS		C			C			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.7	29.2	10.4	11.1	8.3	27.6	5.6	15.8
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	10.0	32.0	10.0	42.0	8.0	34.0	10.0	42.0
Max Q Clear Time (g_c+I1), s	2.7	16.5	5.3	3.9	3.6	7.2	2.4	5.6
Green Ext Time (p_c), s	0.0	8.8	0.1	0.3	0.0	4.5	0.0	0.6

Intersection Summary	
HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

8: CHRISMAN & ELEVENTH ST.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	502	870	90	290	510	46	90	1119	510	23	529	837
Future Volume (veh/h)	502	870	90	290	510	46	90	1119	510	23	529	837
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	502	870	90	290	510	46	90	1119	0	23	529	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	572	918	485	273	874	418	85	1054		32	948	
Arrive On Green	0.18	0.28	0.28	0.16	0.26	0.26	0.05	0.32	0.00	0.02	0.28	0.00
Sat Flow, veh/h	3237	3328	1485	1668	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	502	870	90	290	510	46	90	1119	0	23	529	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1668	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	14.8	25.1	4.3	16.0	13.1	2.2	5.0	31.0	0.0	1.3	13.2	0.0
Cycle Q Clear(g_c), s	14.8	25.1	4.3	16.0	13.1	2.2	5.0	31.0	0.0	1.3	13.2	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	572	918	485	273	874	418	85	1054		32	948	
V/C Ratio(X)	0.88	0.95	0.19	1.06	0.58	0.11	1.06	1.06		0.73	0.56	
Avail Cap(c_a), veh/h	595	918	485	273	874	418	85	1054		68	1020	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	39.3	34.7	23.6	40.9	31.4	26.1	46.4	33.4	0.0	47.7	29.8	0.0
Incr Delay (d2), s/veh	14.8	18.6	0.4	72.2	1.6	0.2	113.5	45.5	0.0	26.7	1.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.8	11.9	1.5	11.6	5.0	0.8	4.7	18.2	0.0	0.8	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.1	53.4	24.0	113.1	33.0	26.3	159.9	78.9	0.0	74.4	31.7	0.0
LnGrp LOS	D	D	C	F	C	C	F	F		E	C	
Approach Vol, veh/h		1462			846			1209	A		552	A
Approach Delay, s/veh		51.8			60.1			85.0			33.4	
Approach LOS		D			E			F			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	22.0	33.0	9.0	33.9	23.3	31.7	5.9	37.0
Change Period (Y+Rc), s	6.0	6.0	4.0	6.0	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	16.0	27.0	5.0	30.0	18.0	25.0	4.0	31.0
Max Q Clear Time (g_c+I1), s	18.0	27.1	7.0	15.2	16.8	15.1	3.3	33.0
Green Ext Time (p_c), s	0.0	0.0	0.0	5.1	0.5	3.2	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	60.9
HCM 6th LOS	E

Notes

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations				↰↰	↱	↱		↑↑↱			↑↑↱	
Traffic Volume (veh/h)	0	0	0	145	0	10	0	2025	452	0	212	520
Future Volume (veh/h)	0	0	0	145	0	10	0	2025	452	0	212	520
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1752	1752	1752	0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h				145	0	10	0	2025	452	0	212	520
Peak Hour Factor				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %				10	10	10	0	10	10	0	10	10
Cap, veh/h				274	0	244	0	2881	621	0	2332	1086
Arrive On Green				0.08	0.00	0.08	0.00	0.73	0.73	0.00	0.73	0.73
Sat Flow, veh/h				3337	0	2969	0	4096	849	0	3346	1485
Grp Volume(v), veh/h				145	0	10	0	1626	851	0	212	520
Grp Sat Flow(s),veh/h/ln				1668	0	1485	0	1594	1599	0	1594	1485
Q Serve(g_s), s				1.8	0.0	0.1	0.0	12.0	13.1	0.0	0.8	6.2
Cycle Q Clear(g_c), s				1.8	0.0	0.1	0.0	12.0	13.1	0.0	0.8	6.2
Prop In Lane				1.00		1.00	0.00		0.53	0.00		1.00
Lane Grp Cap(c), veh/h				274	0	244	0	2332	1170	0	2332	1086
V/C Ratio(X)				0.53	0.00	0.04	0.00	0.70	0.73	0.00	0.09	0.48
Avail Cap(c_a), veh/h				1399	0	1245	0	2525	1266	0	2525	1176
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh				18.9	0.0	18.1	0.0	3.2	3.3	0.0	1.7	2.4
Incr Delay (d2), s/veh				1.6	0.0	0.1	0.0	0.8	2.0	0.0	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	0.0
%ile BackOfQ(50%),veh/ln				0.7	0.0	0.0	0.0	0.8	1.2	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				20.5	0.0	18.2	0.0	3.9	5.3	0.0	1.7	2.7
LnGrp LOS				C	A	B	A	A	A	A	A	A
Approach Vol, veh/h					155			2477			732	
Approach Delay, s/veh					20.3			4.4			2.4	
Approach LOS					C			A			A	

Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		35.4				35.4		7.5				
Change Period (Y+Rc), s		4.0				4.0		4.0				
Max Green Setting (Gmax), s		34.0				34.0		18.0				
Max Q Clear Time (g_c+I1), s		15.1				8.2		3.8				
Green Ext Time (p_c), s		16.3				5.2		0.4				

Intersection Summary			
HCM 6th Ctrl Delay			4.7
HCM 6th LOS			A

Notes

User approved volume balancing among the lanes for turning movement.

10: Chrisman Rd & I-205 EB Off Ramp/I-205 EB On Ramp

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰		↱↱					↑↑↑	↱↱		↑↑↱	
Traffic Volume (veh/h)	910	0	394	0	0	0	0	1566	1147	0	347	10
Future Volume (veh/h)	910	0	394	0	0	0	0	1566	1147	0	347	10
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1752	0	1752				0	1752	1752	0	1752	1752
Adj Flow Rate, veh/h	910	0	394				0	1566	1147	0	347	10
Peak Hour Factor	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	10	0	10				0	10	10	0	10	10
Cap, veh/h	1093	0	882				0	2193	1198	0	2191	63
Arrive On Green	0.34	0.00	0.34				0.00	0.46	0.46	0.00	0.46	0.46
Sat Flow, veh/h	3237	0	2613				0	4940	2613	0	4936	137
Grp Volume(v), veh/h	910	0	394				0	1566	1147	0	231	126
Grp Sat Flow(s),veh/h/ln	1618	0	1306				0	1594	1306	0	1594	1727
Q Serve(g_s), s	10.2	0.0	4.6				0.0	10.4	16.6	0.0	1.7	1.7
Cycle Q Clear(g_c), s	10.2	0.0	4.6				0.0	10.4	16.6	0.0	1.7	1.7
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.08
Lane Grp Cap(c), veh/h	1093	0	882				0	2193	1198	0	1462	792
V/C Ratio(X)	0.83	0.00	0.45				0.00	0.71	0.96	0.00	0.16	0.16
Avail Cap(c_a), veh/h	1154	0	932				0	2193	1198	0	1462	792
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	1.00	0.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	0.0	10.1				0.0	8.6	10.3	0.0	6.2	6.2
Incr Delay (d2), s/veh	5.1	0.0	0.4				0.0	1.1	16.8	0.0	0.0	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.5	0.0	1.0				0.0	2.6	5.9	0.0	0.3	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	17.1	0.0	10.5				0.0	9.7	27.1	0.0	6.3	6.3
LnGrp LOS	B	A	B				A	A	C	A	A	A
Approach Vol, veh/h		1304						2713			357	
Approach Delay, s/veh		15.1						17.0			6.3	
Approach LOS		B						B			A	

Timer - Assigned Phs		2		4		6						
Phs Duration (G+Y+Rc), s		22.0		17.3		22.0						
Change Period (Y+Rc), s		4.0		4.0		4.0						
Max Green Setting (Gmax), s		18.0		14.0		18.0						
Max Q Clear Time (g_c+I1), s		18.6		12.2		3.7						
Green Ext Time (p_c), s		0.0		1.1		1.7						

Intersection Summary			
HCM 6th Ctrl Delay			15.6
HCM 6th LOS			B

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱		↱			↰
Traffic Vol, veh/h	4	4	102	3	5	92
Future Vol, veh/h	4	4	102	3	5	92
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	100	100	10	100	100	10
Mvmt Flow	4	4	102	3	5	92

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	206	104	0	0	105	0
Stage 1	104	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	7.4	7.2	-	-	5.1	-
Critical Hdwy Stg 1	6.4	-	-	-	-	-
Critical Hdwy Stg 2	6.4	-	-	-	-	-
Follow-up Hdwy	4.4	4.2	-	-	3.1	-
Pot Cap-1 Maneuver	606	739	-	-	1047	-
Stage 1	724	-	-	-	-	-
Stage 2	726	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	603	739	-	-	1047	-
Mov Cap-2 Maneuver	605	-	-	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	722	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	0.4
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	665	1047	-
HCM Lane V/C Ratio	-	-	0.012	0.005	-
HCM Control Delay (s)	-	-	10.5	8.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0	-

Intersection	
Int Delay, s/veh	5.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		↱			↰
Traffic Vol, veh/h	16	169	63	43	73	81
Future Vol, veh/h	16	169	63	43	73	81
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	10	3	3	10
Mvmt Flow	16	169	63	43	73	81

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	312	85	0	0	106	0
Stage 1	85	-	-	-	-	-
Stage 2	227	-	-	-	-	-
Critical Hdwy	6.43	6.23	-	-	4.13	-
Critical Hdwy Stg 1	5.43	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.527	3.327	-	-	2.227	-
Pot Cap-1 Maneuver	679	971	-	-	1479	-
Stage 1	936	-	-	-	-	-
Stage 2	808	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	644	971	-	-	1479	-
Mov Cap-2 Maneuver	666	-	-	-	-	-
Stage 1	936	-	-	-	-	-
Stage 2	766	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.8	0	3.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	934	1479	-
HCM Lane V/C Ratio	-	-	0.198	0.049	-
HCM Control Delay (s)	-	-	9.8	7.6	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.2	-

HCM 6th TWSC
13: DWY 3 & GRANT LINE RD

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	2006	125	0	665	0	16
Future Vol, veh/h	2006	125	0	665	0	16
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	100	100	100	100	100	100
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	2006	125	0	665	0	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1066
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	186
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	186
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	26.2
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	186	-	-	-
HCM Lane V/C Ratio	0.086	-	-	-
HCM Control Delay (s)	26.2	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

14: DWY 4/FEMA Driveway & GRANT LINE RD

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	8	1943	70	81	519	1	129	0	81	3	0	17
Future Volume (veh/h)	8	1943	70	81	519	1	129	0	81	3	0	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1856	1752	1752	1856	1856	1856	1752	1752	1752
Adj Flow Rate, veh/h	8	1943	70	81	519	1	129	0	81	3	0	17
Peak Hour 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
Percent Heavy Veh, %	10	10	10	3	10	10	3	3	3	10	10	10
Cap, veh/h	17	2350	85	104	1856	4	162	0	359	7	0	208
Arrive On Green	0.01	0.50	0.50	0.06	0.54	0.54	0.09	0.00	0.23	0.00	0.00	0.14
Sat Flow, veh/h	1668	4739	170	1767	3408	7	1767	0	1572	1668	0	1485
Grp Volume(v), veh/h	8	1306	707	81	253	267	129	0	81	3	0	17
Grp Sat Flow(s),veh/h/ln	1668	1594	1721	1767	1664	1751	1767	0	1572	1668	0	1485
Q Serve(g_s), s	0.4	26.3	26.4	3.4	6.1	6.1	5.4	0.0	3.1	0.1	0.0	0.7
Cycle Q Clear(g_c), s	0.4	26.3	26.4	3.4	6.1	6.1	5.4	0.0	3.1	0.1	0.0	0.7
Prop In Lane	1.00		0.10	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	17	1581	854	104	906	953	162	0	359	7	0	208
V/C Ratio(X)	0.47	0.83	0.83	0.78	0.28	0.28	0.80	0.00	0.23	0.45	0.00	0.08
Avail Cap(c_a), veh/h	111	1699	917	141	909	956	188	0	482	111	0	396
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	36.9	16.1	16.2	34.8	9.2	9.2	33.4	0.0	23.6	37.3	0.0	28.0
Incr Delay (d2), s/veh	18.6	3.3	6.0	17.4	0.2	0.2	18.3	0.0	0.3	39.9	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	8.4	9.8	1.9	1.8	1.9	3.1	0.0	1.2	0.1	0.0	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.6	19.5	22.2	52.3	9.4	9.3	51.7	0.0	23.9	77.2	0.0	28.2
LnGrp LOS	E	B	C	D	A	A	D	A	C	E	A	C
Approach Vol, veh/h		2021			601			210			20	
Approach Delay, s/veh		20.6			15.1			40.9			35.6	
Approach LOS		C			B			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	4.3	21.1	8.4	41.2	10.9	14.5	4.8	44.9
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	23.0	6.0	40.0	8.0	20.0	5.0	41.0
Max Q Clear Time (g_c+I1), s	2.1	5.1	5.4	28.4	7.4	2.7	2.4	8.1
Green Ext Time (p_c), s	0.0	0.3	0.0	8.9	0.0	0.0	0.0	2.9

Intersection Summary			
HCM 6th Ctrl Delay			21.0
HCM 6th LOS			C

Intersection	
Int Delay, s/veh	0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↑↑		↱
Traffic Vol, veh/h	2003	23	0	601	0	31
Future Vol, veh/h	2003	23	0	601	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	100	100	100	100	100	100
Heavy Vehicles, %	10	3	10	10	3	3
Mvmt Flow	2003	23	0	601	0	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	-	-	-	1013
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.16
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.93
Pot Cap-1 Maneuver	-	-	0	-	0	202
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	202
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	26
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	202	-	-	-
HCM Lane V/C Ratio	0.153	-	-	-
HCM Control Delay (s)	26	-	-	-
HCM Lane LOS	D	-	-	-
HCM 95th %tile Q(veh)	0.5	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↱		↑↑↑	↑↑↱	
Traffic Vol, veh/h	0	51	0	1602	668	71
Future Vol, veh/h	0	51	0	1602	668	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	3	3	10	10	10	3
Mvmt Flow	0	51	0	1602	668	71

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	370	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	7.16	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.93	-	-	-	-
Pot Cap-1 Maneuver	0	533	0	-	-	-
Stage 1	0	-	0	-	-	-
Stage 2	0	-	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	533	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB		NB		SB	
HCM Control Delay, s	12.5		0		0	
HCM LOS	B					

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	533	-	-
HCM Lane V/C Ratio	-	0.096	-	-
HCM Control Delay (s)	-	12.5	-	-
HCM Lane LOS	-	B	-	-
HCM 95th %tile Q(veh)	-	0.3	-	-

A10. Cumulative Plus Project with Improvements Synchro Outputs

HCM 6th Signalized Intersection Summary Cumulative Plus Project Conditions (Improvement)
3: MACARTHUR DRIVE (N) & GRANT LINE RD
Timing Plan: AM Peak

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	300	356	80	52	301	67	80	520	84	256	400	250
Future Volume (veh/h)	300	356	80	52	301	67	80	520	84	256	400	250
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	300	356	80	52	301	67	80	520	84	256	400	250
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	339	998	445	87	505	213	112	755	337	292	1128	533
Arrive On Green	0.19	0.28	0.28	0.05	0.14	0.14	0.06	0.23	0.23	0.18	0.34	0.34
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	300	356	80	52	301	67	80	520	84	256	400	250
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	12.9	6.3	3.0	2.4	6.2	3.2	3.5	11.2	3.6	11.7	7.0	9.8
Cycle Q Clear(g_c), s	12.9	6.3	3.0	2.4	6.2	3.2	3.5	11.2	3.6	11.7	7.0	9.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	339	998	445	87	505	213	112	755	337	292	1128	533
V/C Ratio(X)	0.88	0.36	0.18	0.60	0.60	0.32	0.72	0.69	0.25	0.88	0.35	0.47
Avail Cap(c_a), veh/h	408	1898	846	192	1491	628	272	1386	618	342	1557	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.7	22.3	21.1	36.2	31.3	30.0	35.9	27.6	24.7	31.4	19.4	20.3
Incr Delay (d2), s/veh	16.0	0.4	0.3	2.5	1.9	1.4	3.2	1.9	0.7	17.7	0.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.6	2.5	1.1	1.0	2.7	1.2	1.5	4.3	1.3	5.8	2.5	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	22.7	21.5	38.7	33.2	31.4	39.0	29.6	25.4	49.0	19.7	21.4
LnGrp LOS	D	C	C	D	C	C	D	C	C	D	B	C
Approach Vol, veh/h		736			420			684			906	
Approach Delay, s/veh		32.3			33.6			30.1			28.5	
Approach LOS		C			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	18.7	23.2	9.1	27.1	9.9	31.9	20.0	16.2
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	16.0	32.5	9.0	42.0	12.0	36.5	18.0	33.0
Max Q Clear Time (g_c+I1), s	13.7	13.2	4.4	8.3	5.5	11.8	14.9	8.2
Green Ext Time (p_c), s	0.1	4.5	0.0	3.6	0.0	5.3	0.1	2.9

Intersection Summary			
HCM 6th Ctrl Delay			30.7
HCM 6th LOS			C

Notes

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

HCM 6th Signalized Intersection Summary Cumulative Plus Project Conditions (Improvement)
8: CHRISMAN & ELEVENTH ST.

Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	408	820	100	490	960	85	210	613	630	33	208	460
Future Volume (veh/h)	408	820	100	490	960	85	210	613	630	33	208	460
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	408	820	100	490	960	85	210	613	0	33	208	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	494	1074	714	652	1236	587	265	836		40	327	
Arrive On Green	0.15	0.32	0.32	0.20	0.37	0.37	0.16	0.25	0.00	0.02	0.10	0.00
Sat Flow, veh/h	3237	3328	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	408	820	100	490	960	85	210	613	0	33	208	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	13.4	24.3	2.0	15.6	27.9	2.0	13.3	18.5	0.0	2.2	6.6	0.0
Cycle Q Clear(g_c), s	13.4	24.3	2.0	15.6	27.9	2.0	13.3	18.5	0.0	2.2	6.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	494	1074	714	652	1236	587	265	836		40	327	
V/C Ratio(X)	0.83	0.76	0.14	0.75	0.78	0.14	0.79	0.73		0.82	0.64	
Avail Cap(c_a), veh/h	591	1074	714	1211	1701	795	265	1246		91	911	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	45.0	33.4	5.2	41.2	30.4	7.9	44.4	37.7	0.0	53.2	47.5	0.0
Incr Delay (d2), s/veh	10.2	3.9	0.2	3.7	2.6	0.2	15.2	4.5	0.0	31.8	7.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	9.9	0.8	6.2	10.6	0.8	6.4	7.7	0.0	1.3	3.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.1	37.3	5.4	44.9	33.1	8.2	59.5	42.1	0.0	85.1	54.7	0.0
LnGrp LOS	E	D	A	D	C	A	E	D		F	D	
Approach Vol, veh/h		1328			1535			823	A		241	A
Approach Delay, s/veh		40.4			35.5			46.6			58.9	
Approach LOS		D			D			D			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	28.1	41.3	23.4	16.8	22.7	46.7	6.6	33.5
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	41.0	35.0	17.0	* 30	20.0	56.0	6.0	41.0
Max Q Clear Time (g_c+I1), s	17.6	26.3	15.3	8.6	15.4	29.9	4.2	20.5
Green Ext Time (p_c), s	4.5	4.8	0.1	2.2	1.3	10.7	0.0	7.0

Intersection Summary			
HCM 6th Ctrl Delay			40.9
HCM 6th LOS			D

Notes

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

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	320	1500	120	56	294	194	110	610	99	172	580	170
Future Volume (veh/h)	320	1500	120	56	294	194	110	610	99	172	580	170
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1752	1856	1752	1856	1752	1752	1752	1752	1856
Adj Flow Rate, veh/h	320	1500	120	56	294	194	110	610	99	172	580	170
Peak Hour 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
Percent Heavy Veh, %	3	3	3	10	3	10	3	10	10	10	10	3
Cap, veh/h	346	1543	688	74	1009	425	136	757	338	179	859	406
Arrive On Green	0.20	0.44	0.44	0.04	0.29	0.29	0.08	0.23	0.23	0.11	0.26	0.26
Sat Flow, veh/h	1767	3526	1572	1668	3526	1485	1767	3328	1485	1668	3328	1572
Grp Volume(v), veh/h	320	1500	120	56	294	194	110	610	99	172	580	170
Grp Sat Flow(s),veh/h/ln	1767	1763	1572	1668	1763	1485	1767	1664	1485	1668	1664	1572
Q Serve(g_s), s	19.9	46.6	5.2	3.7	7.3	12.0	6.9	19.4	6.2	11.5	17.5	10.1
Cycle Q Clear(g_c), s	19.9	46.6	5.2	3.7	7.3	12.0	6.9	19.4	6.2	11.5	17.5	10.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	346	1543	688	74	1009	425	136	757	338	179	859	406
V/C Ratio(X)	0.93	0.97	0.17	0.76	0.29	0.46	0.81	0.81	0.29	0.96	0.68	0.42
Avail Cap(c_a), veh/h	348	1545	689	90	1040	438	174	967	431	179	997	471
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.2	30.8	19.1	52.9	31.1	32.8	50.8	40.9	35.8	49.7	37.3	34.5
Incr Delay (d2), s/veh	29.3	16.7	0.2	20.2	0.3	1.3	15.7	5.0	0.8	55.3	2.0	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.3	22.0	1.9	2.0	3.1	4.5	3.6	8.2	2.3	7.4	7.2	4.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	47.5	19.3	73.0	31.4	34.1	66.5	45.9	36.6	105.0	39.3	35.7
LnGrp LOS	E	D	B	E	C	C	E	D	D	F	D	D
Approach Vol, veh/h		1940			544			819			922	
Approach Delay, s/veh		50.1			36.6			47.5			50.9	
Approach LOS		D			D			D			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.0	30.9	9.9	54.0	13.6	34.4	26.9	37.0
Change Period (Y+Rc), s	5.0	5.5	5.0	5.0	5.0	5.5	5.0	5.0
Max Green Setting (Gmax), s	12.0	32.5	6.0	49.0	11.0	33.5	22.0	33.0
Max Q Clear Time (g_c+I1), s	13.5	21.4	5.7	48.6	8.9	19.5	21.9	14.0
Green Ext Time (p_c), s	0.0	4.0	0.0	0.4	0.0	4.9	0.0	3.7

Intersection Summary	
HCM 6th Ctrl Delay	48.0
HCM 6th LOS	D

Notes

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱		↰	↑↱		↰	↱		↰	↱	
Traffic Volume (veh/h)	21	2072	103	49	612	4	184	0	49	13	0	52
Future Volume (veh/h)	21	2072	103	49	612	4	184	0	49	13	0	52
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	21	2072	103	49	612	4	184	0	49	13	0	52
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	67	2040	101	62	2131	14	174	0	251	24	0	117
Arrive On Green	0.04	0.63	0.63	0.04	0.63	0.63	0.10	0.00	0.17	0.01	0.00	0.08
Sat Flow, veh/h	1668	3228	159	1668	3390	22	1668	0	1485	1668	0	1485
Grp Volume(v), veh/h	21	1060	1115	49	300	316	184	0	49	13	0	52
Grp Sat Flow(s),veh/h/ln	1668	1664	1723	1668	1664	1748	1668	0	1485	1668	0	1485
Q Serve(g_s), s	1.5	78.6	78.6	3.6	10.2	10.2	13.0	0.0	3.5	1.0	0.0	4.2
Cycle Q Clear(g_c), s	1.5	78.6	78.6	3.6	10.2	10.2	13.0	0.0	3.5	1.0	0.0	4.2
Prop In Lane	1.00		0.09	1.00		0.01	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	67	1052	1089	62	1046	1099	174	0	251	24	0	117
V/C Ratio(X)	0.31	1.01	1.02	0.80	0.29	0.29	1.06	0.00	0.20	0.54	0.00	0.44
Avail Cap(c_a), veh/h	80	1052	1089	67	1046	1099	174	0	454	67	0	358
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	58.0	22.9	22.9	59.4	10.5	10.5	55.7	0.0	44.4	60.9	0.0	54.7
Incr Delay (d2), s/veh	1.0	29.6	33.6	40.1	0.1	0.1	83.6	0.0	0.1	6.7	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	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	34.8	37.3	2.2	3.4	3.6	9.5	0.0	1.3	0.5	0.0	1.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.0	52.5	56.5	99.5	10.5	10.5	139.3	0.0	44.6	67.5	0.0	55.7
LnGrp LOS	E	F	F	F	B	B	F	A	D	E	A	E
Approach Vol, veh/h		2196			665			233			65	
Approach Delay, s/veh		54.6			17.1			119.4			58.0	
Approach LOS		D			B			F			E	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.6	84.4	5.8	25.6	9.0	84.0	17.0	14.4
Change Period (Y+Rc), s	4.0	5.8	4.0	4.6	4.0	5.8	4.0	4.6
Max Green Setting (Gmax), s	5.0	78.6	5.0	38.0	6.0	77.6	13.0	30.0
Max Q Clear Time (g_c+I1), s	5.6	80.6	3.0	5.5	3.5	12.2	15.0	6.2
Green Ext Time (p_c), s	0.0	0.0	0.0	0.2	0.0	2.1	0.0	0.1

Intersection Summary	
HCM 6th Ctrl Delay	51.6
HCM 6th LOS	D

HCM 6th Signalized Intersection Summary Cumulative Plus Project Conditions (Improvement)

6: CHRISMAN RD & GRANT LINE RD

Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	756	1030	248	187	297	25	204	1281	117	25	304	100
Future Volume (veh/h)	756	1030	248	187	297	25	204	1281	117	25	304	100
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	756	1030	248	187	297	25	204	1281	117	25	304	100
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	790	1282	398	272	359	160	232	1327	592	79	1022	456
Arrive On Green	0.24	0.27	0.27	0.08	0.11	0.11	0.14	0.40	0.40	0.05	0.31	0.31
Sat Flow, veh/h	3237	4782	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	756	1030	248	187	297	25	204	1281	117	25	304	100
Grp Sat Flow(s),veh/h/ln	1618	1594	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	27.4	23.9	17.4	6.7	10.4	1.8	14.2	44.7	6.1	1.7	8.3	5.9
Cycle Q Clear(g_c), s	27.4	23.9	17.4	6.7	10.4	1.8	14.2	44.7	6.1	1.7	8.3	5.9
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	790	1282	398	272	359	160	232	1327	592	79	1022	456
V/C Ratio(X)	0.96	0.80	0.62	0.69	0.83	0.16	0.88	0.97	0.20	0.32	0.30	0.22
Avail Cap(c_a), veh/h	790	1530	475	272	532	237	365	1345	600	140	1022	456
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.3	40.6	38.2	52.9	51.9	48.1	50.2	34.9	23.3	54.7	31.4	30.6
Incr Delay (d2), s/veh	21.9	2.2	0.9	7.1	4.2	0.2	9.1	16.7	0.1	2.3	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	12.9	9.3	6.3	2.9	4.4	0.7	6.4	20.3	2.1	0.8	3.3	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.2	42.8	39.1	60.0	56.1	48.2	59.3	51.6	23.4	57.0	31.6	30.8
LnGrp LOS	E	D	D	E	E	D	E	D	C	E	C	C
Approach Vol, veh/h		2034			509			1602			429	
Approach Delay, s/veh		51.0			57.2			50.5			32.9	
Approach LOS		D			E			D			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	16.0	37.8	22.5	42.5	35.0	18.8	11.6	53.4
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	6.0	6.0
Max Green Setting (Gmax), s	10.0	38.0	26.0	* 34	29.0	19.0	10.0	48.0
Max Q Clear Time (g_c+I1), s	8.7	25.9	16.2	10.3	29.4	12.4	3.7	46.7
Green Ext Time (p_c), s	0.1	3.1	0.3	2.1	0.0	0.4	0.0	0.7

Intersection Summary			
HCM 6th Ctrl Delay			49.8
HCM 6th LOS			D

Notes

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

HCM 6th Signalized Intersection Summary Cumulative Plus Project Conditions (Improvement)
8: CHRISMAN & ELEVENTH ST.
Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑	↱	↰↰	↑↑	↱	↰	↑↑	↱	↰	↑↑	↱
Traffic Volume (veh/h)	502	870	90	290	510	46	90	1119	510	23	529	837
Future Volume (veh/h)	502	870	90	290	510	46	90	1119	510	23	529	837
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752	1752
Adj Flow Rate, veh/h	502	870	90	290	510	46	90	1119	0	23	529	0
Peak Hour 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
Percent Heavy Veh, %	10	10	10	10	10	10	10	10	10	10	10	10
Cap, veh/h	669	955	590	388	666	326	184	1117		32	742	
Arrive On Green	0.21	0.29	0.29	0.12	0.20	0.20	0.11	0.34	0.00	0.02	0.22	0.00
Sat Flow, veh/h	3237	3328	1485	3237	3328	1485	1668	3328	1485	1668	3328	1485
Grp Volume(v), veh/h	502	870	90	290	510	46	90	1119	0	23	529	0
Grp Sat Flow(s),veh/h/ln	1618	1664	1485	1618	1664	1485	1668	1664	1485	1668	1664	1485
Q Serve(g_s), s	13.5	23.3	1.1	8.0	13.4	1.2	4.7	31.0	0.0	1.3	13.6	0.0
Cycle Q Clear(g_c), s	13.5	23.3	1.1	8.0	13.4	1.2	4.7	31.0	0.0	1.3	13.6	0.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	669	955	590	388	666	326	184	1117		32	742	
V/C Ratio(X)	0.75	0.91	0.15	0.75	0.77	0.14	0.49	1.00		0.71	0.71	
Avail Cap(c_a), veh/h	669	973	598	561	901	431	184	1117		72	1081	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	34.4	31.8	5.8	39.3	34.9	11.2	38.6	30.7	0.0	45.0	33.1	0.0
Incr Delay (d2), s/veh	5.7	13.0	0.3	6.2	4.5	0.4	2.0	27.3	0.0	25.2	4.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	10.4	0.5	3.3	5.4	0.5	1.9	15.6	0.0	0.7	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	40.1	44.8	6.0	45.5	39.4	11.6	40.6	58.0	0.0	70.3	37.7	0.0
LnGrp LOS	D	D	A	D	D	B	D	F		E	D	
Approach Vol, veh/h		1462			846			1209	A		552	A
Approach Delay, s/veh		40.8			40.0			56.7			39.1	
Approach LOS		D			D			E			D	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	17.1	32.5	16.2	26.6	25.1	24.5	5.8	37.0
Change Period (Y+Rc), s	6.0	6.0	6.0	* 6	6.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	16.0	27.0	5.0	* 30	18.0	25.0	4.0	31.0
Max Q Clear Time (g_c+I1), s	10.0	25.3	6.7	15.6	15.5	15.4	3.3	33.0
Green Ext Time (p_c), s	1.1	1.2	0.0	5.0	1.0	3.1	0.0	0.0

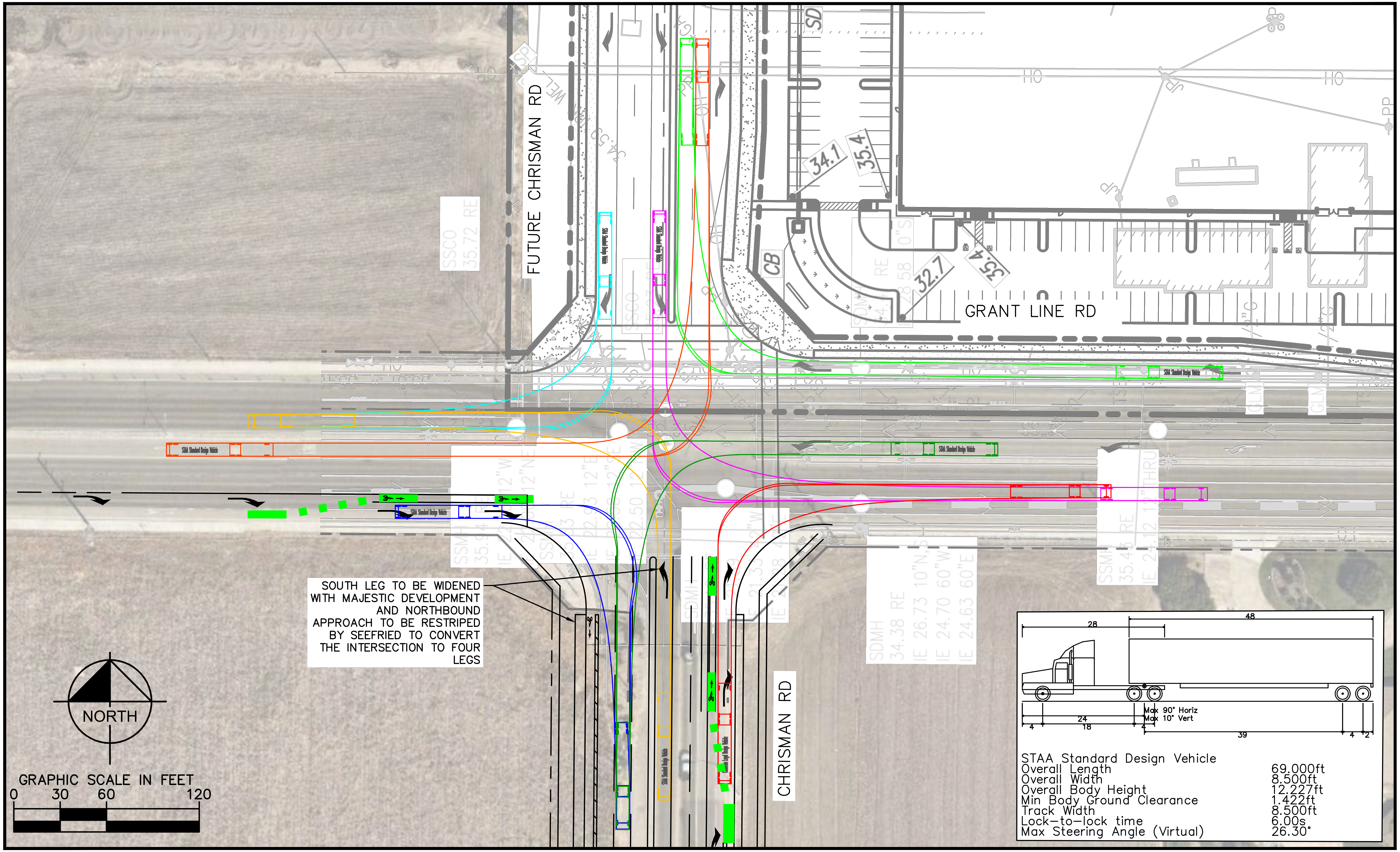
Intersection Summary	
HCM 6th Ctrl Delay	45.1
HCM 6th LOS	D

Notes

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

Unsignalized Delay for [NBR, SBR] is excluded from calculations of the approach delay and intersection delay.

B1. NEI Truck Route Study Turning Templates



SOUTH LEG TO BE WIDENED WITH MAJESTIC DEVELOPMENT AND NORTHBOUND APPROACH TO BE RESTRIPED BY SEEFRIED TO CONVERT THE INTERSECTION TO FOUR LEGS

STAA Standard Design Vehicle

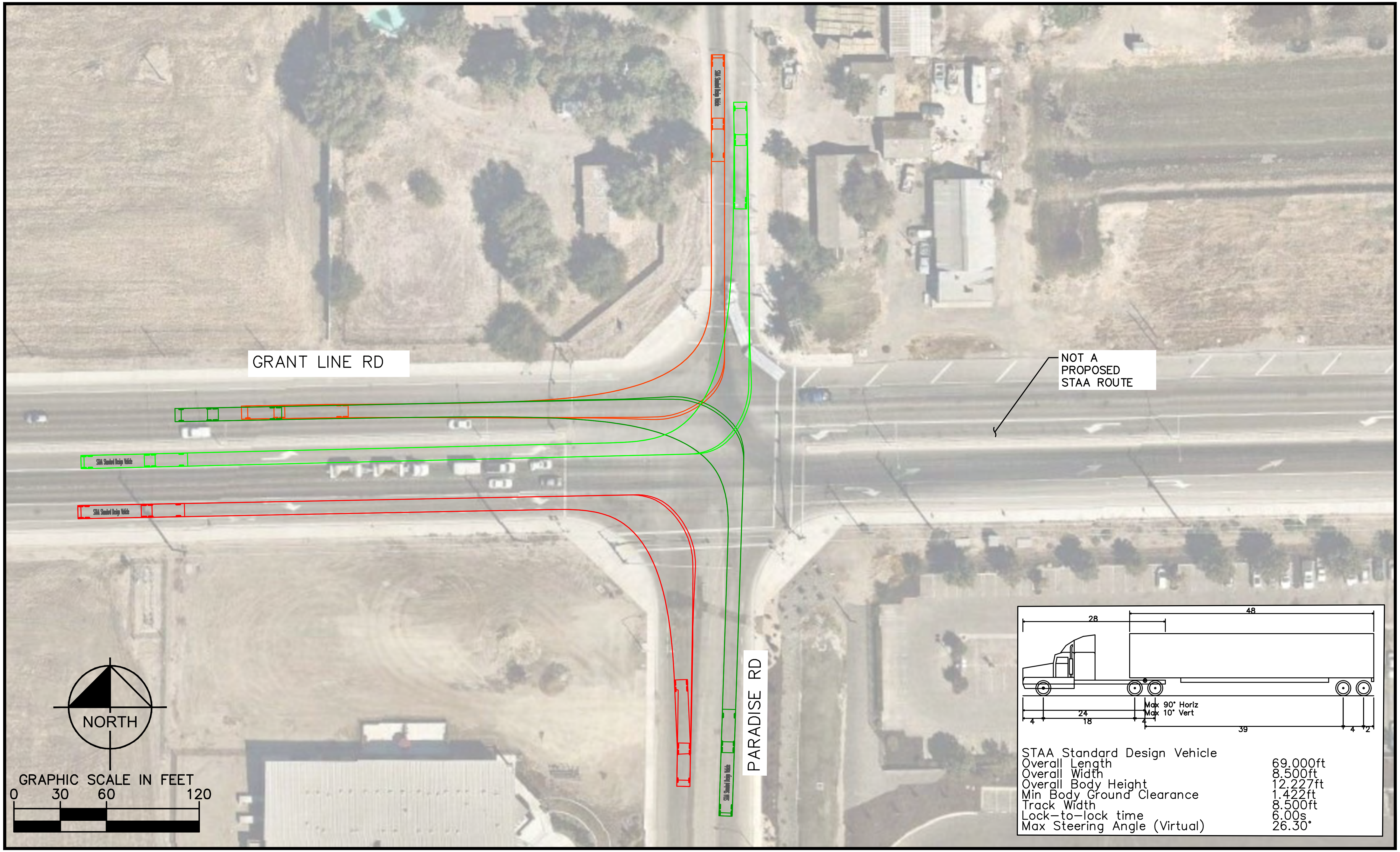
Overall Length	69.000ft
Overall Width	8.500ft
Overall Body Height	12.227ft
Min Body Ground Clearance	1.422ft
Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	26.30°

Kimley»Horn

November 2019

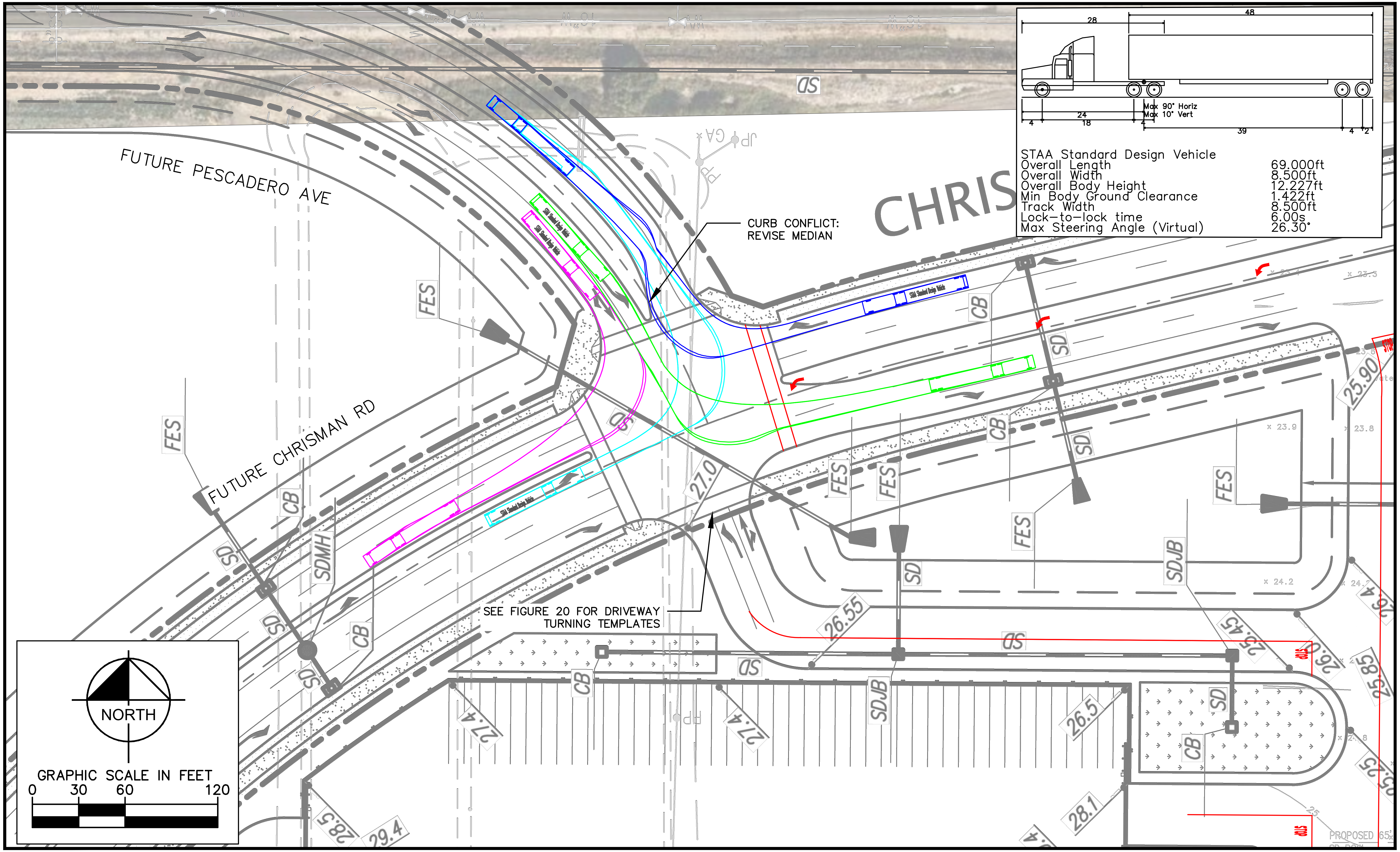
Figure 26 - Interim & Ultimate Truck Routes
(Grant Line Rd & Chrisman Rd)

Seefried Properties



STAA Standard Design Vehicle	
Overall Length	69.000ft
Overall Width	8.500ft
Overall Body Height	12.227ft
Min Body Ground Clearance	1.422ft
Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	26.30°

Figure 27 - Interim & Ultimate Truck Routes
(Grant Line Rd & Paradise Rd)



STAA Standard Design Vehicle

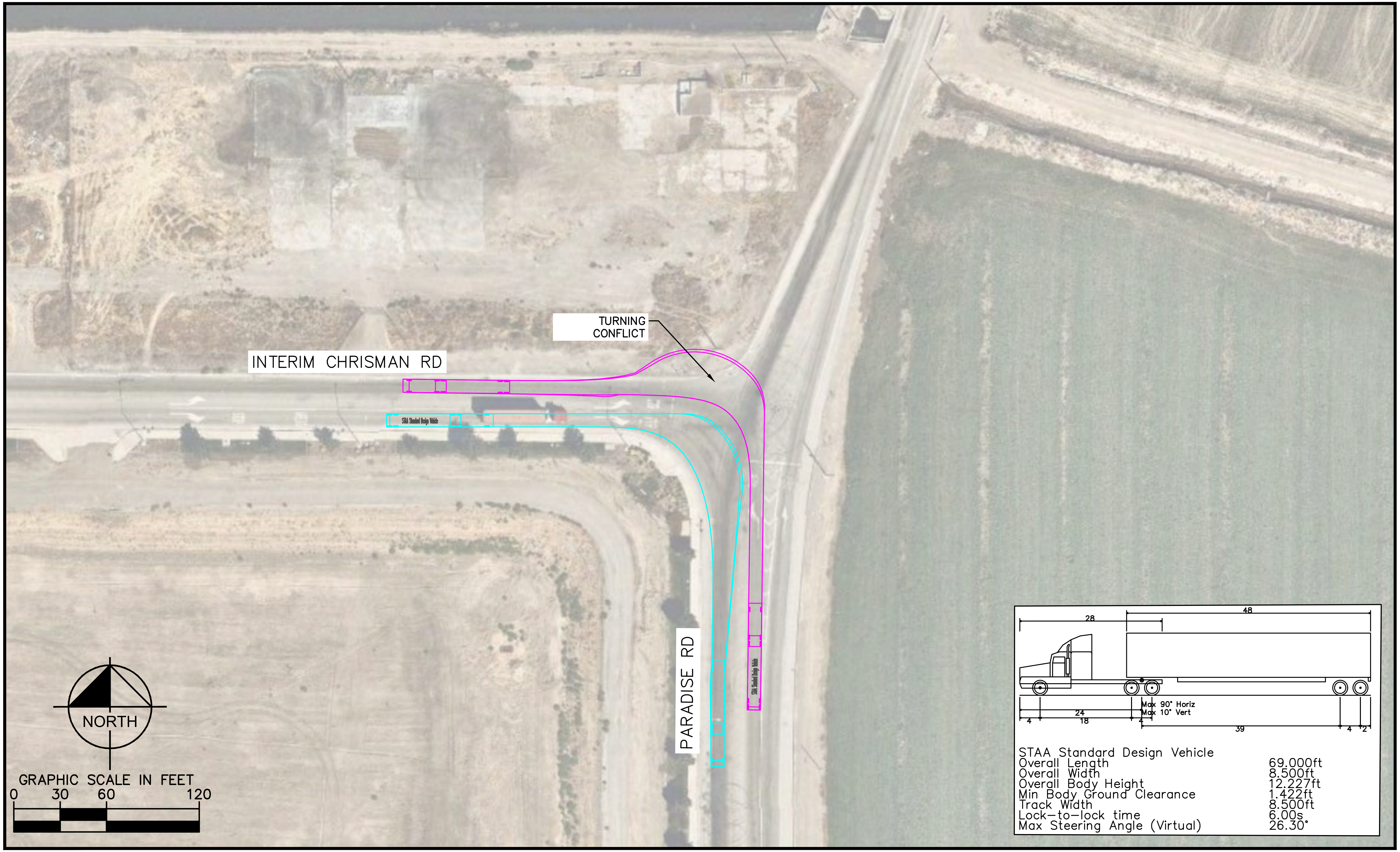
Overall Length	69.000ft
Overall Width	8.500ft
Overall Body Height	12.227ft
Min Body Ground Clearance	1.422ft
Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	26.30°

Kimley»Horn

November 2019

Figure 28 - Interim & Ultimate Truck Routes
(Future Chrisman & Future Pescadero)

Seefried Properties

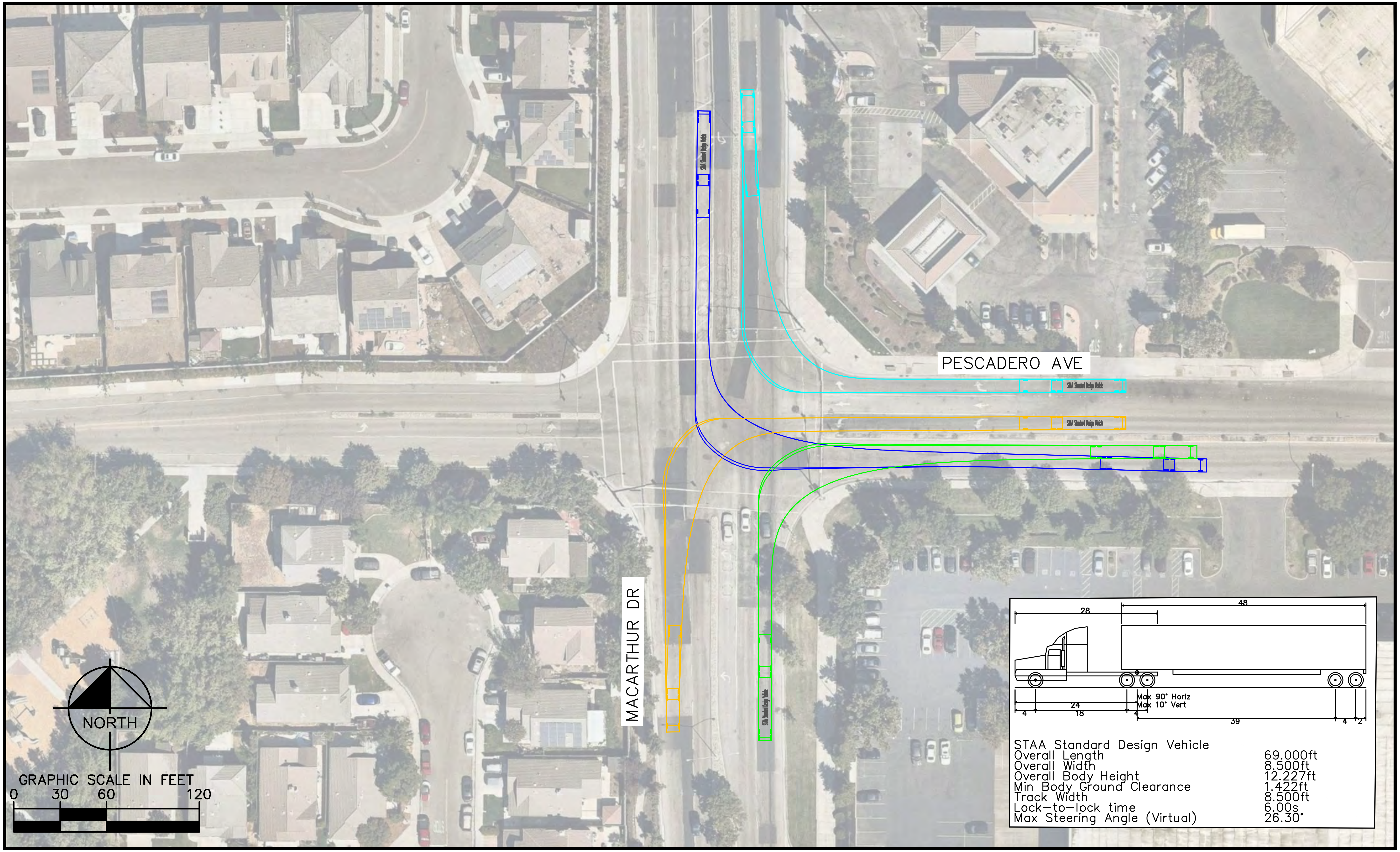


Kimley»Horn

Figure 29 - Interim Truck Routes
(Chrisman Road & Paradise Road)

November 2019

Seefried Properties

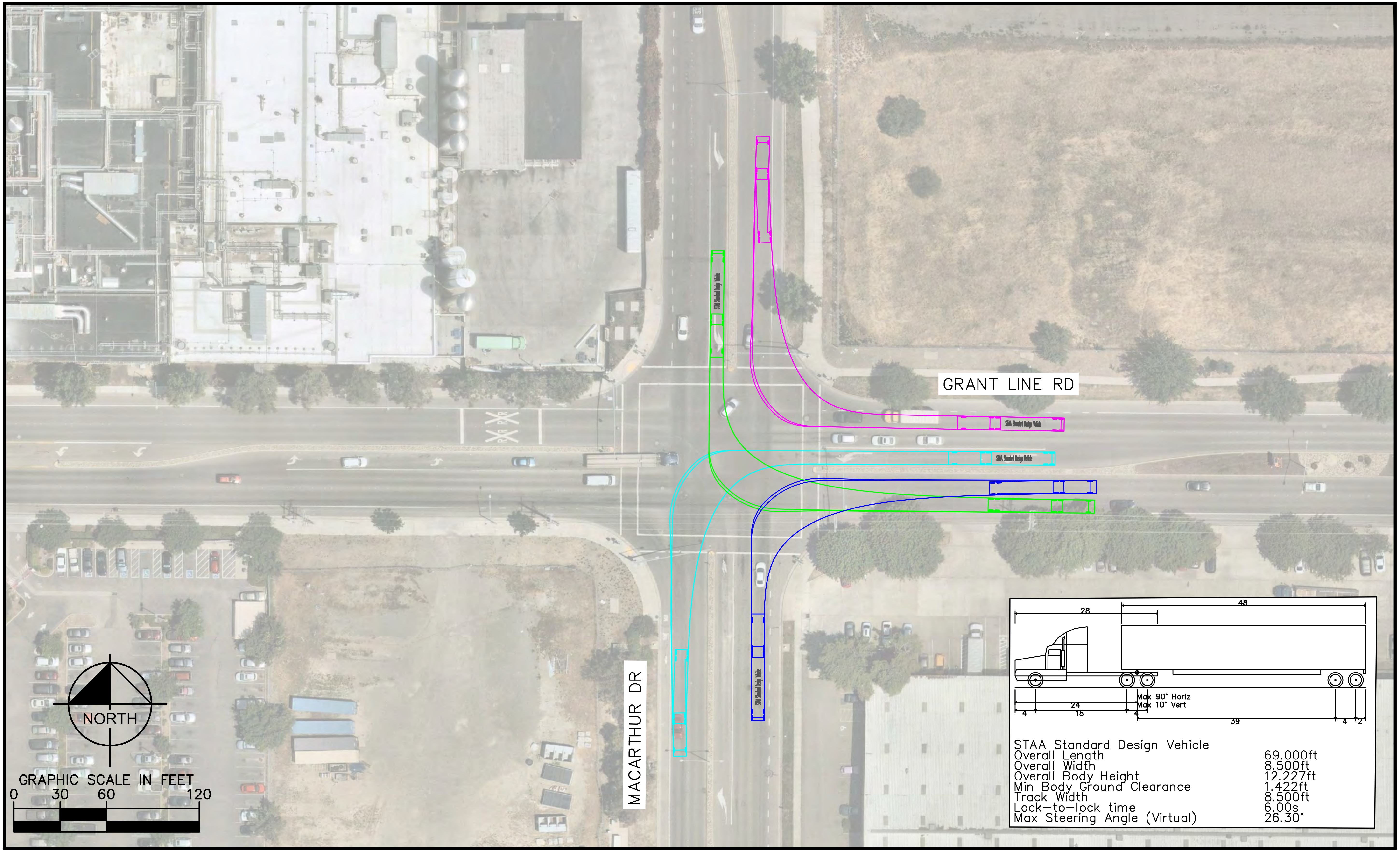


Kimley»Horn

November 2019

Figure 30 - Interim & Ultimate Truck Routes
(Macarthur Dr & Pescadero Ave)

Seefried Properties



STAA Standard Design Vehicle

Overall Length	69.000ft
Overall Width	8.500ft
Overall Body Height	12.227ft
Min Body Ground Clearance	1.422ft
Track Width	8.500ft
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	26.30°

Figure 31 - Interim & Ultimate Truck Routes
(Macarthur Dr & Grant Line Rd)

Seefried Properties

Kimley»Horn

November 2019

ATTACHMENT B

(Corner of Grant Line and Skylark looking Southeast)

PROJECT BIG BIRD

TRACY, CA

PERSPECTIVE - 1

(Grant Line Road looking south at driveway)

PROJECT BIG BIRD

TRACY, CA

PR
Ahea

PERSPECTIVE - 2

(Chrisman Road looking west)

PROJECT BIG BIRD

TRACY, CA

ATTACHMENT C

WEST YOST
ASSOCIATES

TECHNICAL MEMORANDUM

DATE: August 12, 2020

Project No: 404-60-20-61
SENT VIA: EMAIL

TO: Al Gali, City of Tracy

CC: Robert Armijo, City of Tracy
Paul Verma, City of Tracy

FROM: Nathaniel Homan, PE, RCE #89903
Roger Chu, PE, RCE #87591

REVIEWED BY: Elizabeth Drayer, PE, RCE #46872

SUBJECT: Hydraulic Evaluation of Project Big Bird

REGISTERED PROFESSIONAL ENGINEER
ROGER W. CHU
No. C87591
Exp. 9-30-21
CIVIL
STATE OF CALIFORNIA

This Technical Memorandum (TM) summarizes the findings and conclusions of West Yost technical evaluation of the ability of the City of Tracy's (City) existing potable water distribution system to meet the required minimum pressures and flows for the proposed Project Big Bird (Project).

This TM is submitted in accordance with West Yost's May 2020 Scope of Work for engineering services to the City. The scope of this evaluation does not include review of water supply availability or water treatment plant capacity for the Project, as these items are discussed in other documents, such as the City's Water System Master Plan. This evaluation does not determine the adequacy of any private pipelines to serve the Project.

The following sections summarize our findings and conclusions:

- Project Description
- Estimated Water Demand for the Project
- Storage Capacity Evaluation
- Hydraulic Evaluation Findings
- Summary of Evaluation and Recommendations

PROJECT DESCRIPTION

As shown on Figure 1, the Project is located within City limits, southwest of the intersection of Grant Line Road and Chrisman Road. The Project is part of the Northeast Industrial (NEI) Specific Plan area, which consists of approximately 870 acres in the northeast corner of the City and is bounded by East Pescadero Avenue and I-205 to the north, Paradise Avenue and Banta Road to the east, the Union Pacific Railroad to the south, and MacArthur Drive to the west. The area is designated for light industrial use, and development is well underway.

The Project will develop approximately 86 acres of undeveloped land into a warehouse with an office and adjacent parking lot. Potable water service for the Project will be provided by the existing Pressure Zone 1 (Zone 1) pipeline located in Paradise Road.

ESTIMATED WATER DEMAND FOR THE PROJECT

Water demands were projected for the Project using the unit water demand factors adopted in the 2012 Citywide Water System Master Plan (2012 WSMP). Table 1 shows the Project's proposed land use, water use factors, and projected annual potable water use. The total potable water demand for the Project (domestic and irrigation) is estimated at 174 acre-feet per year (af/yr).

This evaluation assumes potable water will be used to meet all Project water demands. The City has yet to construct infrastructure to deliver recycled water to the Project, so potable water will be used to meet non-potable water demands in the interim. Once the City's recycled water system can supply the Project, potable water demands should decrease.

Table 1. Estimated Annual Water Demand for the Project

Land Use Designation	Total Area, gross acres[a]	Potable Water Use Area, acres[b]	Landscaped Area, acres[c]	Unit Potable Water Use Factor[d], af/ac/yr	Annual Potable Water Use, af/yr
Industrial	86.0	73.1	-	1.5	109.7
Irrigation Demand	-	-	12.9	4.0	51.6
UAFW[e]	-	-	-	-	13.1
Total	**86.0**	**73.1**	**12.9**	**-**	**174.3**

(a) Per Prologis Tracy-NEI PHASE 3 G4+5 drawings, dated May 2020.
(b) Consistent with the 2012 WSMP; 85 percent of gross acres are assumed to use potable water.
(c) Consistent with the 2012 WSMP; 15 percent of gross acres are assumed to be landscaped.
(d) Based on the 2012 WSMP.
(e) Unaccounted-for water (UAFW) is equal to 7.5 percent.

Table 2 summarizes the estimated average day, maximum day, and peak hour water demands for the Project. The average day demand (ADD) for the Project is approximately 108 gallons per minute (gpm). Maximum day demands (MDD) and peak hour demands (PHD) were calculated using the City's peaking factors (adopted from the 2012 WSMP) of 2.0 and 3.4 times the ADD, respectively, resulting in an MDD of about 216 gpm and a PHD of about 368 gpm.

Demands for development of the Project area were previously included as part of West Yost's "Hydraulic Evaluation of Northeast Industrial Area (NEI) Specific Plan" TM (NEI TM), dated September 11, 2018. To more accurately simulate demands within the system, the previously projected demands for the Project area were removed from the hydraulic model before adding the updated demands listed in Table 2.

Table 2. Summary of Average Day, Maximum Day, and Peak Hour Water Demands for the Project

Average Day Demand[(a)]		Maximum Day Demand[(b)]		Peak Hour Demand[(c)]	
gpm	mgd	gpm	mgd	gpm	mgd
108	0.16	216	0.31	368	0.53

(a) The ADD is based on the total annual potable water use, 174 af/yr, calculated in Table 1.
(b) MDD is 2.0 times the ADD, per the 2012 WSMP.
(c) PHD is 3.4 times the ADD, per the 2012 WSMP.
mgd = million gallons per day

STORAGE CAPACITY EVALUATION

The storage requirement for the City's potable water system consists of three components:

- **Operational Storage**: 30 percent of a maximum day demand
- **Emergency Storage**: Two times an average day demand
- **Fire Flow Storage**: The required fire flow rate multiplied by the associated fire flow duration period. In larger pressure zones like Zone 1, the City requires the fire flow storage to equal the volume required for two concurrent fire flow events: a Single Family Residential fire (0.18 million gallons (MG)) and an Industrial fire in a sprinklered building (0.96 MG)[1]. Thus, the total Zone 1 fire flow storage required is 1.14 MG.

The Project's required storage capacity would be in addition to the requirements from existing buildings and proposed developments in Zone 1 and Pressure Zone 2 (Zone 2). Per the above criteria, the required operational and emergency storage components for the project are 0.09 and 0.31 MG, respectively.

Based on the City's available storage capacity and emergency storage credit[2] in Zones 1 and 2, there is insufficient storage capacity to adequately serve the Project. After replacing the Project area's projected demands from the NEI TM with the updated Project demands from Table 2, the calculated storage deficit is approximately 0.02 MG[3]. However, the City is currently updating the

---

[1] Per the 2012 WSMP, Single Family Residential fire flow is 1,500 gpm for 2 hours. In sprinklered Industrial buildings, the fire flow is 4,500 gpm for 4 hours. This includes 500 gpm for on-site sprinkler flow. Fire flow storage does not include sprinkler flow, so fire flow storage for sprinklered industrial buildings is based on 4,000 gpm for 4 hours. Refer to Table 6-1 of the 2012 WSMP for additional details.

[2] Refer to Section *7.4.2.2 Water Storage Capacity* of the 2012 WSMP for additional details.

[3] Assumes that the storage capacity deficit in City-side Zone 3 is supplied by the emergency storage surplus available in Zones 1 and 2 (*Hydraulic Evaluation of IPC Buildings 9, 10, and 14 Memorandum*, West Yost, May 3, 2018).

2012 WSMP, which includes a re-evaluation of the City's storage requirements and future storage needs. The WSMP Update may reduce the storage requirements and therefore increase the available storage capacity in Zone 1. Therefore, it is not recommended that the City construct additional storage in Zone 1 until the updated WSMP is finalized and the need for additional storage in Zone 1 has been re-evaluated.

HYDRAULIC EVALUATION FINDINGS

Hydraulic evaluation of the Project is based on system performance and operational criteria developed in the 2012 WSMP. These criteria are provided in Attachment A for reference. The City's existing developer hydraulic model[4] was modified to include the water demands for the Project. This updated model was then used to simulate PHD and MDD plus fire flow conditions to determine the Project's impacts on the potable water system. Results from this hydraulic evaluation are discussed below.

Peak Hour Demand Evaluation

Figure 2 displays the system pressures and pipeline velocities during a PHD condition. Pressure at the Project's service connection point is approximately 62 pounds per square inch (psi), while pressures at other service locations in Zone 1 remain above 40 psi. No distribution pipelines exceed the maximum pipeline velocity limit of 8 feet per second (fps).

Maximum Day Demand plus Fire Flow Evaluation

To meet fire flow requirements, the water system must be able to provide 4,500 gpm to the Project and adjacent industrial sites during an MDD condition while maintaining 30 psi residual system pressure (primary criterion) and pipeline velocities below 12 fps (secondary criterion). Figure 3 shows the Project does not meet fire flow requirements, as available fire flow is only 3,900 gpm. This deficit is due to the 320-foot-long, 8-inch diameter pipeline west of the intersection of Paradise Road and Chrisman Road, where flows are restricted by the 12-fps velocity limit.

If the secondary pipeline velocity criterion is disregarded, the distribution system can meet fire flow requirements for the Project. Because the primary pressure criterion is met and the 8-inch diameter pipeline in question is relatively short, improvements are not critical. However, the Project should consider upsizing this segment to a 12-inch diameter pipeline to avoid high velocities during fire flow conditions. Figure 4 shows that with this improvement, the distribution system could fully satisfy fire flow requirements for the Project.

Two other locations in the NEI Specific Plan Area also fail to meet fire flow requirements. These locations on the dead-end pipeline in Grant Line Road were previously identified as deficient in the NEI TM. Because these deficiencies are not triggered by the Project, the corresponding improvements to address these deficiencies are outside the scope of this hydraulic evaluation.

---

[4] The City's developer hydraulic model includes all the previously evaluated development projects that have been proposed and is separate from the 2012 Water System Master Plan model.

SUMMARY OF EVALUATION AND RECOMMENDATIONS

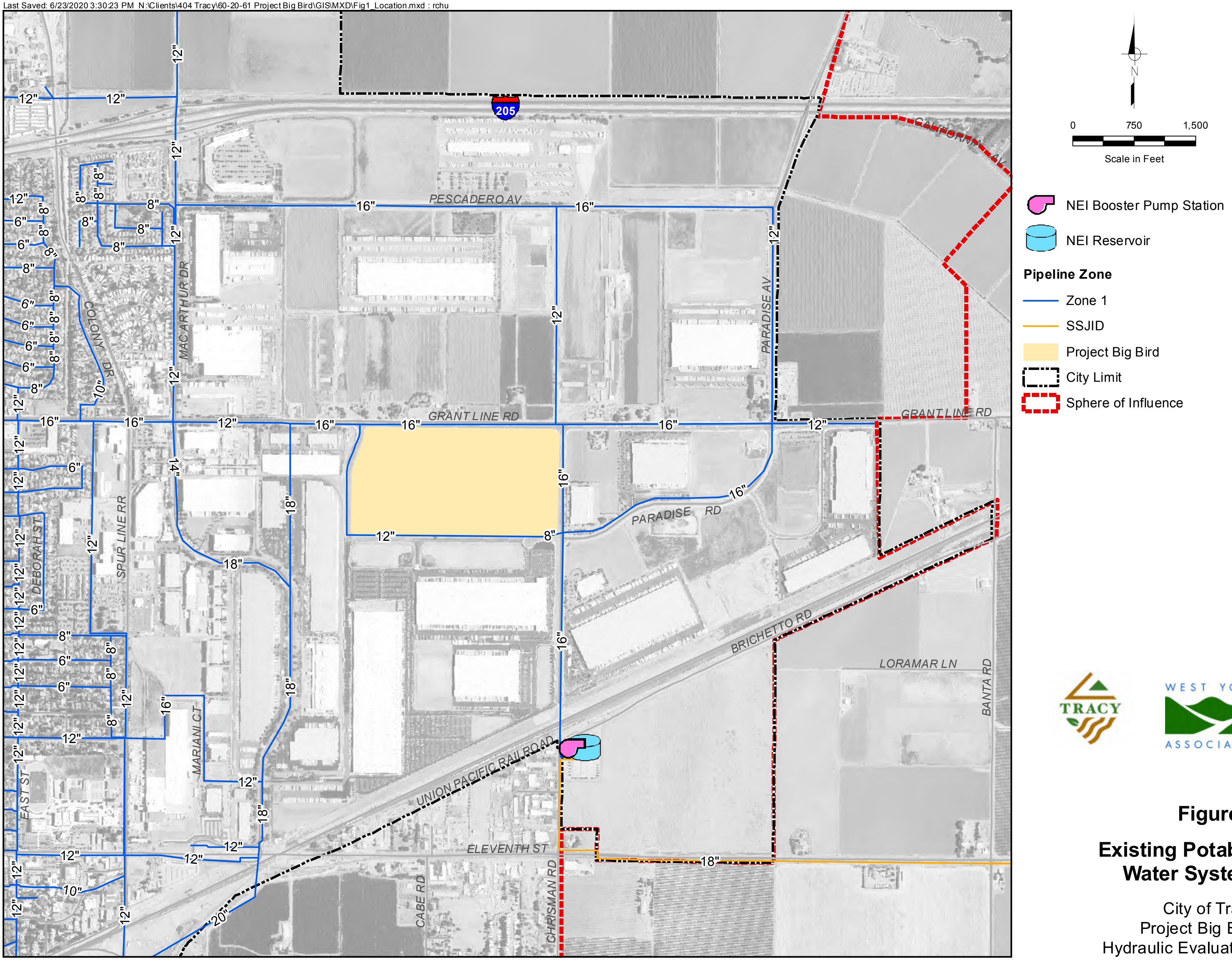
Under PHD conditions, the City’s water system infrastructure can provide adequate flows and pressures to the Project and adjacent sites in the NEI Specific Plan area. Under MDD plus fire flow conditions, the distribution system can deliver fire flows to the Project while maintaining 30 psi residual pressure, but a nearby 8-inch diameter pipeline would see velocities exceeding 12 fps. This pipeline velocity deficiency is relatively minor, so upsizing this pipeline west of the intersection of Paradise Road and Chrisman Road to 12-inch diameter is not critical but recommended as part of the Project.

Based on the storage capacity criteria in the 2012 WSMP, the City currently has insufficient storage capacity in Zones 1 and 2 to meet the needs of the proposed Project. However, the City is currently updating the 2012 WSMP, and an updated storage capacity evaluation will be developed, along with revised potable water system improvement recommendations. Therefore, it is not recommended that the City construct additional storage in Zone 1 until the updated WSMP is finalized and the need for additional storage in Zone 1 has been re-evaluated.

In addition, it is anticipated that potable water demands will decrease once the City’s recycled water system is operational. Converting the City’s irrigation demands from potable to recycled water will also increase the storage capacity available to meet potable water demands.

The hydraulic evaluation performed for the proposed Project is based on the various assumptions stated above. If any of these items are modified in any way, other than as described in this TM, additional hydraulic evaluation will be required.

Last Saved: 6/23/2020 3:30:23 PM N:\Clients\404 Tracy\60-20-61 Project Big Bird\GIS\MXD\Fig1_Location.mxd : rchu



TRACY

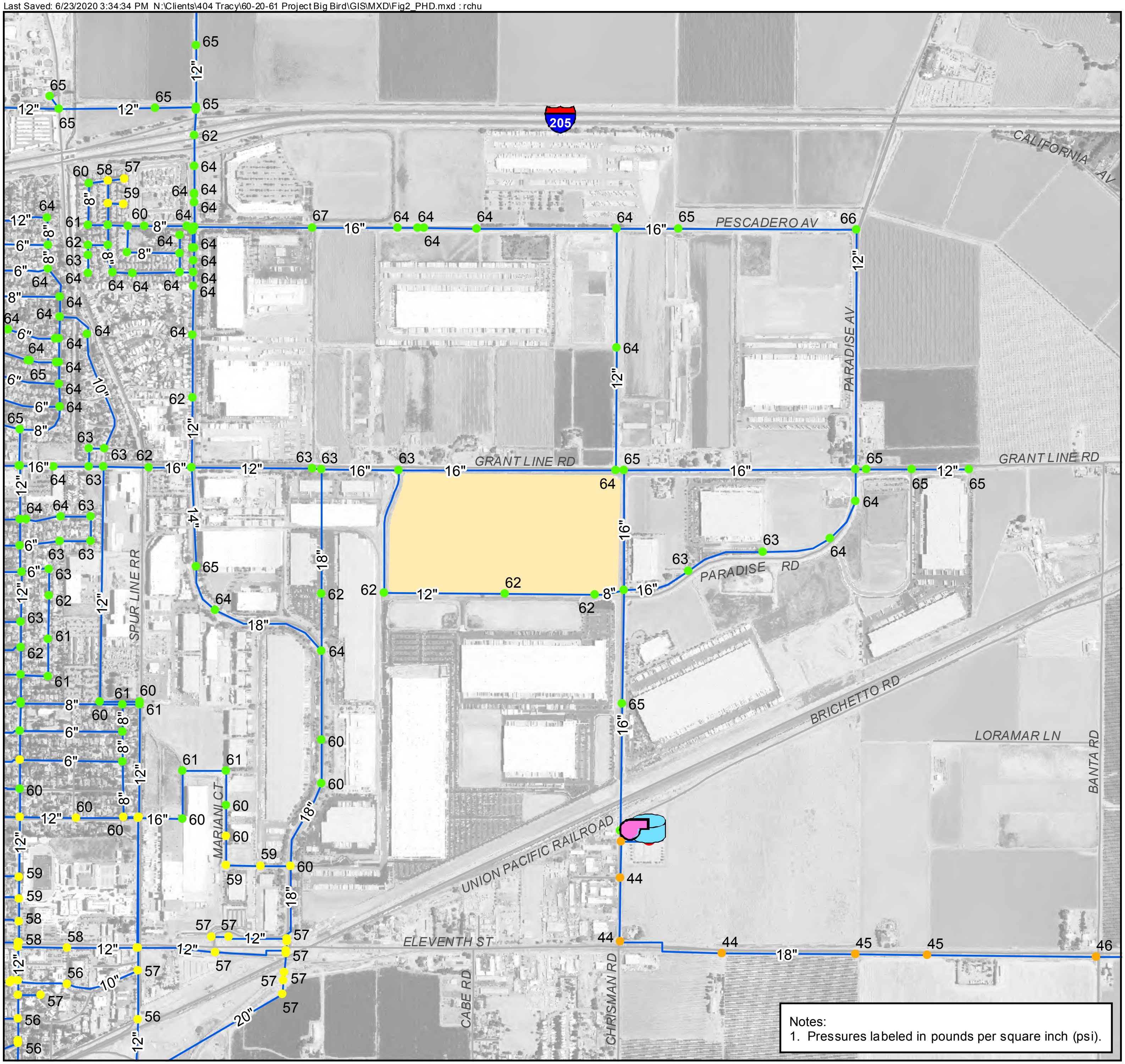
WEST YOST ASSOCIATES

Figure 1

Existing Potable Water System

City of Tracy
Project Big Bird
Hydraulic Evaluation

Last Saved: 6/23/2020 3:34:34 PM N:\Clients\404 Tracy\60-20-61 Project Big Bird\GIS\MXD\Fig2_PHD.mxd : rchu



Notes:
1. Pressures labeled in pounds per square inch (psi).

N

0 750 1,500

Scale in Feet

NEI Booster Pump Station

NEI Reservoir

Peak Hour Pressure

- 🔴 Less than 40 psi
- 🟠 40 to 50 psi
- 🟡 50 to 60 psi
- 🟢 60 to 70 psi
- 🔵 70 to 80 psi
- 🟣 Greater than 80 psi

Pipeline Velocity

- Less than or equal to 8 fps
- Greater than 8 fps
- Project Big Bird

TRACY

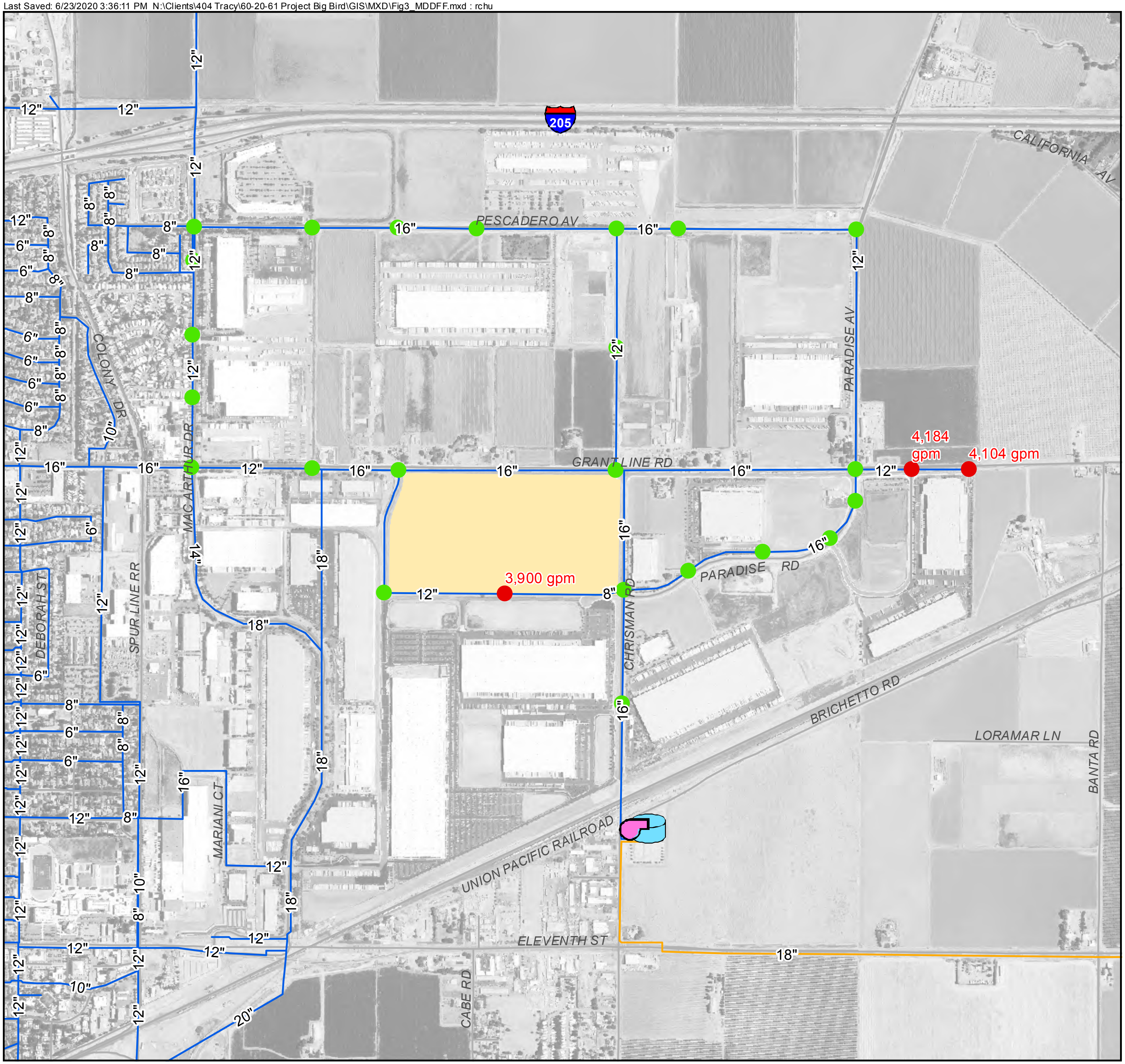
WEST YOST ASSOCIATES

Figure 2

Peak Hour Results

City of Tracy
Project Big Bird
Hydraulic Evaluation

Last Saved: 6/23/2020 3:36:11 PM N:\Clients\404 Tracy\60-20-61 Project Big Bird\GIS\MXD\Fig3_MDDFF.mxd : rchu



N

0 750 1,500

Scale in Feet

NEI Booster Pump Station

NEI Reservoir

Available Fire Flow

- 🔴 Does not meet Requirements
- 🟢 Meets Requirements

Pipeline Zone

- Zone 1
- SSJID
- Project Big Bird

Notes:

1. The available fire flow shown is the maximum flow available while maintaining 30 psi residual system pressure and limiting maximum pipeline velocities to 12 fps.
2. Fire flow requirements vary by land use type. Project Big Bird and adjacent locations require 4,500 gpm.

TRACY

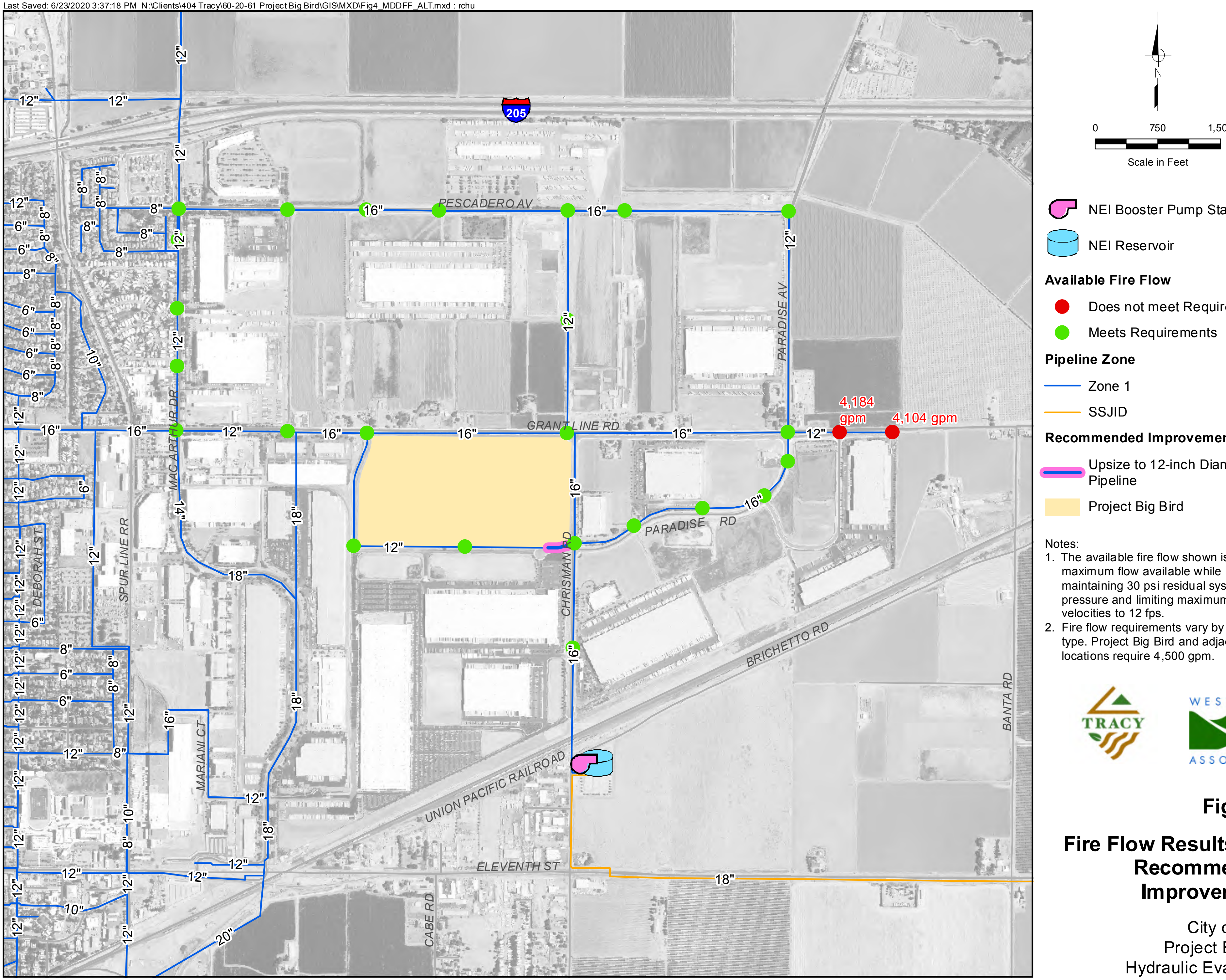
WEST YOST ASSOCIATES

Figure 3

Fire Flow Results

City of Tracy
Project Big Bird
Hydraulic Evaluation

Last Saved: 6/23/2020 3:37:18 PM N:\Clients\404 Tracy\60-20-61 Project Big Bird\GIS\MXD\Fig4_MDDFF_ALT.mxd : rchu



NEI Booster Pump Station

NEI Reservoir

Available Fire Flow

🔴 Does not meet Requirements

🟢 Meets Requirements

Pipeline Zone

Zone 1

SSJID

Recommended Improvements

Upsize to 12-inch Diameter Pipeline

Project Big Bird

Notes:

1. The available fire flow shown is the maximum flow available while maintaining 30 psi residual system pressure and limiting maximum pipeline velocities to 12 fps.
2. Fire flow requirements vary by land use type. Project Big Bird and adjacent locations require 4,500 gpm.

TRACY

WEST YOST ASSOCIATES

Figure 4

Fire Flow Results with Recommended Improvements

City of Tracy
Project Big Bird
Hydraulic Evaluation

ATTACHMENT A

Planning and Modeling Criteria

ATTACHMENT A

Planning and Modeling Criteria

Planning and modeling criteria used to evaluate the proposed Project are based on the system performance and operational criteria developed in the 2012 Citywide Water System Master Plan. The criteria used to evaluate the existing water system and the proposed pipelines for the Project are listed as follows:

- Residual pressure at the flowing hydrant (during an assumed maximum day demand plus fire flow condition) and throughout the water system must be equal to or greater than 30 pounds per square inch (psi) during the simulated fire condition.
- Minimum allowable service pressure is 40 psi during all other non-fire demand conditions.
- Maximum allowable service pressure is 80 psi. A pressure reducing valve (PRV) will be required on all water services with a static pressure greater than 80 psi and should conform with the requirements from the Uniform Plumbing Code.
- Maximum allowable distribution pipeline velocity is 12 feet per second (fps) during the simulated fire flow demand condition.
- Maximum allowable transmission and distribution pipeline velocity is 6 fps and 8 fps, respectively, during a non-fire demand condition.
- Maximum allowable head loss rate is 10 feet per 1,000 feet (ft/kft) during the simulated fire demand condition.
- Maximum head losses in distribution system pipelines should be limited to 7 ft/kft during a non-fire demand condition.
- New and required pipelines will be modeled with a roughness coefficient (C-factor) of 130.
- Available fire flow demand must meet a minimum flow of 1,500 gpm, 2,500 gpm, 3,500 gpm, or 4,500 gpm depending on land use during a maximum day demand condition. These required fire flow demands assume that buildings are sprinklered.
- The 2012 Master Plan hydraulic model of the City's water distribution system was used as the basis for evaluation.[1] However, the hydraulic model was updated to include the following major existing system improvements:
  - Improvements that have been recently constructed on South Lammers Road (20-inch diameter pipeline and pressure regulating station (PRS #6)); and
  - Proposed improvements on South MacArthur Drive (24-inch diameter pipeline).

---

[1] This hydraulic model was updated to include projected water demands from new developments such as Valpico and MacDonald Apartments; Sierra Hills (Aspire I) Apartments; Tiburon Village; Middlefield Drive Apartments and Self-Storage Facility; I 205 Parcels M1 and M2 and Infill Parcels 7 and 13; Grant Line Road Apartments; South Lammers Road Development; Aspire II Development; Pescadero IPT Development; first three buildings at Cordes Ranch; Ellis Specific Plan Phase 1A and Phase 1A Extension; Marriott TownePlace Suites; Larch Clover Interim Annexation; Ellis Specific Plan Phase 2 - The Gardens, IPC Buildings 3, 4, and 12; IPC Building 25; IPC Buildings 22, 23, and Thermo Fisher; Tracy Village Specific Plan; Avenues Specific Plan; IPC Buildings 9, 10, and 14; NEI Specific Plan; Tracy Hills Phases 1A, 1B, and 1C; Ellis Phase 3 – Town and Country; IPC Building 19A; Costco Depot; West Parkway Village; KT Project; IPC Prologis Sales Office Building; and IPC Building 2. City staff also requested West Yost to incorporate the following developments, which were evaluated by Black Water Consulting Engineers, Inc. into the City's hydraulic model: Barcelona Infill, Berg Road Properties, Harvest Apartments, 321 E. Grant Line Apartments, Project Hawk/IPC, and Home 2 Suites.

ATTACHMENT D

Technical Memorandum

BLACKWATER
CONSULTING ENGINEERS, INC.

To: Mike O'Connor, P.E. SNG & Associates (SENT VIA: EMAIL)
From: Aja Verburg, P.E.

Subject: Prologis Big Bird Tracy-NEI Phase 3 G4+5 Project
Sewer Collection System Hydraulic Capacity Analysis
Date: October 15, 2020

REGISTERED PROFESSIONAL ENGINEER
AJA J. VERBURG
No. C73020
CIVIL
STATE OF CALIFORNIA

INTRODUCTION

This Technical Memorandum (TM) has been prepared by Black Water Consulting Engineers, Inc. (Black Water) to present the findings of the sewer collection system hydraulic capacity analysis for the proposed Prologis Big Bird Tracy-NEI Phase 3 G4+5 Project (Project). Evaluation of the sewer collection system serving the proposed Project was modeled using Innovyze InfoSewer. This TM evaluates the capacity of the existing sewer collection system serving the Project and documents any impacts to the sewer system.

Section 1 provides a general description of the proposed Project, design criteria and assumptions. Section 2 includes the analyses methodology and analyses results. Section 3 identifies system deficiencies and recommended improvements.

Engineering reports and documents reviewed and referenced in this TM include the following:

[1] Project Big Bird Tracy-NEI Phase 3 G4+5 Plans, prepared by HPA Architecture, May 2020.
[2] Wastewater System Impact Fee Analysis for the NEI Phase 2 Area, prepared by CH2M Hill, updated April 27, 2005.
[3] City of Tracy Wastewater Master Plan, prepared by CH2M Hill, December 2012. (2012 WWMP)
[4] City of Tracy General Plan, Design, Community & Environment, February 2011. (2011 General Plan)
[5] City of Tracy Engineering Design & Construction Standards, February 2020.
[6] City of Tracy Wastewater System Analysis for McLaughlin Industrial Project, prepared by CH2M Hill, August 2017.

SECTION 1 – GENERAL DESCRIPTION

Project Description

The proposed Project is located in Tracy, California, south of Grant Line Road, west of N. Chrisman Road, and east of Skylark Way. Refer to **Figure 1** for the Project site location. The proposed preliminary utility plan provided by the City is included in **Appendix A** [1]. The Project site area totals approximately 86 acres. The 2011 General Plan designates the Project area as industrial land use, consistent with the proposed Project land use.

Figure 1 – Project Location

Existing Sewer System Service Area

The Project is part of the MacArthur Sewer System within the Northeast Industrial Area (NEI) development area [2]. Sewer flows from the MacArthur Sewer System service area are collected and conveyed by the existing sewer pipeline along W. Pescadero Avenue and the existing MacArthur Pump Station to the WWTP. **Appendix B**, Figure 2, provides an overview of the existing sewer infrastructure proposed to serve the Project. The Project site plan shows a proposed connection to the existing 12-inch diameter sewer pipeline in N. Chrisman Road and another connection to the existing 12-inch diameter sewer pipeline in E. Grant Line Road. The existing 12-inch diameter sewer pipeline in E. Grant Line Road is not part of the MacArthur Sewer System. Sewer flows from the Project should convey all flows to the MacArthur Sewer System at the east end of the Project.

The sewer analysis of the MacArthur Pump Station in the 2012 WWMP was excluded from this TM because the City staff has confirmed that the MacArthur Pump Station is currently running well under capacity. Pump station information provided by the City shows additional capacity is available at the MacArthur Pump Station. The MacArthur Pump Station consists of six (6) pumps that has a total capacity of 7.81 mgd. The pump controls only allow for three (3) pumps to operate at any given time. The City provided Black Water with the pump station performance data, presented in **Table 1**.

Table 1 – MacArthur Pump Station Performance Data[1]

Equipment Number	P1	P2	P3	P4	P5	P6
Capacity (each), gpm	1,235	1,235	1,235	1,235	242	242
Total Dynamic Head, feet	34	34	34	34	16	16
Maximum Shutoff Head, feet	57	57	57	57	43	43
Pump Speed, rpm (nominal)	1,800	1,800	1,800	1,800	1,800	1,800
Horsepower, Hp	20	20	20	20	3	3
Voltage, volts/Phase	460/3	460/3	460/3	460/3	460/3	460/3
Minimum efficiency (at design condition)	75%	75%	75%	45%	68%	68%

[1] Data provided by City staff via email on December 16, 2019. Black Water did not field verify or confirm the information.

The MacArthur Pump Station cycles on and off based on the wetwell level with no variable frequency drive (VFD). The minimum capacity of the pump station is 2.48 mgd with two smaller pumps operating with one larger pump and a maximum capacity of 5.33 mgd when all three of the larger pumps are operating at the same time.

Existing Peak Flows

Measured peak flow data collected from the City's flow monitoring program in March/April 2019 for the NEI area was used to estimate existing contributing flows and determine the available capacity of the MacArthur Sewer System. **Table 2** summarizes the measure peak flow data, estimated average dry weather flow (ADWF) and peak wet weather flow (PWWF) used to evaluate the capacity of the existing sewer system.

Table 2 – 2019 Flow Monitoring Data and Estimated Existing PWWF within the NEI Area

Site ID	Location	Pipeline Diameter (inch)	Measured Peak Flow[1] (mgd)	Measured ADWF[1] (mgd)	Estimated PWWF[2] (mgd)
1	Located at the intersection E Grant Line Rd & Paradise Rd	15	0.070	0.017	0.118
2	Located approximately 1700 Pescadero Rd	15	0.182	0.063	0.232
3	Located on Pescadero Rd near 1305 E Pescadero Ave	18	0.259	0.136	0.323
4	Located at the intersection of Pescadero Rd & MacArthur Dr	18	0.351	0.212	0.418
5	Located on MacArthur Drive near Highway 205 off-ramp	18	0.447	0.251	0.462
6	Located at the intersection of Chrisman Rd & E Grant Line Rd	17	0.096	0.029	0.097

[1] Flow Monitoring Data from 3/27/2019 to 4/3/2019, Preston Pipelines Tracy TM – 15-Minute Data.

[2] Based on measured peak flow and estimated inflow/infiltration rates. The total inflow rate is equal to the estimated existing contributing area of approximately 500 gross acres multiplied by 400 gal/ac-day. Groundwater infiltration rate is 6 percent of the measured ADWF.

This sewer analysis includes PWWF from the following development projects within the service area:

- MacLaughlin (PWWF = 0.168 mgd)
- Central Plastic (PWWF = 0.011 mgd)
- PreFab Structures – Katerra Blg. 17 (PWWF = 0.099 mgd)
- Seefried Industrial Campus (PWWF = 0.225 mgd)
- California Highway Patrol (PWWF = 0.073 mgd)

Estimated Project Sewer Flows

The ADWF for the proposed Project is typically estimated based on the 2012 WWMP wastewater generation factor for the designated land use. However, due to the anticipated high occupancy for the Project buildings, the ADWF was also estimated based on the 2009 International Building Code occupancy based on the building type and area. **Table 3** and **Table 4** provide the total estimated ADWF based on land use and occupancy.

Table 3 – Estimated Project ADWF by Land Use Designation

Land Use Designation	Assessor Parcel Number	Gross Acreage, Acres	Generation Factor, gpd/gross acre	ADWF, gpd
Industrial	250-020-93	86.0	1,056	90,816

Table 4 – Estimated Project ADWF by Building Occupancy

Function of Space	Assessor Parcel Number	Floor Area, ft^2	Occupancy[1]	Wastewater Generation Factor, gpd/capita	ADWF, gpd
Warehouse	250-020-93	767,714	1,535	80	122,834
Business		55,808	558	80	44,646
				Total	167,481

[1] Occupancy was estimated by using the 2009 International Building Code. Warehouse area is 500 sq-ft per occupant and business area is 100 sq-ft per occupant.

The total estimated ADWF by land use designation is 90,816 gpd. The total estimated ADWF by building occupancy is 167,481 gpd. For the purposes of this analysis and capacity evaluation, the higher estimated ADWF based on building occupancy is used.

The PWWF is used to evaluate the hydraulic capacity of the existing sewer system. PWWF includes the peak dry weather flow (PDWF) and the rainfall induced inflow/infiltration. The total estimated PWWF is 458,551 gpd. **Table 5** provides the values for parameters used to estimate the PWWF.

Table 5 – Estimated Project PWWF

Parameter	Value
Peaking Factor	2.50
Gross Acreage, acres	86.0
PDWF[1], gpd	418,702
Infiltration[2], gpd	5,449
Inflow[3], gpd	34,400
PWWF[4], gpd	458,551

[1] PDWF is equal to ADWF multiply by the Peaking Factor [5].
[2] Infiltration is equal to six (6) percent of the ADWF.
[3] Inflow is equal to the gross acreage multiply by 400 gal/ac-day.
[4] PWWF is equal to the summation of the PDWF, infiltration, and inflow.

Design Criteria

Sewer system performance design criteria and analysis requirements for new development are summarized in **Table 6**.

Table 6 – Design Criteria and Requirements [5]

Component	Criteria
Friction Factor “n”	0.013
Sewer Pipeline	
Minimum Velocity	2.0 fps (flowing full)
Maximum Velocity	10.0 fps
Maximum d/D Ratio	1.0
Minimum Diameter	8-inch
Available Slope	Obtain the minimum velocity of 2 fps
Material	Vitrified Clay Pipe (VCP) and Ductile Iron Pipe (DIP)
Service Lateral Sizing	
Single Family Residences	4-inch
Commercial	6-inch
Duplex and Multi-Family Lots	6-inch
Minimum Slope	2%
Sewer Manhole Maximum Spacing	
Diameter 12-inch and under	400 feet
Diameter 15-inch and over	600 feet

The following lists the data, documents, and assumptions in addition to the design criteria used to model and evaluate the sewer system for the hydraulic capacity analysis:

- City parcel shapefiles downloaded by Black Water from the San Joaquin County Geographic Information Systems (GIS) website on October 11, 2019.
- City GIS shapefiles of the existing sewer system provided to Black Water on October 10, 2019.
- City AutoCAD Utility Base Map shapefiles provided to Black Water on August 20, 2019.
- Contributing areas to the existing sewer system were estimated based on the AutoCAD map and GIS shapefiles. The existing system CAD shapefile pipe inverts provided the information used to determine the direction of flow.

SECTION 2 – HYDRAULIC CAPACITY ANALYSIS EVALUATION AND RESULTS

The sewer system serving the proposed Project was modeled using Geographic Information System (GIS) integrated Innovyze Infosewer software. Although most of the sewers within the City are included in the GIS database, the modeling focused on the major trunk sewers within the system serving the Project. The software uses the Manning equation to determine the pipe flow in a gravity main.

The modeling software uses the upstream and downstream invert elevation, pipe diameter, and wastewater flow data to calculate slope, d/D, and the velocity in the pipes. The software also uses rim elevation, invert elevation, manhole diameter, and wastewater flow data to calculate the liquid level in a manhole. For this analysis, a manhole diameter of 5 feet is assumed.

Modeling Results

The system was modeled by connecting the Project to the sewer pipeline in N. Chrisman Road. The modeling results show that the existing MacArthur Sewer System has sufficient capacity to meet the established hydraulic criteria. The velocity of the MacArthur Sewer System ranged from 0.664 fps to 3.492 fps with a maximum d/D ratio of 0.652 during the modeling analysis. **Appendix B**, Figure 3 presents the sewer collection system modeling layout and hydraulic capacity for this analysis. **Appendix B** also includes the model output data for the modeling analysis.

The modeling analysis calculates a total influent flow at MacArthur Pump Station of 1.50 mgd. The remaining available capacity of the MacArthur Pump Station is 0.98 mgd, based on a minimum capacity of 2.48 mgd. The MacArthur Pump Station has sufficient capacity to accommodate the sewer flows generated by the Project, based on the existing system capacity discussed in Section 1.

SECTION 3 – SYSTEM DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

Based on the modeling results, the exiting MacArthur Sewer System has sufficient capacity to accommodate sewer flows generated by the Project. The 2012 WWMP stated that the MacArthur Pump Station is at or near design capacity, however, City staff has indicated otherwise. Based on the pump station pump performance data and operation schedule provided by the City, the MacArthur Pump Station has sufficient capacity to serve the Project. The 2012 WWMP is currently being updated by the City.

The utility plan shows a connection to the 12-inch diameter sewer pipeline in E. Grant Line Road which is not part of the MacArthur Sewer System. The developer is required to relocate the proposed connection in E. Grant Line Road to utilize the existing MacArthur Sewer System infrastructure in N. Chrisman Road.

Any changes or modifications to the proposed Project, sewer system layout or development of the Project inconsistent with assumptions made in this analysis will require additional evaluation.

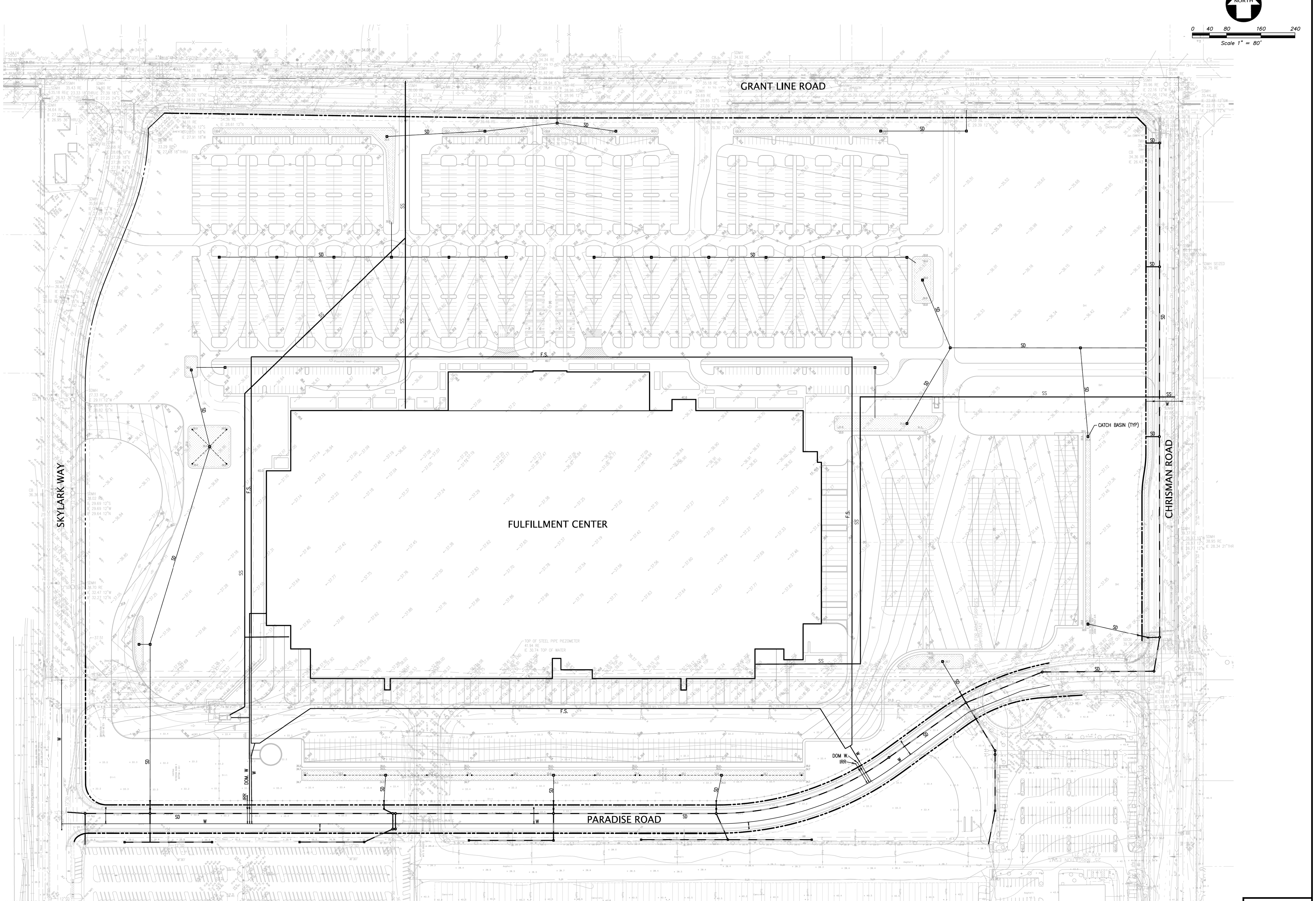
SUMMARY

The MacArthur Sewer System has sufficient capacity to accommodate sewer flows generated by the Project for the current buildout conditions of the service area. No off-site improvements are recommended to serve the Project. The proposed Project is required to be connected to the MacArthur Sewer System. The developer is required to relocate the proposed connection in E. Grant Line Road to utilize the existing MacArthur Sewer System infrastructure in N. Chrisman Road.

APPENDIX A

PRELIMINARY PROPOSED UTILITY PLAN

Project Big Bird Tracy-NEI Phase 3 G4+5 Plans, Sheets DAB-A1.1 and C.4



NO.	REVISION	BY
1	PLANNING SUBMITTAL	5/22/2020
2		
3		
4		
5		

KIER+WRIGHT

2850 Collier Canyon Road
Livermore, California 94551

Phone (925) 245-8788
www.kierwright.com

REGISTERED PROFESSIONAL ENGINEER
MICHAEL F. BASSILIOS
No. 71814
Exp. 12-31-21
CIVIL
STATE OF CALIFORNIA

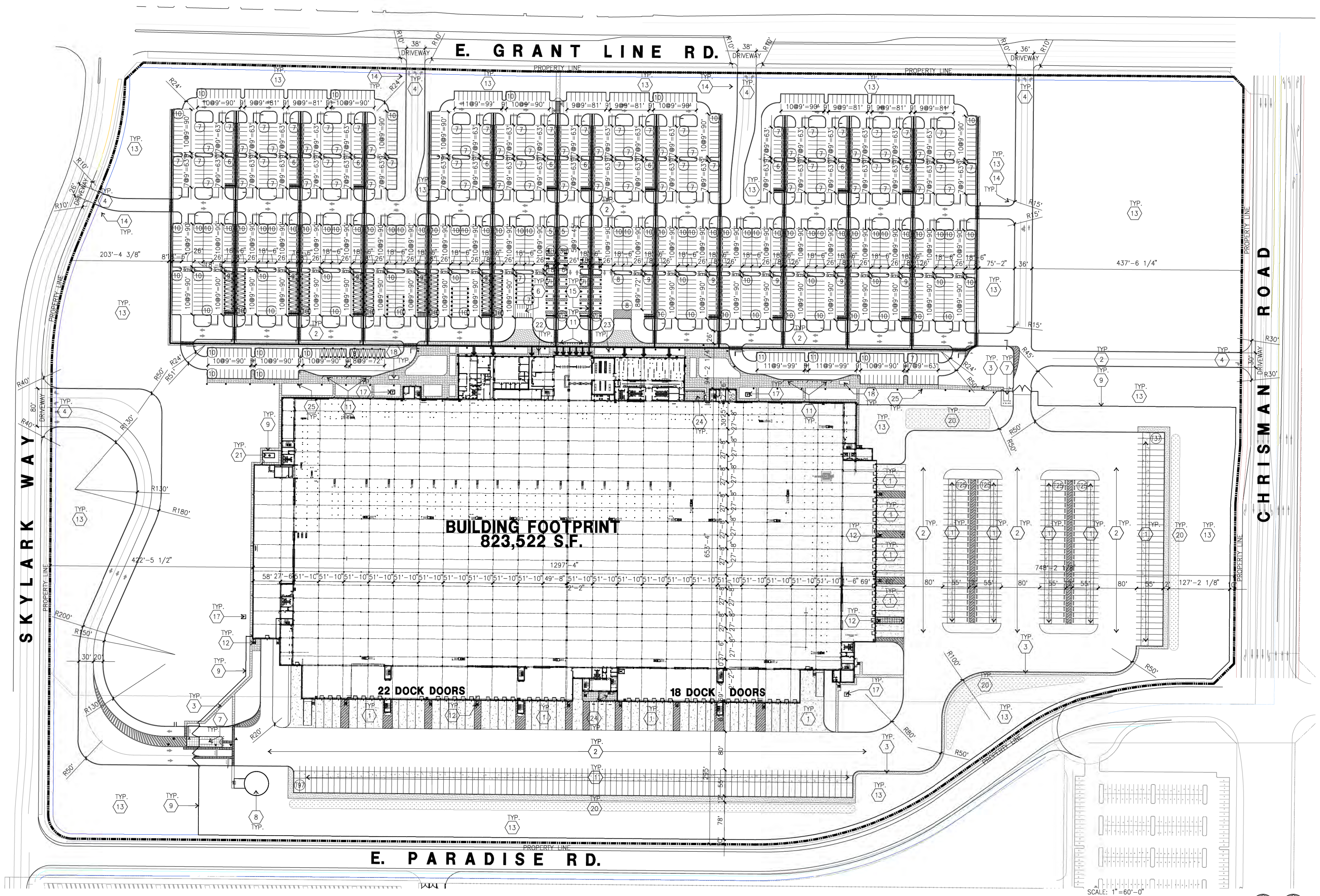
OVERALL PRELIMINARY UTILITY PLAN
NEI PHASE 3
SKYLARK FULFILLMENT CENTER

TRACY CALIFORNIA

DATE	05/22/2020
SCALE	1" = 80'
ENGINEER	M.F.B.
DRAFTER	-
JOB NO.	A05728-43
SHEET	C.4
OF 9 SHEETS	

\\Kierwright.local\Global\Z\2005\A05728-43\DWG\CIVIL\A05728-43-PG.dwg 5-21-20 08:59:23 PM rsalib

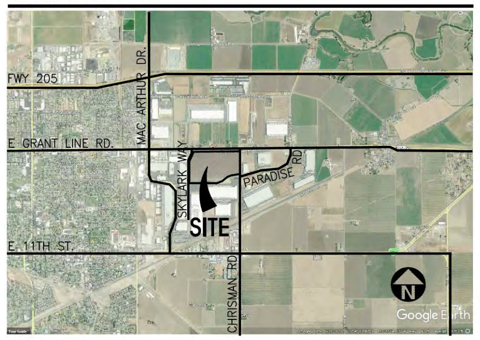
RECEIVED
May 26, 2020
City of Tracy
Development Services



OVERALL SITE PLAN (A)
scale: 1"=60'-0"

SCALE: 1"=60'-0"
0 60' 120' 180'
PLAN NORTH
TRUE NORTH

AERIAL MAP



TABULATION

		OCCUPIED AREA	NON OCCUPIED AREA RSP (ROBOTIC STORAGE PLATFORM)
SITE AREA			
In s.f.		3,746,777 s.f.	
In acres		86.0 ac	
BUILDING AREA			
Office		55,808 s.f.	
Warehouse		767,714 s.f.	
BUILDING FOOTPRINT		**823,522** s.f.	
Level 2		133,024 s.f.	532,446 s.f.
Level 3		133,024 s.f.	532,446 s.f.
Level 4		133,024 s.f.	532,446 s.f.
Level 5		133,024 s.f.	532,446 s.f.
TOTAL AREA		**1,355,618** s.f.	**2,129,784** s.f.
CONSTRUCTION TYPE		IA	
OCCUPANCY		B/S-1/A2/A3	
FLOOR AREA RATIO			
Max. allowed - .50			
Actual - 0.36			
AUTO PARKING REQUIRED *(City Code)*			
Office: 1 / 250 s.f.		224 stalls	
Whse: 1st 20K @ 1/1,000 s.f.		20 stalls	
2nd 20K @ 1/2,000 s.f.		10 stalls	
above 40K @ 1/4,000 s.f.		325 stalls	
TOTAL		579 stalls	
AUTO PARKING PROVIDED			
Standard (18-6" X 9')		1,689 stalls	
Accessible standard (9' x 18'-6")		20 stalls	
Accessible van (12' x 18'-6")		8 stalls	
EV/Clean Air/Vanpool (8% req'd) including below		150 stalls	
EV/Clean Air/Vanpool	38	stalls	
Future EV Charging Station (6% Req'd) including below	112	stalls	
- Future EVCS Standard Accessible	4	stalls	
- Future EVCS (Van)	2	stalls	
- Future Ambulatory (18'-6" x 10')	4	stalls	
TOTAL		1,867 stalls	
Motorcycle Parking	12	stalls	
TRAILER PARKING PROVIDED			
Trailer (12' x 55')		234 stalls	
ZONING ORDINANCE FOR CITY			
Zoning Designation - Northeast Industrial			
MAXIMUM BUILDING HEIGHT ALLOWED			
Max. allowed - 60'			
Actual - 125' (variance requested)			
LANDSCAPE REQUIREMENT			
Percentage - 10% of parking area			
SETBACKS			
Building	Landscape		
Front - 25'	15'		
Side / Rear - 15'	5'		

SITE PLAN KEYNOTES

① HEAVY BROOM FINISH CONC. PAVEMENT,
② ASPHALT PAVING
③ CONCRETE WALKWAY
④ DRIVEWAY APRONS
⑤ 5'-6"X 5'-6" CONCRETE EXTERIOR LANDING PAD
⑥ MOTORCYCLE PARKING
⑦ TILT-UP CONCRETE WALLED GUARD HOUSE, SEE DAB 4.1
⑧ FIRE PUMP HOUSE AND WATER STORAGE TANK
⑨ 8' H TALL BLACK WROUGHT IRON FENCE.
⑩ PRE-CAST CONC. WHEEL STOP
⑪ CONC. FILLED GUARD POST 6" DIA., 48" H,, U.N.O.
⑫ EXTERIOR STAIR.
⑬ LANDSCAPE. SEE "L" DWGS.
⑭ ACCESSIBLE ENTRY SIGN
⑮ ACCESSIBLE PARKING STALL SIGN
⑯ ELECTRICAL ROOM
⑰ APPROXIMATE LOCATION OF THE TRANSFORMER. SEE DAB-A4.1 DWG.
⑱ EMPLOYEE DROP-OFF SHELTER. HANDI-HUT MODEL #6-3WSPH OR EQUAL.
⑲ CONCRETE SIDEWALK. SEE CIVIL
⑳ STORM DRAINAGE OR TREATMENT. SEE CIVIL.
㉑ APPROXIMATE LOCATION OF EMERGENCY GENERATOR AND ASSOCIATED ELECTRICAL PANELS.
㉒ BIKE RACK, THE BIKE RACK LOCATION.
㉓ 30' H FLAG POLE AND LIGHTS.
㉔ PRE-ENGINEERED SMOKERS SHELTER.
㉕ PEDESTRIAN LIGHTS

SITE PLAN GENERAL NOTES

1. THE SOILS REPORT WILL BE PREPARED BY ENGEO AND SUBMITTED WITH THE BUILDING PERMIT APPLICATION.
2. IF SOILS ARE EXPANSIVE IN NATURE, USE STEEL REINFORCING FOR ALL SITE CONCRETE.
3. ALL DIMENSIONS ARE TO THE FACE OF CONCRETE WALL, FACE OF CONCRETE CURB OR GRID LINE U.N.O.
4. SEE "C" PLANS FOR ALL CONCRETE CURBS, GUTTERS AND SWALES.
5. THE ENTIRE PROJECT SHALL BE PERMANENTLY MAINTAINED WITH AN AUTOMATIC IRRIGATION SYSTEM, IF REQUIRED.
6. SEE "C" DRAWINGS FOR POINT OF CONNECTIONS TO OFF-SITE UTILITIES. CONTRACTOR SHALL VERIFY ACTUAL UTILITY CONTRACTOR SHALL VERIFY ACTUAL UTILITY LOCATIONS.
7. PROVIDE POSITIVE DRAINAGE AWAY FROM BLDG. SEE "C" DRAWINGS.
8. CONTRACTOR TO REFER TO "C" DRAWINGS FOR ALL HORIZONTAL CONTROL DIMENSIONS. SITE PLANS ARE FOR GUIDANCE AND STARTING LAYOUT POINTS.
9. SEE "C"DRAWINGS FOR FINISH GRADE ELEVATIONS.
10. CONCRETE SIDEWALKS TO BE A MINIMUM OF 4" THICK W/ TOOLED JOINTS AT 6' O.C. EXPANSION/CONSTRUCTION JOINTS SHALL BE A MAXIMUM 12' EA. WAY W/ 1:20 MAX. SLOPE. EXPANSION JOINTS TO HAVE COMPRESSIVE EXPANSION FILLER MATERIAL OF 1/4". SEE "L" DRAWINGS FOR FINISH.
11. NOT USED
12. PAINT CURBS AND PROVIDE SIGNS TO INFORM OF FIRE LANES AS REQUIRED BY FIRE DEPARTMENT.
13. CONSTRUCTION DOCUMENTS PERTAINING TO THE LANDSCAPE AND IRRIGATION OF THE ENTIRE PROJECT SITE SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND APPROVED BY PUBLIC FACILITIES DEVELOPMENT PRIOR TO ISSUANCE OF BUILDING PERMITS.
14. PRIOR TO FINAL CITY INSPECTION, THE LANDSCAPE ARCHITECT SHALL SUBMIT A CERTIFICATE OF COMPLETION TO PUBLIC FACILITIES DEVELOPMENT.
15. NOT USED
16. ALL LANDSCAPE AND IRRIGATION DESIGNS SHALL MEET CURRENT CITY STANDARDS AS LISTED IN GUIDELINES OR AS OBTAINED FROM PUBLIC FACILITIES DEVELOPMENT.
17. NOT USED.
18. LANDSCAPED AREAS SHALL BE DELINEATED WITH A MINIMUM SIX INCHES (6") HIGH CURB

SITE LEGEND

☐	LANDSCAPED AREA
☐	AC. PAVING - SEE "C" DRWGS. FOR THICKNESS
▨	CONCRETE PAVING SEE "C" DRWGS. FOR THICKNESS
☐	STANDARD PARKING STALL (9' X 18'-6"')
▨	HANDICAP PARKING STALL (9' X 18'-6")
▨	VAN HANDICAP PARKING STALL (12' X 18'-6")

PROJECT INFORMATION

Project Address
GRANT LINE ROAD,
TRACY, CA

Assessors Parcel Number
250-020-93

Owner/Applicant
PROLOGIS INC.
815 INTERNATIONAL PKWY
TRACY, CA 95377
CONTACT: MATT SIMS
TEL: (510) 661-4012

Code
CBC 2019
CPC 2019
CMC 2019
CEC 2019

Applicant's Representatives
HPA, INC.
600 GRAND AVE., SUITE 302
OAKLAND, CA 94610
CONTACT: TERESA GOODWIN
PHONE: (925) 413-6896

Zoning
SPECIFIC PLAN: NORTH EAST INDUSTRIAL SPECIFIC PLAN

HPA
architecture

hpa, inc.
18831 Bardeen Avenue, Suite 100
Irvine, CA
92612
tel: 949•863•1770

email: hpa@hparchs.com

ROBERT MICHAEL JACOB
C-22276
08-31-21
RENEWAL DATE

Owner:

PROLOGIS
Ahead of what's next

3353 Gateway Blvd.
Fremont, CA 94538
tel: (510) 656-1900

Project:

Project Big Bird
Tracy-NEI
PHASE 3 G4+5

Tracy, CA

Consultants:

CIVIL	K&W
STRUCTURAL	HSA
MECHANICAL	KRAEMER
PLUMBING	KRAEMER
ELECTRICAL	KRAEMER
LANDSCAPE	GREEN DESIGN
FIREPROTECTION	HARRINGTON
SOILS ENGINEER	ENGEO

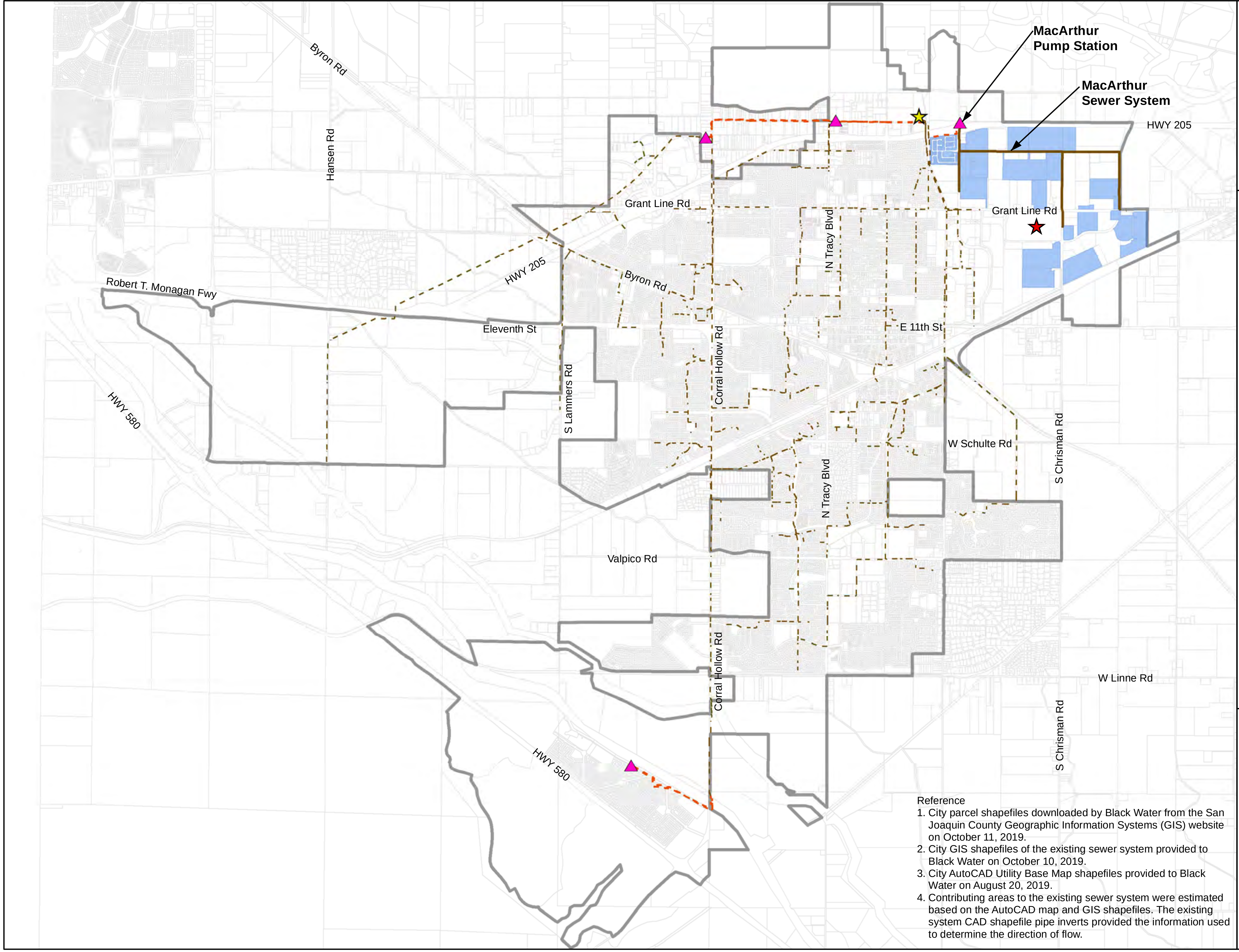
Title: Overall Site Plan

Project Number: 20160
Drawn by: CG
Date: 7/01/20
Revision:

Sheet:
DAB-A1.1

APPENDIX B

MODELING ANALYSIS FIGURES 2-3
DATA OUTPUT
FLOW DATA



Reference
1. City parcel shapefiles downloaded by Black Water from the San Joaquin County Geographic Information Systems (GIS) website on October 11, 2019.
2. City GIS shapefiles of the existing sewer system provided to Black Water on October 10, 2019.
3. City AutoCAD Utility Base Map shapefiles provided to Black Water on August 20, 2019.
4. Contributing areas to the existing sewer system were estimated based on the AutoCAD map and GIS shapefiles. The existing system CAD shapefile pipe inverts provided the information used to determine the direction of flow.

TRACY

LEGEND

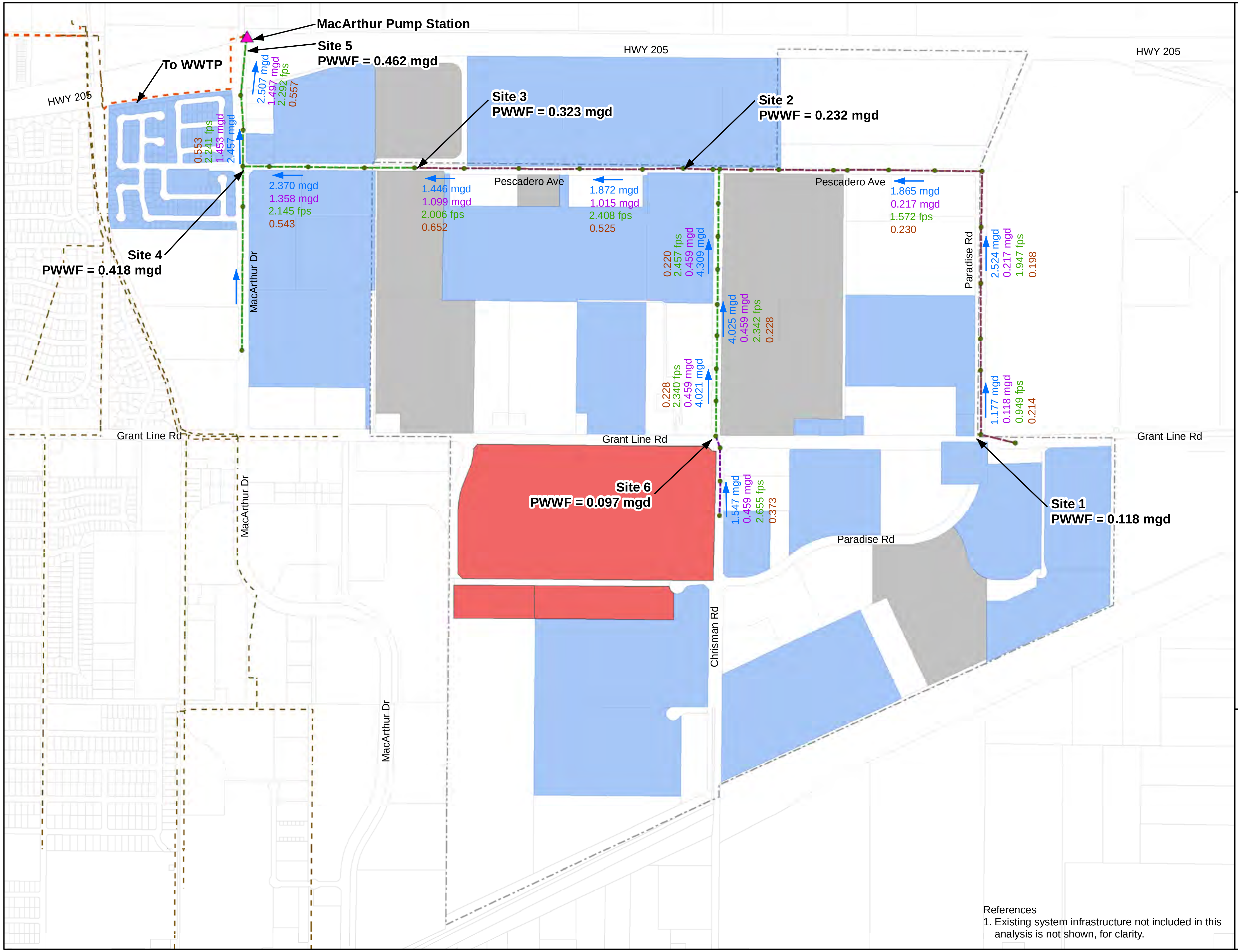
- ▭ Tracy City Limits
- ☆ Wastewater Treatment Plant
- ▲ Pump Station
- ― Gravity Sewer Pipeline Serving Project
- - - Existing Sewer Force Main
- - - Existing Sewer Pipeline
- 🟦 Existing Contributing Area of Sewer Flow to MacArthur Pump Station (Approximately 500 gross acres)
- ★ Prologis Big Bird Tracy-NEI Phase 3 G4+5 (Proposed Project)

Figure 2

SEWER CAPACITY ANALYSIS

Existing Sewer System Schematic

BLACKWATER
CONSULTING ENGINEERS, INC.



References
1. Existing system infrastructure not included in this analysis is not shown, for clarity.

TRACY

LEGEND

- ⬚ NEI Area
- ▲ Pump Station
- ● Sewer Manhole
- ---- 12 - inch Sewer Pipeline
- ---- 18 - inch Sewer Pipeline
- ---- 15 - inch Sewer Pipeline
- ---- Existing Sewer Force Main
- ---- Existing Sewer Pipeline
- 🟥 Prologis (Proposed Project)
- ▨ Proposed Sewer Flows to MacArthur Pump Station
- 🟦 Existing Contributing Area of Sewer Flow to MacArthur Pump Station (Approximately 500 gross acres)
- # mgd → Hydraulic Capacity and Direction of Flow
- # mgd Total Peak Flow
- # fps Velocity
- # d/D Ratio

Figure 3

SEWER CAPACITY ANALYSIS RESULTS

Prologis Project Development

BLACKWATER
CONSULTING ENGINEERS, INC.

MacArthur Sewer System - Manhole Report

ID	Rim Elevation (ft)	Base Flow (mgd)	Total Flow (mgd)	Storm Flow	Grade (ft)	Status	Hydraulic Jump	Surcharge Depth (ft)	Unfilled Depth (ft)
2057	23.02	0.095	0.095	0	2.86	Not Full	No	-0.67	20.16
2057-1	24.13	0	0	0	3.257	Not Full	No	-0.683	20.873
2057-2	23.04	0	0	0	3.734	Not Full	No	-0.686	19.306
2058	27.522	0	0	0	19.08	Not Full	No	-1.5	8.442
2059	21.2	0.044	0.044	0	1.975	Not Full	No	-0.665	19.225
2060	33.463	0	0	0	2.409	Not Full	No	-0.661	31.054
3395	26.31	0	0	0	7.687	Not Full	No	-0.593	18.623
3396	25.41	0	0	0	8.906	Not Full	No	-0.594	16.504
3397	27.455	0.114	0.114	0	10.141	Not Full	No	-0.684	17.314
3398	27.138	0	0	0	10.719	Not Full	No	-0.614	16.419
3399	26.993	0	0	0	10.841	Not Full	Yes	-0.614	16.152
3399.1	28	0	0	0	13.528	Not Full	No	-1.232	14.472
3399.1	36.8	0	0	0	24.753	Not Full	No	-0.627	12.047
3399.1	37.7	0.459	0.459	0	26.283	Not Full	No	-0.627	11.417
3399.2	29	0	0	0	14.891	Not Full	No	-1.169	14.109
3399.3	30.6	0	0	0	16.201	Not Full	No	-1.169	14.399
3399.4	31	0	0	0	17.571	Not Full	No	-1.169	13.429
3399.5	33	0	0	0	18.652	Not Full	No	-1.158	14.348
3399.6	33	0	0	0	19.792	Not Full	No	-1.158	13.208
3399.7	33	0	0	0	20.912	Not Full	No	-1.158	12.088
3399.8	35.7	0	0	0	22.665	Not Full	Yes	-1.185	13.035
3399.9	35.8	0	0	0	23.096	Not Full	No	-0.694	12.704
3400	26.095	0	0	0	11.168	Not Full	No	-0.821	14.927
3401	25.701	0.225	0.225	0	11.645	Not Full	No	-0.821	14.056
3402	24.874	0	0	0	12.451	Not Full	No	-0.953	12.423
3403	24.607	0	0	0	12.687	Not Full	No	-0.953	11.92
3404	24.453	0	0	0	13.397	Not Full	No	-0.953	11.056
3405	25.02	0	0	0	14.288	Not Full	No	-0.962	10.732
3406	27.38	0	0	0	15.19	Not Full	No	-0.96	12.19
3407	27.627	0	0	0	15.538	Not Full	No	-0.712	12.089
3408	28.599	0	0	0	17.248	Not Full	No	-1.002	11.351
3409	31.561	0	0	0	18.202	Not Full	No	-0.948	13.359
3410	32.409	0.099	0.099	0	18.703	Not Full	No	-0.947	13.706
3411	33.314	0.118	0.118	0	19.167	Not Full	No	-0.983	14.147
3435	32.802	0	0	0	19.5	Not Full	No	-1.25	13.302
3436	23.12	0.168	0.168	0	4.388	Not Full	No	-0.682	18.732
3437	23.08	0.091	0.091	0	4.914	Not Full	No	-0.746	18.166
3438	24.34	0.073	0.073	0	5.555	Not Full	No	-0.435	18.785
3439	25.95	0.011	0.011	0	6.479	Not Full	No	-0.591	19.471
JCT-408	20.5	0	0	0	-0.822	Not Full	No	-0.582	21.322
JCT-88	32.027	0	0	0	19.98	Not Full	No	-1.5	12.047

MacArthur Sewer System - Pipe Report

ID	From ID	To ID	Diameter (in)	Length (ft)	Slope	Total Flow (mgd)	Unpeakable Flow (mgd)	Flow Type	Velocity (ft/s)	d/D	q/Q	Water Depth (ft)	Critical Depth (ft)	Froude Number	Full Flow (mgd)	Backwater Adjustment	Adjusted Depth (ft)	Adjusted Velocity (ft/s)
1824	2060	2059	18	342.037	0.001	1.453	1.453	Free Surface	2.21	0.559	0.602	0.839	0.567	0.471	2.414	No	0.839	2.21
20805-1	3436	2057-2	18	545	0.001	1.358	1.358	Free Surface	2.132	0.545	0.578	0.818	0.547	0.463	2.351	No	0.818	2.132
20805-2	2057-1	2057	18	259	0.001	1.358	1.358	Free Surface	2.135	0.545	0.577	0.817	0.547	0.464	2.355	No	0.817	2.135
20805-3	2057-2	2057-1	18	396	0.001	1.358	1.358	Free Surface	2.145	0.543	0.573	0.814	0.547	0.467	2.37	Yes	0.816	2.14
935	2057	2060	18	352.988	0.001	1.453	1.453	Free Surface	2.241	0.553	0.591	0.83	0.567	0.482	2.457	Yes	0.835	2.226
937	JCT-88	2058	18	1,416.88	0.001	0	0	Free Surface	0	0	0	0	0	0	1.716	No	0	0
CDT-303	3437	3436	18	491.16	0.001	1.19	1.19	Free Surface	2.07	0.503	0.504	0.754	0.511	0.474	2.359	Yes	0.786	1.964
CDT-305	3438	3437	15	486	0.001	1.099	1.099	Free Surface	2.006	0.652	0.76	0.815	0.518	0.419	1.446	No	0.815	2.006
CDT-307	3439	3438	15	538	0.002	1.026	1.026	Free Surface	2.418	0.528	0.547	0.659	0.499	0.587	1.876	Yes	0.737	2.108
CDT-309	3395	3439	15	607	0.002	1.015	1.015	Free Surface	2.405	0.525	0.543	0.657	0.497	0.586	1.869	Yes	0.658	2.398
CDT-313	3396	3395	15	610	0.002	1.015	1.015	Free Surface	2.408	0.525	0.542	0.656	0.497	0.587	1.872	Yes	0.656	2.406
CDT-315	3397	3396	15	399.68	0.003	1.015	1.015	Free Surface	2.908	0.453	0.421	0.566	0.497	0.778	2.41	Yes	0.611	2.635
CDT-317	3398	3397	15	291.445	0.002	0.901	0.901	Free Surface	2.221	0.509	0.516	0.636	0.467	0.552	1.748	No	0.636	2.221
CDT-319	3399	3398	15	69.827	0.002	0.901	0.901	Free Surface	2.222	0.509	0.515	0.636	0.467	0.553	1.75	Yes	0.636	2.221
CDT-320.1	3399.1	3399	18	328	0.009	0.459	0.459	Free Surface	3.31	0.179	0.07	0.268	0.313	1.35	6.57	Yes	0.452	1.582
CDT-320.10	3399.1	3399.9	12	352	0.005	0.459	0.459	Free Surface	2.662	0.373	0.296	0.373	0.352	0.893	1.552	No	0.373	2.662
CDT-320.11	3399.11	3399.1	12	341	0.004	0.459	0.459	Free Surface	2.655	0.373	0.297	0.373	0.352	0.89	1.547	No	0.373	2.655
CDT-320.2	3399.2	3399.1	18	325	0.004	0.459	0.459	Free Surface	2.456	0.22	0.107	0.331	0.313	0.898	4.305	No	0.331	2.456
CDT-320.3	3399.3	3399.2	18	327	0.004	0.459	0.459	Free Surface	2.457	0.22	0.107	0.331	0.313	0.898	4.309	Yes	0.331	2.456
CDT-320.4	3399.4	3399.3	18	343	0.004	0.459	0.459	Free Surface	2.454	0.221	0.107	0.331	0.313	0.897	4.302	No	0.331	2.454
CDT-320.5	3399.5	3399.4	18	306	0.003	0.459	0.459	Free Surface	2.342	0.228	0.114	0.342	0.313	0.841	4.025	No	0.342	2.342
CDT-320.6	3399.6	3399.5	18	325	0.004	0.459	0.459	Free Surface	2.344	0.228	0.114	0.342	0.313	0.842	4.032	Yes	0.342	2.343
CDT-320.7	3399.7	3399.6	18	321	0.003	0.459	0.459	Free Surface	2.34	0.228	0.114	0.342	0.313	0.84	4.021	No	0.342	2.34
CDT-320.8	3399.8	3399.7	18	366	0.005	0.459	0.459	Free Surface	2.632	0.21	0.097	0.315	0.313	0.987	4.747	Yes	0.329	2.478
CDT-320.9	3399.9	3399.8	12	98	0.01	0.459	0.459	Free Surface	3.492	0.306	0.203	0.306	0.352	1.31	2.261	Yes	0.56	1.568
CDT-321	3400	3399	15	306.192	0.002	0.442	0.442	Free Surface	1.838	0.343	0.253	0.429	0.323	0.578	1.748	Yes	0.532	1.373
CDT-323	3401	3400	15	273.505	0.002	0.442	0.442	Free Surface	1.838	0.343	0.253	0.429	0.323	0.578	1.748	No	0.429	1.838
CDT-325	3402	3401	15	538.256	0.002	0.217	0.217	Free Surface	1.501	0.238	0.124	0.297	0.225	0.577	1.748	Yes	0.363	1.135
CDT-327	3403	3402	15	135.304	0.002	0.217	0.217	Free Surface	1.501	0.238	0.124	0.297	0.225	0.577	1.748	Yes	0.297	1.501
CDT-329	3404	3403	15	407.053	0.002	0.217	0.217	Free Surface	1.501	0.238	0.124	0.297	0.225	0.577	1.748	No	0.297	1.501
CDT-331	3405	3404	15	453.268	0.002	0.217	0.217	Free Surface	1.572	0.23	0.116	0.288	0.225	0.615	1.865	Yes	0.293	1.536
CDT-333	3406	3405	15	466.281	0.002	0.217	0.217	Free Surface	1.556	0.232	0.118	0.29	0.225	0.606	1.839	No	0.29	1.556
CDT-335	3407	3406	15	551.655	0	0.217	0.217	Free Surface	0.664	0.431	0.385	0.538	0.225	0.183	0.564	No	0.538	0.664
CDT-337	3408	3407	15	550.188	0.004	0.217	0.217	Free Surface	1.947	0.198	0.086	0.248	0.225	0.825	2.524	Yes	0.393	1.016
CDT-339	3409	3408	15	547.639	0.002	0.217	0.217	Free Surface	1.47	0.241	0.128	0.302	0.225	0.56	1.697	No	0.302	1.47
CDT-341	3410	3409	15	309.154	0.002	0.217	0.217	Free Surface	1.461	0.242	0.129	0.303	0.225	0.556	1.684	No	0.303	1.461
CDT-343	3411	3410	15	632.74	0.001	0.118	0.118	Free Surface	0.949	0.214	0.1	0.267	0.165	0.386	1.177	Yes	0.285	0.866
CDT-345	3435	3411	15	349.115	0.002	0	0	Free Surface	0	0	0	0	0	0	1.735	Yes	0.134	0
CDT-715	2059	JCT-408	18	567.827	0.001	1.497	1.497	Free Surface	2.292	0.557	0.597	0.835	0.575	0.49	2.507	No	0.835	2.292
CDT-75	2058	2057	18	396.955	0.038	0	0	Free Surface	0	0		0	0	0	13.255	No	0	0