Transportation Impact Study

for

Project Panda

Prepared For:

Hillwood Enterprises
9550 W Higgins Road
Suite 425
Rosemont, IL 60018

Prepared By:

Langan Engineering & Environmental Services, Inc.
2400 Ansys Drive, Suite 403
Canonsburg PA, 15317

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

August 2020
250095201

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MDOT Prequalifications Performed and / or Reviewed By:
ROWE Professional Services Company(1) (2) (3)

ROWE Professional Services Company performed and / or reviewed elements of the TIS as it pertained to the following three (3) prequalifications:

(1) Design – Traffic: Signal Operations – Complex
(2) Design – Traffic: Capacity
(3) Design – Traffic: Safety Studies

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I. EXECUTIVE SUMMARY

Overview of Development

Langan has prepared the following Transportation Impact Study in support of the proposed Project Panda development. As shown in **Figure 1**, the proposed project is located at the 1301 Eight Mile Road in the State Fair Grounds at the existing Gateway Marketplace in the City of Detroit, Michigan. The approximately 163.2 acre site is bound by Eight Mile Road (M-102) to the north, a CN rail line to the east, West State Fair Avenue to the south, and Woodward Avenue (M-1) to the west. The proposed warehouse (Warehouse C) will employ two (2) shifts of 993 employees and will include approximately 1,900 car parking spaces, 207 trailer parking spaces, and 64 loading docks. The majority of the day shift (@60%) is anticipated to arrive between 6:30 – 7:30 AM prior to the typical AM commuter peak hour and depart between 5:30 – 6:30 PM after the typical PM commuter peak hour. Similarly, the majority of the night shift (@60%) is anticipated to arrive between 5:30 – 6:30 PM after the typical PM commuter peak hour and depart between 4:30 – 5:30 AM prior to the typical AM commuter peak hour. In addition to relocating the existing transit station along Woodward Avenue to the State Fair Grounds property, there are also three (3) other proposed warehouses that are contemplated for a Phase II which total 665,000 SF (Warehouses B, D1, and D2).

The proposed site is to be constructed in two (2) phases of development. Phase I will include Warehouse C which is anticipated to be completed in 2022. Phase II will include the additional three (3) warehouses which are anticipated to be completed between 2026 and 2028. Access to the site is proposed along Eight Mile Road by one (1) full signalized access point, one (1) signalized access point along Woodward Avenue at the existing transit station, and two (2) full access unsignalized points along West State Fair Avenue with exiting stop control. Both access points along West State Fair Avenue will only service employee vehicles per the City of Detroit's request to restrict truck traffic along that road. The proposed site access locations are shown on **Figure 2**.

Site Trip Generation, Distribution, and Capacity Analyses

Langan estimated the trip generation for the proposed warehouse which will utilize approximately 993 employees per shift and the combined 665,000 SF warehouses using trip generation data contained in the *Trip Generation Manual*, 10th Edition, published by the Institute of Transportation Engineers (ITE). The end-user typically sees a 19% total modal split reduction for these types of facilities nationwide; however, for a conservative approach a 10% total modal split reduction was applied to the proposed site generated trips for transit, carpool, bicycles, and other uses. Based on data provided by the end-user of Warehouse C, trucks account for 3% of the peak hour site generated trips. Truck trips for warehouses B, D1, and D2 were calculated using the *Trip Generation Manual Supplement*, 10th Edition, published by ITE.

The resulting trip generation calculations indicate the proposed Phase I development (Warehouse C) would generate 545 AM Peak Hour trips (392 In, 153 Out) and 589 PM Peak Hour trips (212 In, 377 Out). The resulting trip generation calculations indicate the proposed Phase II development (Warehouses B, D1, and D2) would generate an additional 140 AM Peak Hour trips (108 In, 32 Out) and 147 PM Peak Hour trips (40 In, 107 Out).

All proposed Phase I and Phase II trips were distributed to the study area network based on the location of the site and neighboring metropolitan areas, local employment statistics, on-site separation of truck and employee parking, and engineering judgement. The employee distributions estimated approximately 30% of site traffic will be coming to/from the northeast/east/southeast on Eight Mile Road, 20% to/from the southwest on Woodward Avenue, 15% to/from the northwest on Woodward Avenue, 15% to/from the east on West State Fair Avenue, 5% locally to/from the south on John R Street, and 15% locally to/from the west on Eight Mile Road. The truck distributions estimated approximately 55% of site traffic will be coming to/from the northeast/east/southeast on Eight Mile Road, 25% to/from the southwest on Woodward Avenue, 10% to/from the northwest on Woodward Avenue, and 10% to/from the west on Eight Mile Road.

Conclusions

The results of this study provide a broad overview of the transportation impacts that are associated with Project Panda. The proposed warehouses can be accommodated at this site by modifying the crossover east of Ralston Street to include two (2) eastbound left turning lanes and two (2) westbound left turning lanes. The northbound approach of Site Driveway A should include one (1) dedicated left turn lane and one (1) dedicated right turn lane. This system would also include updated traffic signal phasing to facilitate northbound exiting site traffic traveling across the eastbound Eight Mile Road segment to then turn left onto the westbound segment. The modification would include roadway widening / alterations and traffic signal upgrades at the intersection of Eight Mile Road & Crossover / Site Driveway A. Additionally, signal modifications would be required at Woodward Avenue & Site Driveway B to accommodate the new site connection. The westbound approach of Site Driveway B should include one (1) dedicated left turn lane and one (1) dedicated right turn lane. Minor signal timing optimization should also be pursued at Woodward Avenue & West State Fair Avenue. Per MDOT's request, all three (3) of the aforementioned intersections should include upgraded or additional pedestrian facilities and infrastructure.

The capacity analyses indicate that all study area intersections are projected to operate at an overall LOS D or better during the 2022 Build and 2032 Build AM and PM Peak hour conditions.

In conclusion, the proposed warehousing development will have a minimal transportation impact on the surrounding study area roads & intersections with the construction of the roadway improvement outlined above.

II. INTRODUCTION / PROJECT SUMMARY

Purpose of Report

The purpose of this document is to summarize the findings of the Transportation Impact Study conducted in support of the proposed Project Panda development. As shown in **Figure 1**, the proposed project is located in the State Fair Grounds in the City of Detroit, Wayne County, Michigan. The approximately 163.2 acre site is bound by Eight Mile Road (M-102) to the north, a CN rail line to the east, West State Fair Avenue to the south, and Woodward Avenue (M-1) to the west. There are currently two (2) existing access points to the site along Eight Mile Road, two (2) existing access points to the site along West State Fair Avenue, and one (1) existing access point to the site along Woodward Avenue. The proposed warehouse (Warehouse C) will employ two (2) shifts of 993 employees and will include approximately 1,900 car parking spaces, 207 trailer parking spaces, and 64 loading docks. The majority of the day shift (@60%) is anticipated to arrive between 6:30 – 7:30 AM prior to the typical AM commuter peak hour and depart between 5:30 – 6:30 PM after the typical PM commuter peak hour. Similarly, the majority of the night shift (@60%) is anticipated to arrive between 5:30 – 6:30 PM after the typical PM commuter peak hour and depart between 4:30 – 5:30 AM prior to the typical AM commuter peak hour. There are also three (3) other proposed warehouses which are proposed as part of the master plan development that total 665,000 SF: Warehouse B – 320,000 SF, Warehouse D1 – 195,000 SF, and Warehouse D2 – 150,000 SF.

There are a total of four (4) proposed access points to the site. One (1) access point (Site Driveway A) is proposed along Eight Mile Road which is proposed to become a fully signalized intersection which includes two (2) westbound left turn lanes at the crossover. This site access point will service both employee vehicles and trucks. There is one (1) signalized access point (Site Driveway B) proposed along Woodward Avenue (NB) at the existing transit station access. The transit station is proposed to be relocated onto the northwestern corner of the State Fair Grounds property adjacent to Site Driveway A and included with this development. The access point along Woodward Avenue is proposed to service employee vehicles, trucks, and transit vehicles and will need to be modified to accommodate the new site connection. There are two (2) unsignalized access points (Site Driveway C and Site Driveway D) proposed along West State Fair Avenue which are proposed to become full access driveways with exiting stop control. Both access points along West State Fair Avenue will only service employee vehicles per the City of Detroit's request. The proposed site plan is illustrated on **Figure 2**.

This report examines if there are any impacts from the proposed development on the surrounding intersections and roadways. Based on the results of the analyses, this report provides recommended improvements.

III. EXISTING STUDY AREA CONDITIONS

Study Area Roadways

Eight Mile Road (M-102) is a state road with a posted speed limit of 40 mph. This road has a general east-west orientation and is divided into two (2) segments by a median: one segment for eastbound vehicles and one segment for westbound vehicles. This road generally provides four (4) lanes of

travel in each direction with dedicated left turn lanes via crossovers. Land use along this road is predominately commercial.

Eight Mile Road (M-102) has multiple service roads to facilitate vehicles traveling to/from large arterial roads such as Woodward Avenue (M-102). These service roads have a general east-west orientation and generally provide two (2) lanes of travel in both directions with dedicated left turn lanes. Land use along these service roads are a mix of commercial and residential

Woodward Avenue (M-1) is a state road with a posted speed limit of 40 mph. This road has a general north-south orientation and is divided into two (2) segments by a median: one segment for northbound vehicles and one segment for southbound vehicles. This road generally provides five (5) lanes of travel in each direction with dedicated left turn lanes via crossovers. Land use along this road is predominately commercial.

Woodward Avenue (M-1) has two (2) service roads near the site to facilitate vehicles traveling to/from Eight Mile Road (M-1). These service roads have a general north-south orientation and generally provide two (2) to three (3) lanes of travel in both directions with dedicated left turn lanes. Land use along these service roads are predominately commercial.

State Fair Avenue is a city road with a posted speed limit of 30 mph near the site. This road has a general east-west orientation and provides one (1) lane of travel in each direction. Land use along this road is a mix of commercial and residential.

John R Street is a city road with a posted speed limit of 30 mph near the site. This road has a general north-south orientation and provides one (1) lane of travel in each direction. Land use along this road is predominately commercial.

Data Collection

Based upon a review of the surrounding study area, the scope of the study identified to satisfy MDOT / City of Detroit requirements includes the peak hour turning movement counts at the following eight (8) intersections:

1. Eight Mile Road & Site Driveway A (signalized)
2. E Woodward Service Road (NB) & E Eight Mile Service Road (WB) (signalized)
3. E Woodward Service Road (SB) & Eight Mile Service Road (EB) (signalized)
4. Woodward Avenue & Site Driveway B (signalized)*
5. Woodward Avenue & West State Fair Avenue (signalized)
6. West State Fair Avenue & Site Driveway C / Ralston Street (unsignalized)*
7. West State Fair Avenue & Site Driveway D (unsignalized)*
8. West State Fair Avenue & John R Street (signalized)**

(*Existing mainline thru volumes at these unsignalized intersections were determined from upstream or downstream signalized intersections. Additionally, Intersections 1 and 6 include estimated southbound and northbound volumes, respectively, based on engineering judgement as no historic count data included these turning movements.)

(**Turning movement counts at this intersection were conducted on July 16th, 2020.)

Due to the current "Stay Home, Stay Safe" orders issued throughout Michigan and the nation abroad as a result of COVID-19, the collection of turning movement counts at the study intersections was not feasible initially. As such, two (2) different sets of historic count data was provided by MDOT. The first data set includes counts for Intersections 1, 2, and 3 from 2007 which were used in the approved Gateway Marketplace TIS. The second data set includes counts for Intersection 5 from 2019 which were used in an optimization project along Woodward Avenue.

The counts are representative of a typical weekday during the AM peak period (7:00 AM to 9:00 AM) and PM peak period (4:00 PM to 6:00 PM); however, the data from 2007 does not include typical turning movement count printouts but rather only summaries of the peak hour turning movements. All manual / video turning movement count summaries are included as **Appendix A**.

The AM and PM peak hours (four consecutive 15-minute periods comprising the highest volume) from the intersection counts were used to determine the 2007 / 2019 Historic Peak Hour Traffic Volumes shown on **Figure 3**.

We conducted a desktop reconnaissance of the study area to obtain existing intersection geometry, turn lane lengths, lane widths, and posted speed limits. The inventory sketches and existing traffic signal plans are included in **Appendix B**.

Existing Traffic Volume Growth

The Southeastern Michigan Council of Governments (SEMCOG) regional travel forecasting model was used to determine the regional growth rate in the area. Based on the model, and as previously identified in the approved Gateway Marketplace TIS, vehicular volumes are generally projected to decrease along the study roadways. As such, no growth was applied to the 2007 / 2019 historic count data so the volumes are representative of the standard "2019 peak hour traffic volumes".

For a conservative estimate, a growth rate of 1.0% per year was applied to all study roadways to grow these historic volumes from 2019 to 2020. The 2020 Historic Regional Growth is illustrated on **Figure 4A**. The 2020 Historic Regional Growth volumes were added to the 2007 / 2019 Historic Peak Hour Traffic Volumes (**Figure 3**) to obtain the 2020 Historic Peak Hour Traffic Volumes (**Figure 4**).

Since the 2007 count data was collected prior to the opening of the Gateway Marketplace, the trips outlined in that study at Intersections 1, 2, and 3 (**Figure 5A**) were added to the 2007 / 2019 Historic Peak Hour Traffic Volumes (**Figure 3**). These trips were not included at other intersections as the Gateway Marketplace was open when the 2019 counts were conducted. The resulting 2020 Existing Peak Hour Traffic Volumes are illustrated on **Figure 5**. The original trip figure for the approved Gateway Marketplace study is included in **Appendix C**.

Per the City of Detroit's request, all existing turning movements at the John R Street & West State Fair Street intersection which were collected in July 2020 were grown by 10% to account for potentially lower traffic volumes as a result of COVID-19. The additional volume growth at this intersection is illustrated on **Figure 6A**. This additional growth was added to the 2020 Existing Peak Hour Traffic Volumes to develop the 2020 Adjusted Peak Hour Traffic Volumes (**Figure 6**).

IV. DEVELOPMENT DESCRIPTION

The proposed project is located at the 1301 Eight Mile Road in the State Fair Grounds at the existing Gateway Marketplace in the City of Detroit, Michigan. The approximately 163.2 acre site is bound by Eight Mile Road (M-102) to the north, a CN rail line to the east, West State Fair Avenue to the south, and Woodward Avenue to the west. The proposed Warehouse C will employ two (2) shifts of 993 employees and will include approximately 1,900 car parking spaces, 207 trailer parking spaces, and 64 loading docks. The majority of the day shift (@60%) is anticipated to arrive between 6:30 – 7:30 AM prior to the typical AM commuter peak hour and depart between 5:30 – 6:30 PM after the typical PM commuter peak hour. Similarly, the majority of the night shift (@60%) is anticipated to arrive between 5:30 – 6:30 PM after the typical PM commuter peak hour and depart between 4:30 – 5:30 AM prior to the typical AM commuter peak hour. There are also three (3) other proposed warehouses which are proposed as part of the master plan development that total 665,000 SF: Warehouse B – 320,000 SF, Warehouse D1 – 195,000 SF, and Warehouse D2 – 150,000 SF. In addition to the warehousing developments, the existing transit station located along Woodward Avenue is proposed to be relocated onto the northwestern corner of the State Fair Grounds property adjacent to Site Driveway A as part of this development.

The proposed site is to be constructed in two (2) phases of development. Phase I will include Warehouse C which is anticipated to be completed in 2022. Phase II will include the additional three (3) warehouses (Warehouses B, D1, and D2) which are anticipated to be completed between 2026 and 2028. Therefore, for the purposes of this study, Langan analyzed the following design scenarios:

- 2020 Existing Conditions
- 2022 Opening Day Conditions without Development (2022 No Build)
- 2022 Opening Day Conditions with Development (2022 Phase I Build)
- 2032 Opening Day Conditions without Development (2032 No Build)
- 2032 Opening Day Conditions with Development (2032 Master Plan Build)

Proposed Site Access

There are a total of four (4) proposed access points to the site. One (1) access point (Site Driveway A) is proposed along Eight Mile Road which is proposed to become a fully signalized intersection which includes two (2) westbound left turn lanes at the crossover. This site access point will service both employee vehicles and trucks as well as relocated transit vehicles. There is one (1) signalized access point (Site Driveway B) proposed along Woodward Avenue (NB) at the existing transit station access. The transit station is proposed to be relocated onto the northwestern corner of the State Fair Grounds property adjacent to Site Driveway A and included with this development. The access point along Woodward Avenue is proposed to service employee vehicles, trucks, and transit vehicles and

will need to be modified to accommodate the new site connection. There are two (2) unsignalized access points (Site Driveway C and Site Driveway D) proposed along West State Fair Avenue which are proposed to become full access driveways with exiting stop control. Both access points along West State Fair Avenue will only service employee vehicles per the City of Detroit's request to restrict truck traffic along that road. The proposed site plan is illustrated in **Figure 2**.

Site Trip Generation

Langan estimated the trip generation for the proposed warehouse with 993 employees per shift and the combined 665,000 SF warehouses using trip generation data contained in the *Trip Generation Manual*, 10th Edition, published by the Institute of Transportation Engineers (ITE). The end-user typically sees a 19% total modal split reduction for these types of facilities nationwide; however, for a conservative approach a 10% total modal split reduction was applied to the proposed site generated trips for transit, carpool, bicycles, and other uses. Correspondence with MDOT regarding the 10% modal split reduction is included in **Appendix D**. Based on data provided by the end-user of Warehouse C, trucks account for 3% of the peak hour site generated trips. Truck trips for Warehouses B, D1, and D2 were calculated using the *Trip Generation Manual Supplement*, 10th Edition, published by ITE.

The resulting trip generation calculations indicate the proposed Phase I development (Warehouse C) would generate 545 AM Peak Hour trips (392 In, 153 Out) and 589 PM Peak Hour trips (212 In, 377 Out). The resulting trip generation calculations indicate the proposed Phase II development (Warehouses B, D1, and D2) would generate an additional 140 AM Peak Hour trips (108 In, 32 Out) and 147 PM Peak Hour trips (40 In, 107 Out). The Phase I site trip generation calculations are shown in **Table 1A** and the Phase II site trip generation for the additional warehouses are shown in **Table 1B**.

Site Trip Distribution

All proposed Phase I and Phase II site generated trips were distributed to the study area network based on the location of the site and neighboring metropolitan areas, local employment statistics, on-site separation of truck and employee parking, and engineering judgement. The total proposed Phase I (Warehouse C) site generated trips are illustrated on **Figure 8**. The proposed Phase I employee site generated trips and distribution percentages are illustrated on **Figure 8A**. The proposed Phase I truck site generated trips and distribution percentages are illustrated on **Figure 8B**.

The total proposed Phase II (warehousing buildings B, D1, and D2) generated trips are illustrated on **Figure 9**. The proposed Phase II employee site generated trips and distribution percentages are illustrated on **Figure 9A**. The proposed Phase II truck site generated trips and distribution percentages are illustrated on **Figure 9B**.

The Phase I and Phase II employee distributions estimated approximately 30% of site traffic will be coming to/from the northeast/east/southeast on Eight Mile Road, 20% to/from the southwest on Woodward Avenue, 15% to/from the northwest on Woodward Avenue, 15% to/from the east on West State Fair Avenue, 5% locally to/from the south on John R Street, and 15% locally to/from the west

on Eight Mile Road. The Phase I and Phase II truck distributions estimated approximately 55% of site traffic will be coming to/from the northeast/east/southeast on Eight Mile Road, 25% to/from the southwest on Woodward Avenue, 10% to/from the northwest on Woodward Avenue, and 10% to/from the west on Eight Mile Road.

V. FUTURE TRAFFIC VOLUMES

No Build Traffic Volumes

The Southeastern Michigan Council of Governments (SEMCOG) regional travel forecasting model was used to determine the regional growth rate in the area. Based on the model, and as previously identified in the approved Gateway Marketplace TIS, vehicular volumes are generally projected to decrease along the study roadways.

For a conservative estimate, a growth rate of 1.0% per year was applied to all study roadways to develop the 2022 regional growth volumes. Although first used to grow the 2007 / 2019 historic volumes to the 2020 historic volumes condition, the growth rate was also used to grow the 2020 historic volumes to the 2022 opening year condition and the 2032 design year condition. The 2022 Regional Growth (**Figure 6A**) was added to the 2020 Existing Peak Hour Traffic Volumes (**Figure 5**) to develop the 2022 No Build Peak Hour Traffic Volumes which are illustrated on **Figure 6**. The 2032 Regional Growth (**Figure 7A**) was added to the 2020 Existing Peak Hour Traffic Volumes (**Figure 5**) to develop the 2032 No Build Peak Hour Traffic Volumes which are illustrated on **Figure 7**.

Build Traffic Volumes

We developed 2022 Phase I Build traffic volumes by adding the Total Phase I Site Trips (**Figure 8**) to the 2022 No Build Peak Hour Traffic Volumes (**Figure 6**). The 2022 Phase I Build Peak Hour Traffic Volumes are illustrated on **Figure 10**.

We developed 2032 Phase II Build traffic volumes by adding the Total Phase I (Warehouse C) Trips (**Figure 8**) and the Total Phase II (Warehouse Buildings B, D1, and D2) Trips (**Figure 9**) to the 2032 No Build Peak Hour Traffic Volumes (**Figure 7**). The 2032 Master Plan Build Peak Hour Traffic Volumes are illustrated on **Figure 11**.

Roadway Improvements

To facilitate site traffic entering / exiting the development along Eight Mile Road, the eastbound-to-westbound crossover located east of Ralston Street is proposed to facilitate both eastbound left and westbound left turning movements. The existing geometry of the crossover includes two (2) eastbound left turning lanes with a signalized intersection along the westbound segment of Eight Mile Road. The proposed geometry of the crossover includes two (2) eastbound left turning lanes and two (2) westbound left turning lanes. The westbound left turning lanes with allow site vehicles to turn left to travel south into Site Driveway A which will require the installation of a traffic signal along the eastbound segment of Eight Mile Road. The proposed geometry will also facilitate northbound

exiting site traffic to travel across the eastbound Eight Mile Road segment to then turn left onto the westbound segment. This modification would include roadway widening / alterations and traffic signal upgrades. Additionally, signal modifications would be required at Woodward Avenue & Site Driveway B to accommodate the new site connection as well as minor signal timing optimization at Woodward Avenue & West State Fair Avenue.

VI. OPERATIONAL ANALYSIS

Capacity and Level of Service Analysis

Langan utilized the provided turning movement count data and existing roadway geometry and characteristics to perform capacity analyses based on Highway Capacity Manual (HCM) methodology for the study intersections. We used Synchro software to conduct the capacity analyses.

These analyses calculate the delay experienced by an average motorist and assigns the appropriate level of service (LOS). There are six levels of service that are defined for any intersection. They are given a letter designation from A to F, with LOS A representing the best operating conditions and LOS F the worst. Typically, review agencies consider LOS D or better acceptable for urban conditions.

Table 1 & Table 2 in **Appendix E** depicts the level of service criteria for signalized and unsignalized intersections.

Existing, No Build, Build, and Build with Improvements levels of service (LOS) were calculated for the AM and PM peak hours on a typical day for 2020 Existing, 2022 No Build, 2022 Opening Year, 2032 No Build, and 2032 Design Year. Roadway grades and lane widths were obtained through a desktop review which was incorporated into the calculations. Existing peak hour factors and heavy vehicle percentages were mostly left at their default values as the only count data printouts which included these values or 15 minute interval count data were for the Woodward Avenue & West State Fair Avenue intersection.

The 2020 Existing, 2022 No Build, 2022 Phase I Build, 2032 No Build, and 2032 Master Plan Build levels of service are summarized in the Level of Service Comparison **Tables 2A – 2B**. The 2020 Existing, 2022 No Build, 2022 Phase I Build, 2032 No Build, and 2032 Master Plan Build Synchro printouts can be found in **Appendix F – J**, respectively. For capacity analyses reference purposes, traffic volumes and site trips at two (2) additional intersections (Int 9 - E Woodward Service Road (SB) & Eight Mile Service Road (WB) and Int 10 - E Woodward Service Road (NB) & Eight Mile Service Road (EB)) are included at the end of **Appendix F**.

As anticipated, there will be minimal increases in delay under the 2022 Build condition as a result of the increase in Phase I site traffic volumes. However, as shown in **Tables 2A – 2B,** all study area intersections are projected to operate at an overall LOS D or better during both the AM and PM peak hours during the 2022 Build condition.

According to the capacity analyses, there will be minor increases in delay under the 2032 Build condition as a result of the increase in Phase II site traffic volumes. However, as shown in **Tables 2A – 2B,** all study area intersections are projected to operate at an overall LOS D or better during both the AM and PM peak hour during the 2032 Build condition.

A queue length comparison is provided for the AM and PM peak hours of all scenarios. As shown in **Tables 3A – 3B**, all 2022 Build and 2032 Build queues can be accommodated within the existing provided storage bay lengths.

Traffic Signal Warrant Analyses

Based on the proposed improvements outlined in the Roadway Improvements section above, we conducted a peak hour signal warrant analysis, four-hour warrant analysis, and eight-hour warrant analysis for the intersection of Eight Mile Road (EB) & Crossover / Site Driveway A. The eastbound segment of Eight Mile Road at Site Driveway A is currently unsignalized but the westbound segment at this location is currently signalized for protected eastbound left crossover and southbound right turning movements.

The peak hour signal warrants, four-hour signal warrants, and eight-hour signal warrants are based on MDOT guidelines and use the MDOT signal warrant spreadsheet. These warrants use historic ATR data provided by MDOT which were grown to 2022 and 2032 using the 1.0% linear growth rate. The reduced warrants were utilized as it can be assumed the 85th percentile speed is greater than the posted speed limit of 40 MPH along this multi-lane boulevard.

Based on the analysis, the Eight Mile Road (EB) & Crossover / Site Driveway A intersection satisfies the peak hour warrant's criteria for both the AM and PM peak hours of the 2022 Phase I Build scenario and 2032 Master Plan Build scenario. This intersection also satisfies the four-hour warrant's criteria for the 2022 Build Phase I scenario and the 2032 Build Master Plan scenario as well as the eight-hour warrant's criteria for the 2032 Build Master Plan scenario.

Refer to **Appendix K** for the signal warrant calculations.

VII. CONCLUSIONS

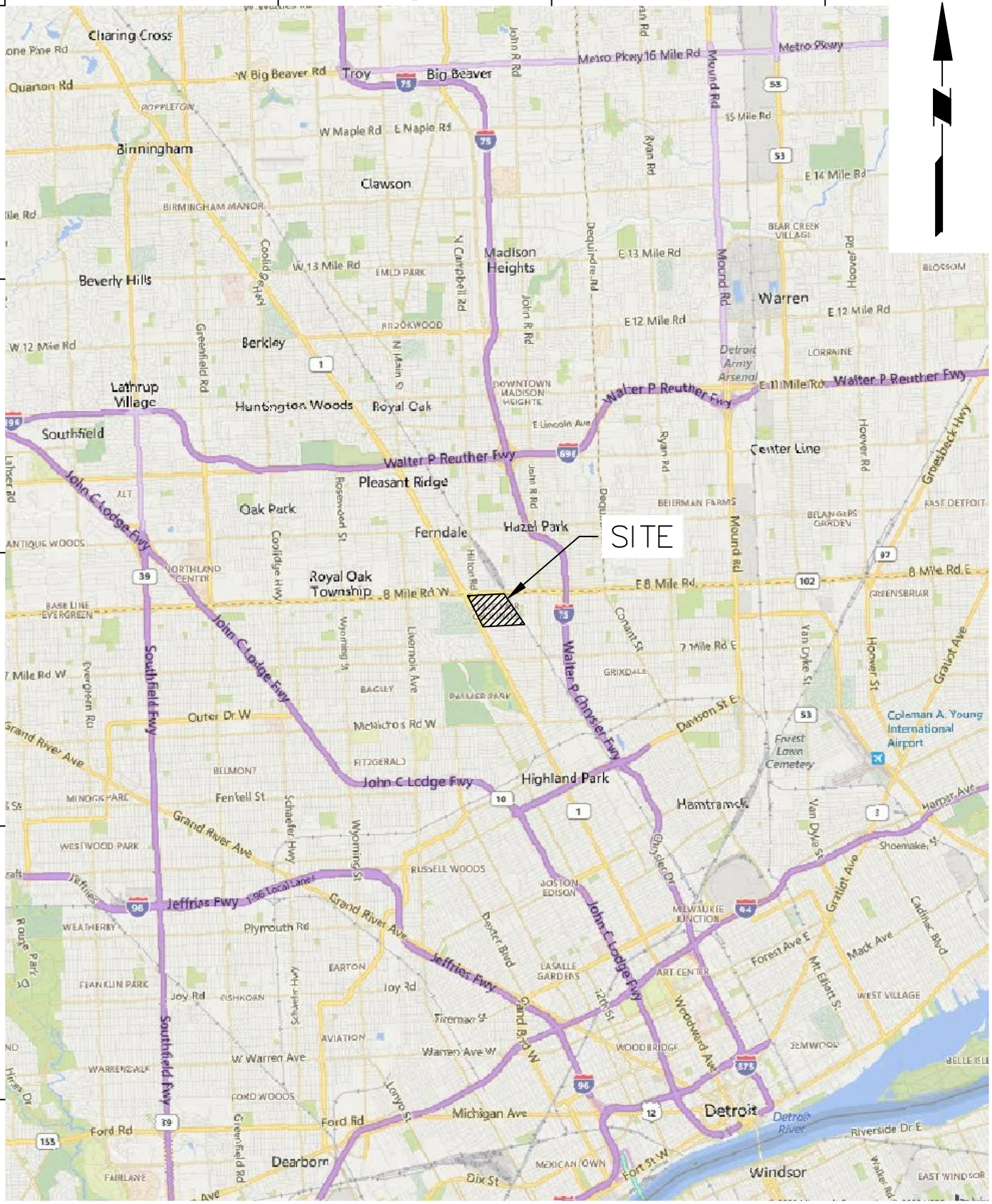
The results of this study provide a broad overview of the transportation impacts that are associated with Project Panda. The proposed warehouses can be accommodated at this site by modifying the crossover east of Ralston Street to include two (2) westbound left turning lanes and allowing northbound site vehicles exiting the proposed site to turn left at this intersection. This system would also include updated traffic signal phasing to facilitate northbound exiting site traffic traveling across the eastbound Eight Mile Road segment to then turn left onto the westbound segment. The modification would include roadway widening / alterations, vehicular and pedestrian signal upgrades, and additional pedestrian facilities / infrastructure upgrades at the intersection of Eight Mile Road & Crossover / Site Driveway A. Additionally, signal modifications would be required at Woodward Avenue & Site Driveway B to accommodate the new site connection as well as minor signal timing optimization at Woodward Avenue & West State Fair Avenue. Pedestrian facilities and infrastructure

should be added / upgraded at the Woodward Avenue & Site Driveway B intersection and Woodward Avenue & West State Fair Avenue intersection.

The capacity analyses indicate that all study area intersections are projected to operate at an overall LOS D or better during the 2022 Build and 2032 Build AM and PM Peak hour conditions

In conclusion, the proposed warehousing development will have a minimal transportation impact on the surrounding study area roads & intersections with the construction of the roadway improvement outlined above.

FIGURES



LANGAN Langan Engineering and Environmental Services, Inc. 2400 Ansys Drive, Suite 403 Canonsburg, PA 15317 T: 724.514.5100 F: 724.514.5101 www.langan.com	Project **PROJECT PANDA** CITY OF DETROIT WAYNE COUNTY MICHIGAN	Drawing Title **SITE LOCATION MAP**	Project No. 250095201 Date JULY 2020 Drawn By JMK Checked By CAP	Figure **1**

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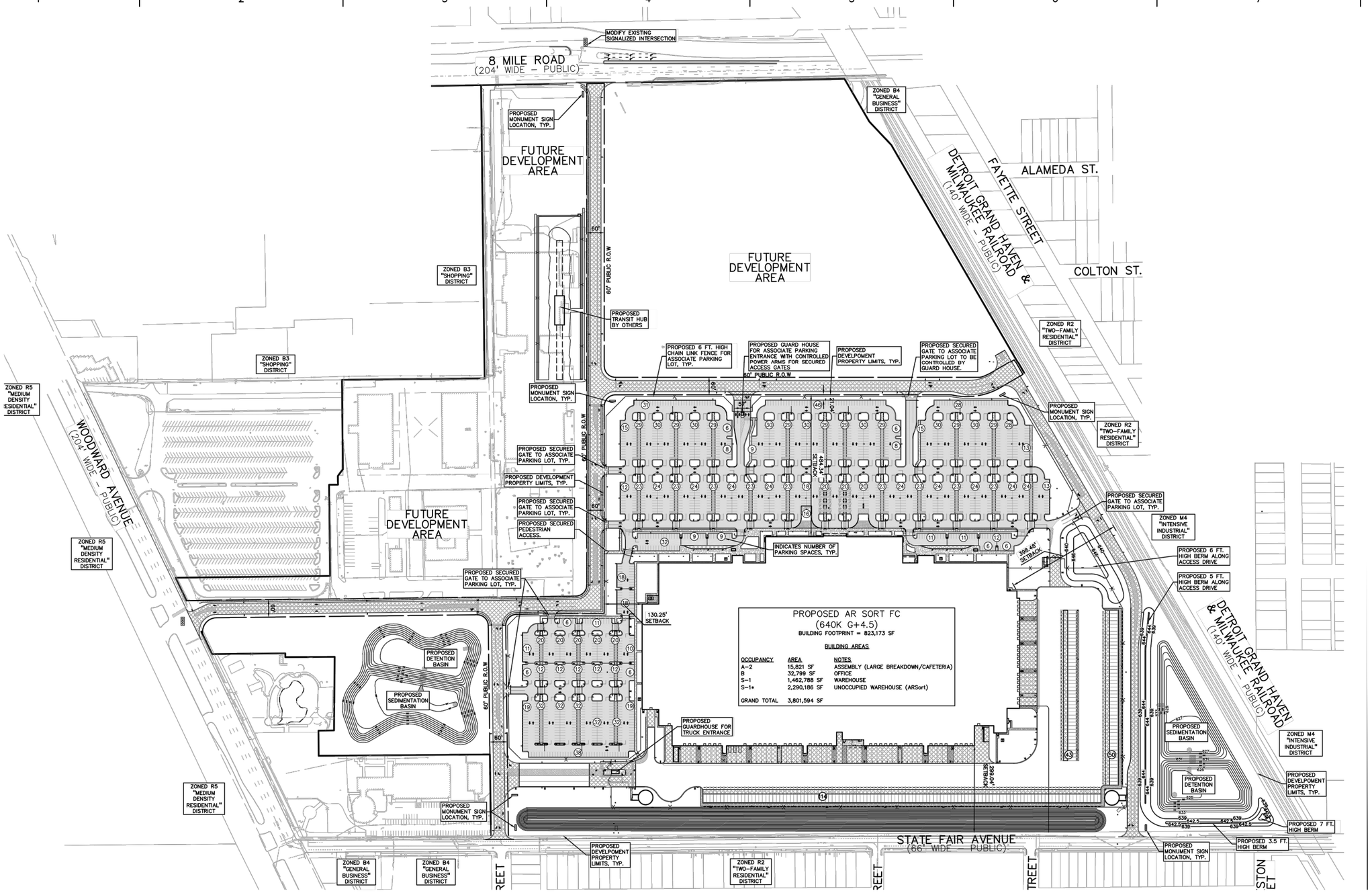

SITE PLAN PROVIDED BY PEA, INC. ON JULY 28, 2020.

350 0 175 350

SCALE IN FEET

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Project

PROJECT PANDA

CITY OF DETROIT

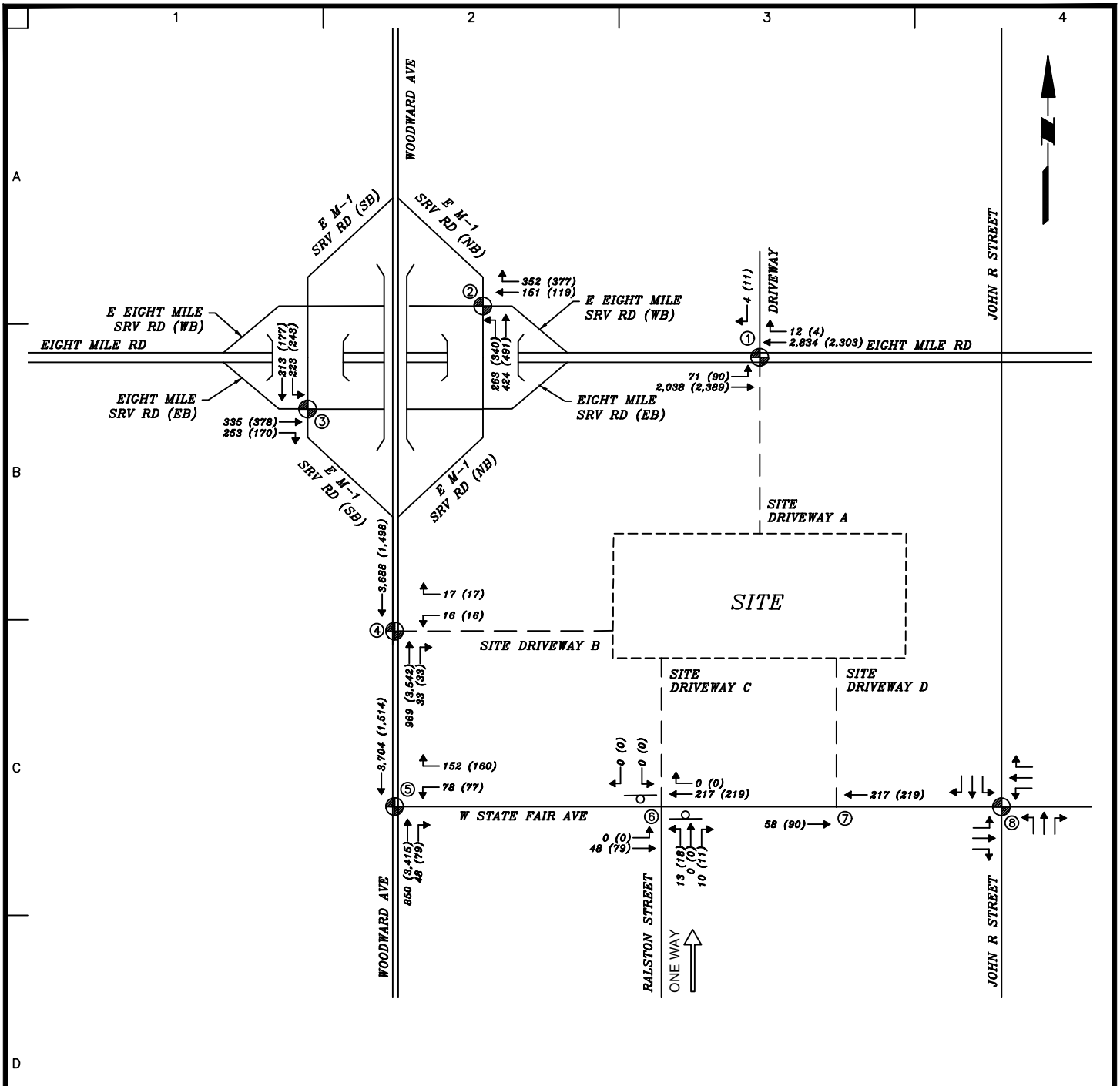
WAYNE COUNTY MICHIGAN

Drawing Title

SITE PLAN

Project No.	Figure
250095201	2
Date: JULY 2020	
Drawn By: JMK	
Checked By: CAP	

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TM0101.dwg Date: 8/17/2020 Time: 14:47 User: jkomp Style Table: Langan.stb Layout: FIG 2



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

(#) – INTERSECTION ID

NOTES:

(1) TURNING MOVEMENT COUNT DATA AT INTERSECTIONS 1, 2, AND 3 WERE PROVIDED BY MDOT AND WERE ORIGINALLY CONDUCTED IN 2007.
(2) TURNING MOVEMENT COUNT DATA AT INTERSECTION 5 WAS PROVIDED BY MDOT AND WERE ORIGINALLY CONDUCTED IN 2013.
(3) MAINLINE THRU VOLUMES AT INTERSECTIONS 4, 6, AND 7 ARE BASED ON APPLICABLE TURNING MOVEMENTS AT INTERSECTION 5.
(4) THE SOUTHBOUND VOLUMES EXITING THE DRIVEWAY AT INTERSECTION 1 AND THE NORTHBOUND APPROACH VOLUMES AT INTERSECTION 6 WERE ESTIMATED AS NO HISTORIC COUNT DATA WAS INCLUDED FOR THOSE APPROACHES.
(5) THERE IS NO HISTORICAL TURNING MOVEMENT COUNTS AT THE W STATE FAIR ROAD & JOHN R STREET INTERSECTION. COUNTS ARE CURRENTLY SCHEDULED FOR THIS INTERSECTION.

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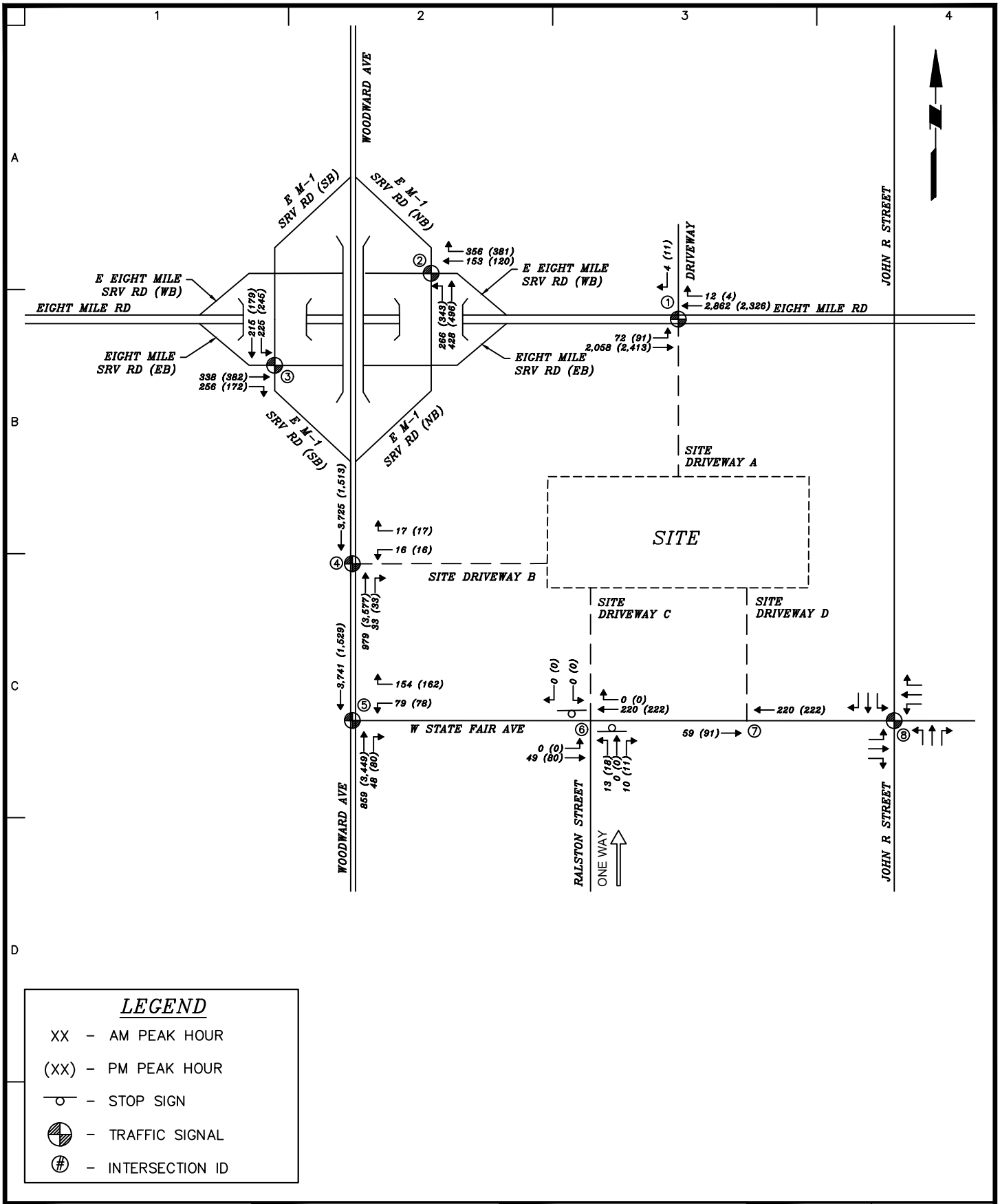
Project
PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
2007/2019 HISTORIC PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	JULY 2020
Drawn By	JMK
Checked By	CAP

Figure 3

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 7/14/2020 Time: 10:45 User: jkomp Style Table: Langan.stb Layout: FIG 3



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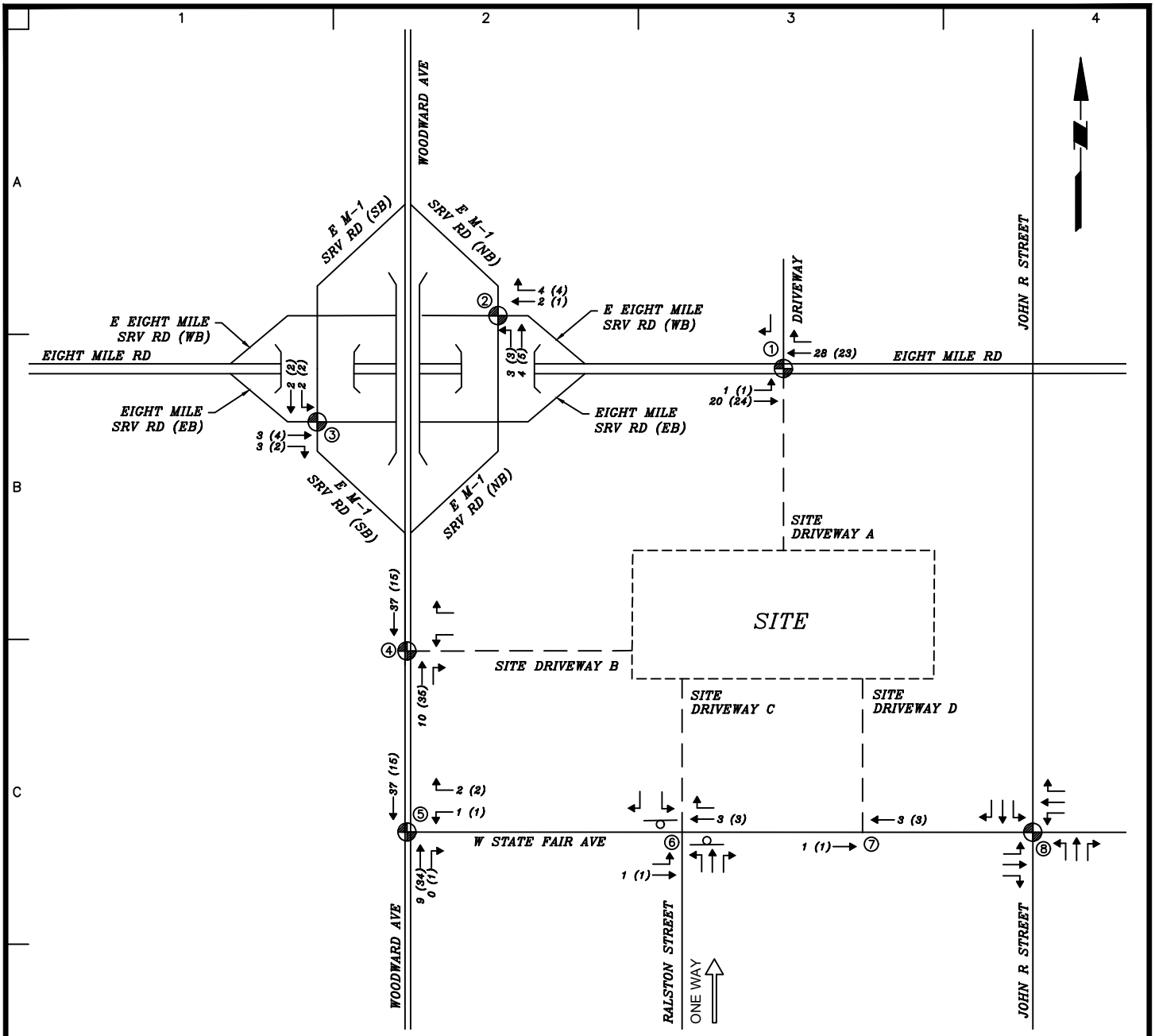
WAYNE COUNTY MICHIGAN

Drawing Title
2020 HISTORIC PEAK HOUR TRAFFIC VOLUMES

Project No. 250095201
Date JULY 2020
Drawn By JMK
Checked By CAP

Figure 4

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 7/14/2020 Time: 10:45 User: jkomp Style Table: Langan.stb Layout: FIG 4



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

NOTES:

(1) BASED ON THE SEMCOG REGIONAL TRAVEL FORECASTING MODEL, VEHICULAR VOLUMES ARE GENERALLY PROJECTED TO DECREASE IN THIS AREA. TO BE CONSERVATIVE, THE 2007 / 2019 HISTORIC PEAK HOUR TRAFFIC VOLUMES WERE GROWN BY 1% TO REPRESENT THE VEHICULAR GROWTH TO 2020.

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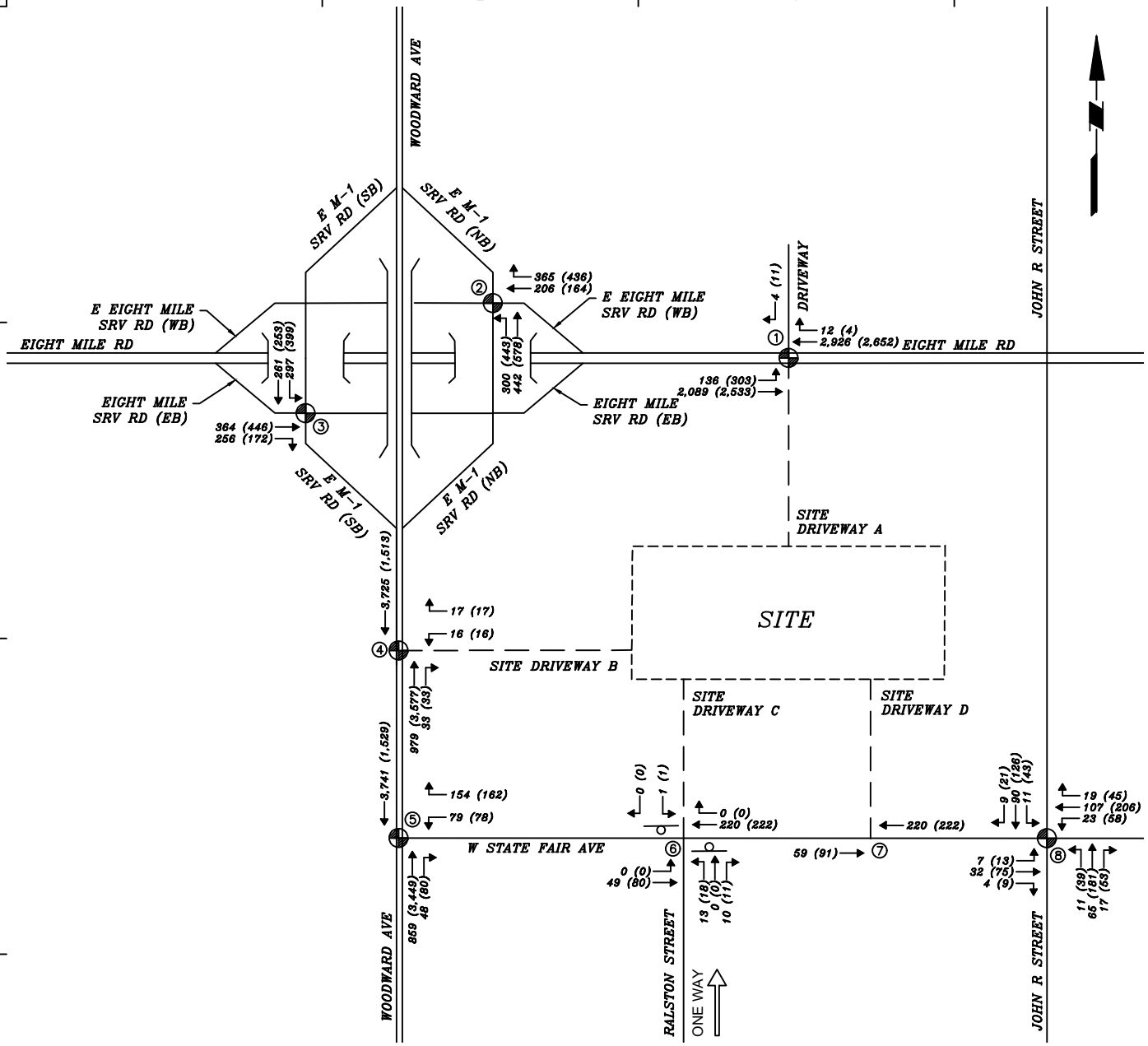
WAYNE COUNTY MICHIGAN

Drawing Title
2020 HISTORIC REGIONAL GROWTH

Project No.	250095201
Date	JULY 2020
Drawn By	JMK
Checked By	CAP

Figure
4A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 7/14/2020 Time: 10:45 User: jkomp Style Table: Langan.stb Layout: FIG 4A



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

(#) – INTERSECTION ID

NOTES:

(1) CURRENT COUNT DATA COULD NOT BE OBTAINED DUE TO THE "STAY HOME, STAY SAFE" ORDERS THROUGHOUT MICHIGAN AND THE NATION ABROAD AS A RESULT OF COVID–19.
(2) 2020 EXISTING PEAK HOUR TRAFFIC VOLUMES ARE THE SUM OF THE 2007 / 2019 HISTORIC PEAK HOUR TRAFFIC VOLUMES (FIGURE 3), 2020 REGIONAL GROWTH (FIGURE 4A), AND GATEWAY MARKETPLACE TRIPS (FIGURE 5A),

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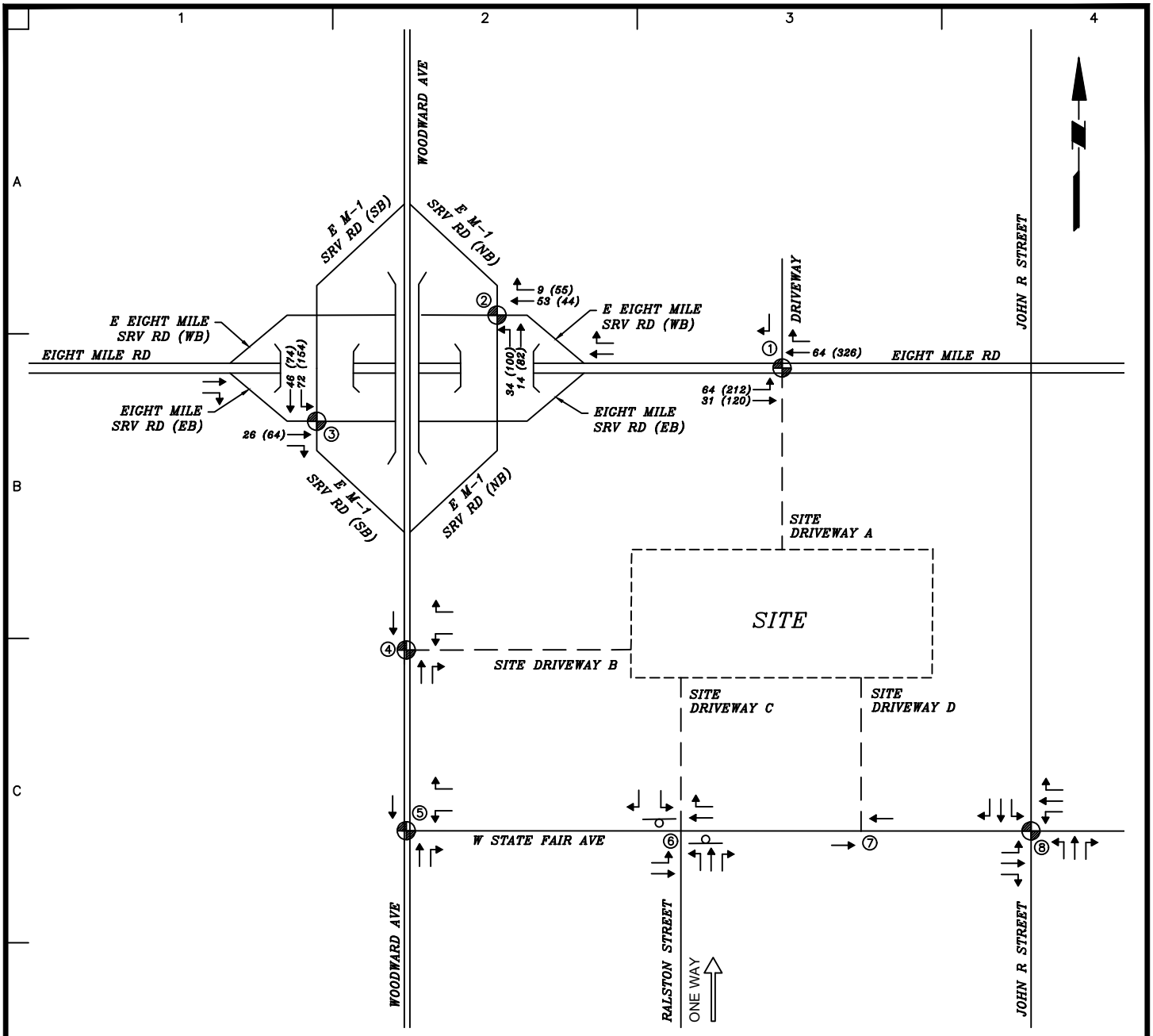
WAYNE COUNTY MICHIGAN

Drawing Title
2020 EXISTING PEAK HOUR TRAFFIC VOLUMES

Project No. 250095201
Date AUGUST 2020
Drawn By JMK
Checked By CAP

Figure 5

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 5



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

(#) – INTERSECTION ID

NOTES:

(1) GATEWAY MARKETPLACE TRIPS WERE PROVIDED BY MDOT.

(2) INTERSECTIONS 1, 2, AND 3 WERE ORIGINALLY COUNTED IN 2007 AND THEREFORE DID NOT INCLUDE THE GATEWAY MARKETPLACE TRIPS.

(3) INTERSECTION 5, AND SUBSEQUENTLY INTERSECTIONS 4, 6, AND 7, WERE COUNTED IN 2019 AND THEREFORE THE COUNT DATA INCLUDED THE GATEWAY MARKETPLACE TRIPS.

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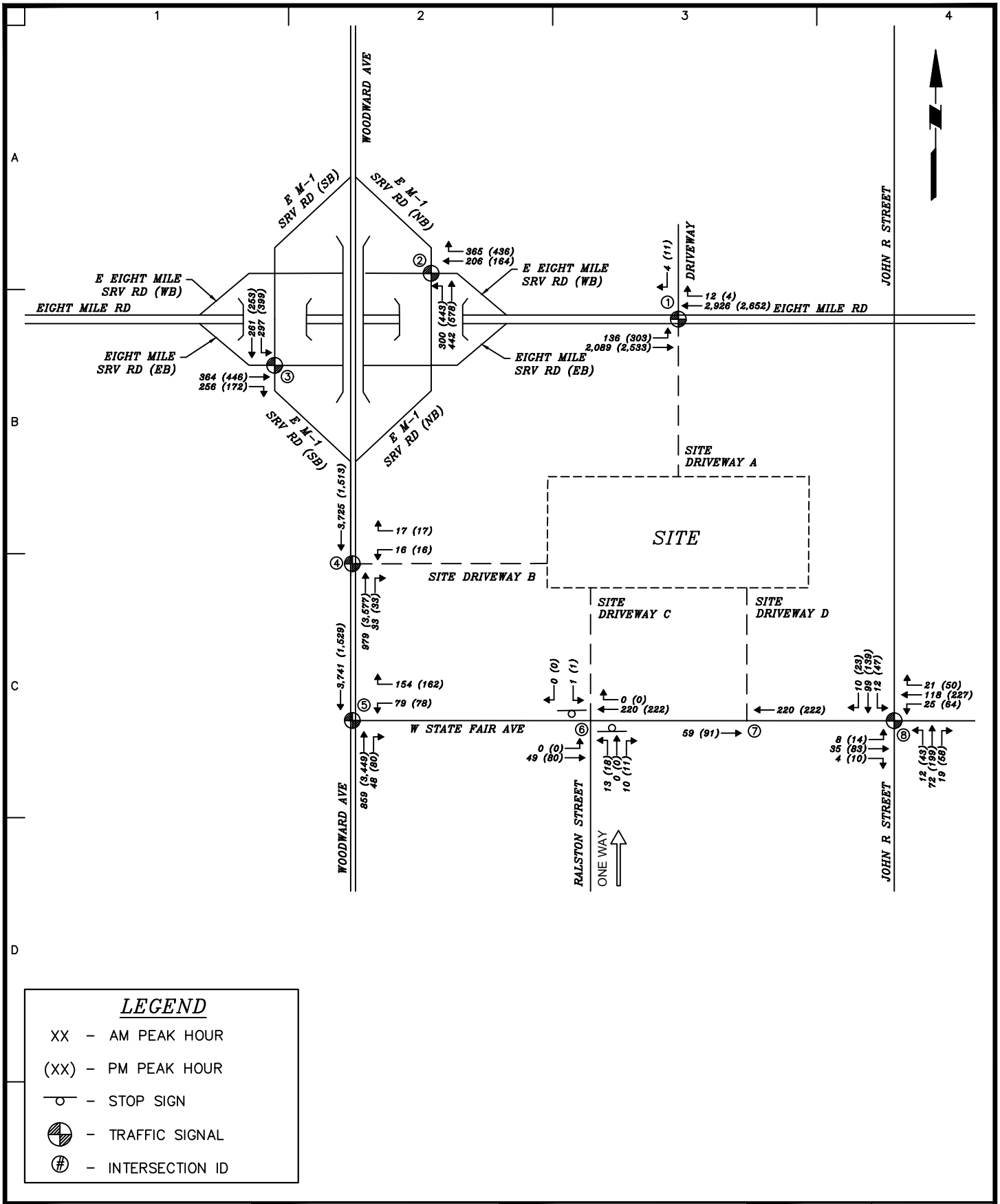
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
GATEWAY MARKETPLACE TRIPS

Project No.	250095201
Date	JULY 2020
Drawn By	JMK
Checked By	CAP

Figure
5A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 7/14/2020 Time: 10:45 User: jkomp Style Table: Langan.stb Layout: FIG 5A



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

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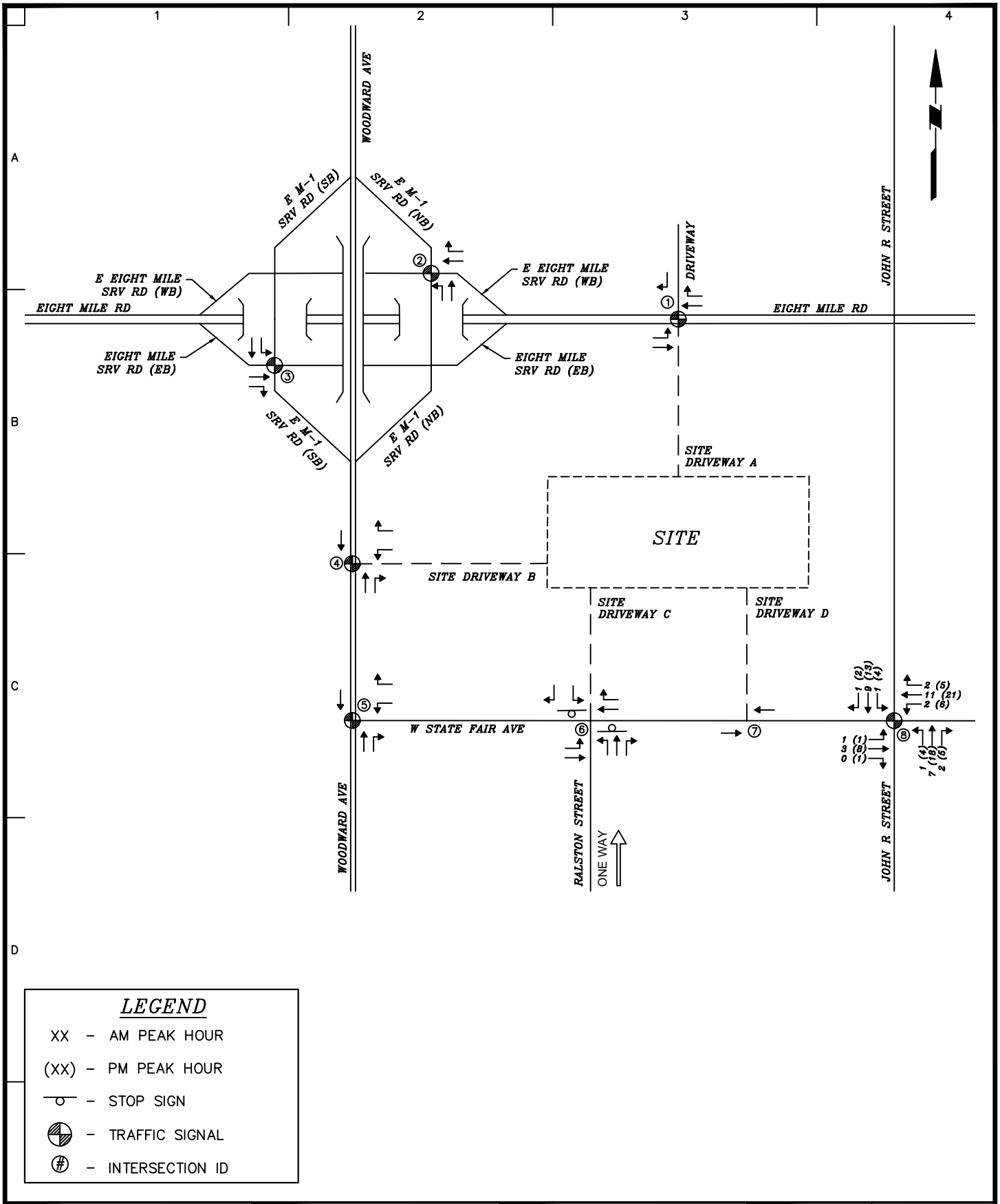
Drawing Title
2020 ADJUSTED PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure **6**

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 6



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Project
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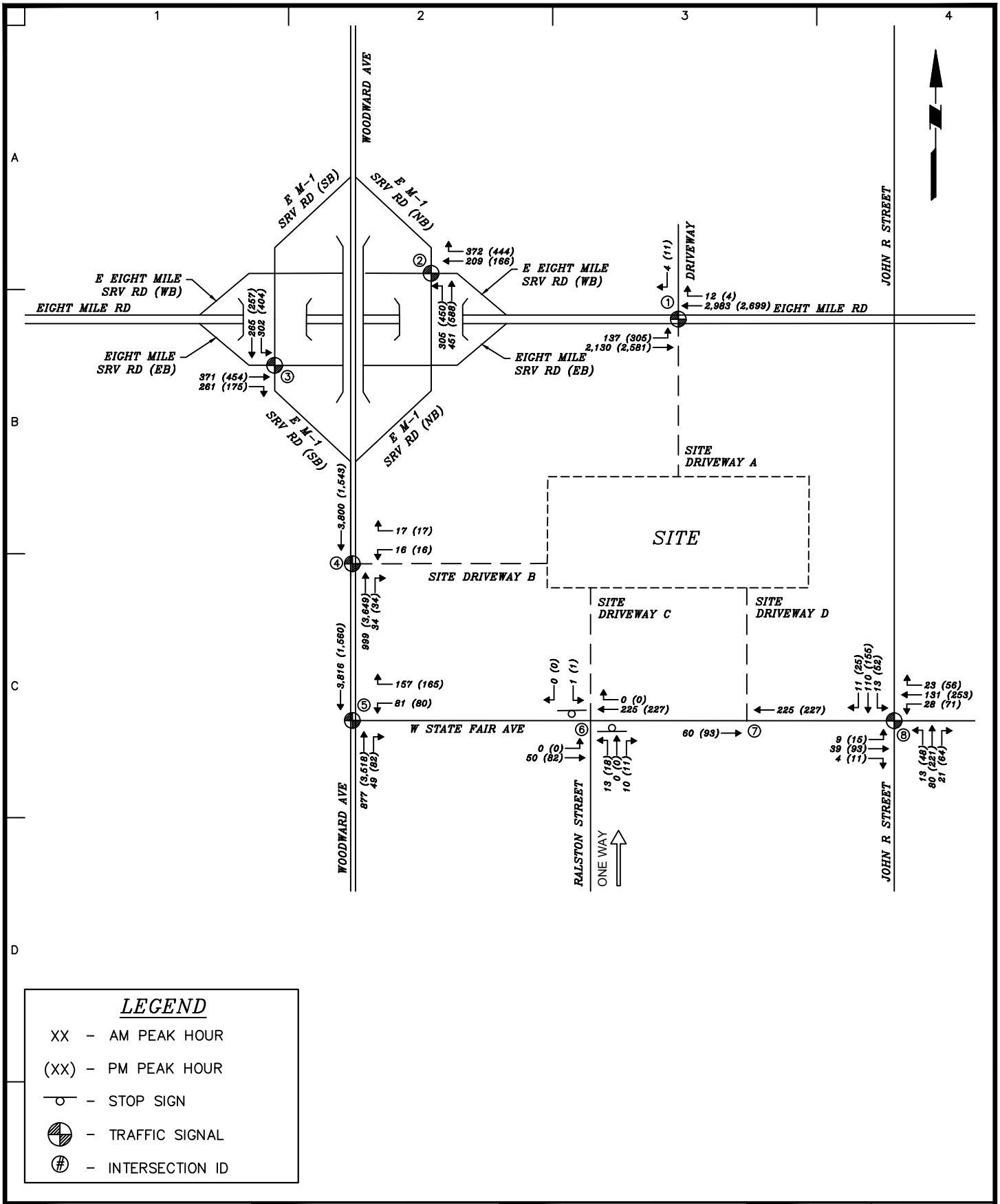
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
TRAFFIC VOLUME ADJUSTMENT FACTOR

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure
6A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 6A



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

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Project

PROJECT PANDA

CITY OF DETROIT

WAYNE COUNTY MICHIGAN

Drawing Title

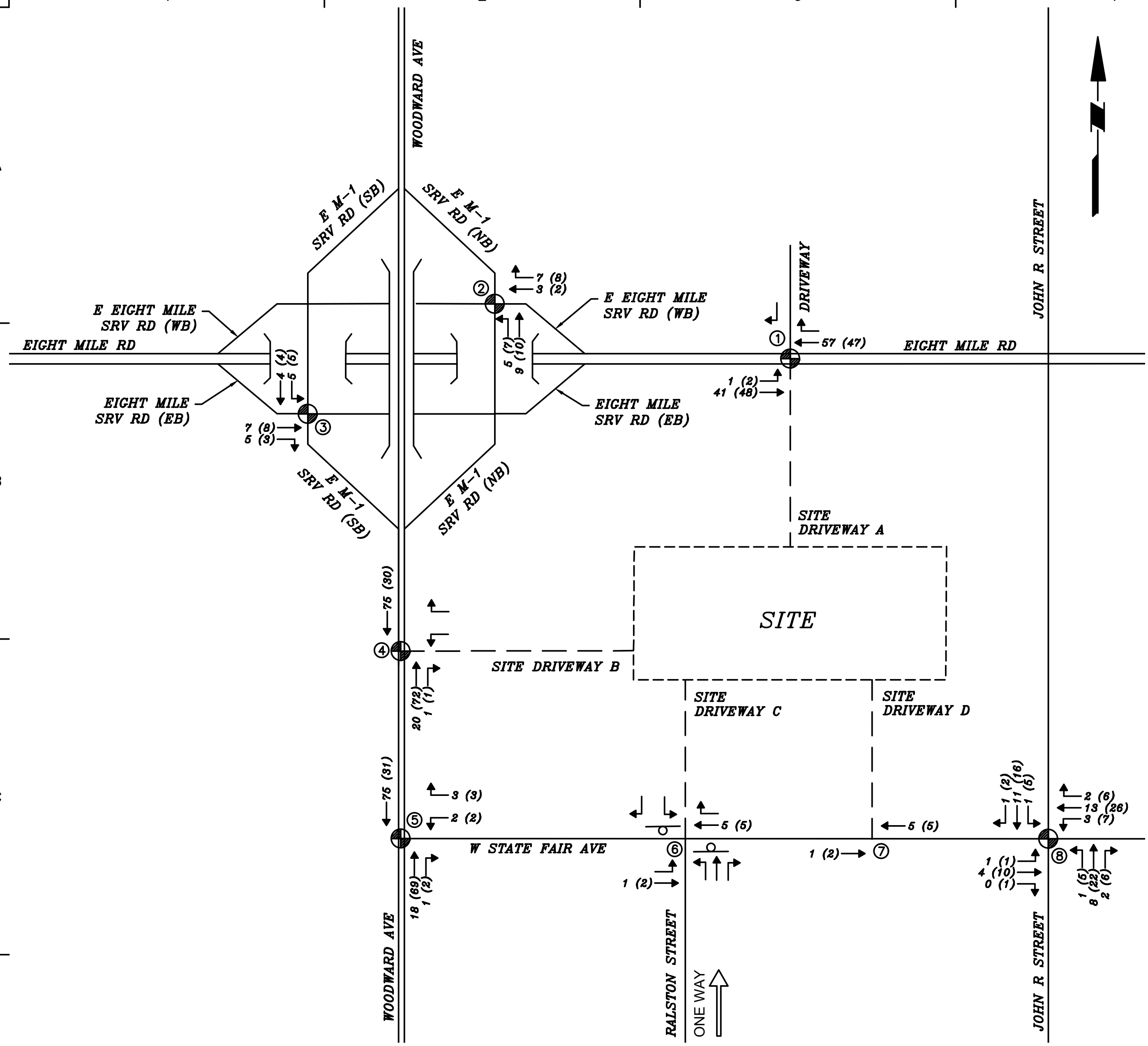
2022 NO BUILD PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure

7

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 7



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

\# – INTERSECTION ID

NOTES:

(1) BASED ON THE SEMCOG REGIONAL TRAVEL FORECASTING MODEL, VEHICULAR VOLUMES ARE GENERALLY PROJECTED TO DECREASE IN THIS AREA. TO BE CONSERVATIVE, THE 2020 HISTORIC PEAK HOUR TRAFFIC VOLUMES WERE GROWN LINEARLY BY 1% PER YEAR TO REPRESENT THE VEHICULAR GROWTH TO 2022.

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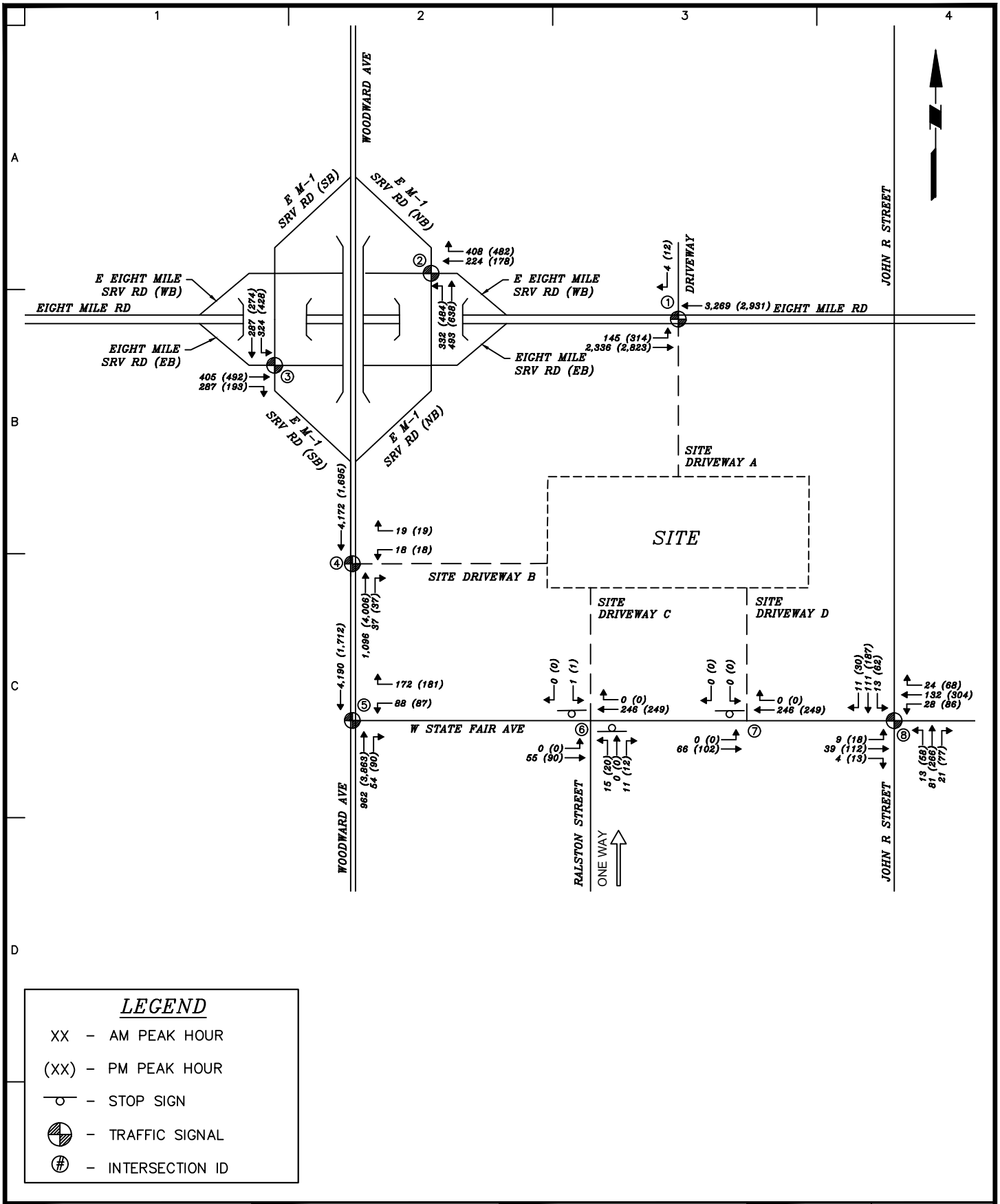
Project	Drawing Title	Project No. / Date / Drawn By / Checked By	Figure
PROJECT PANDA CITY OF DETROIT WAYNE COUNTY MICHIGAN	2022 REGIONAL GROWTH	Project No. 250095201 Date AUGUST 2020 Drawn By JMK Checked By CAP	7A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 7A



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

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Project

PROJECT PANDA

CITY OF DETROIT

WAYNE COUNTY MICHIGAN

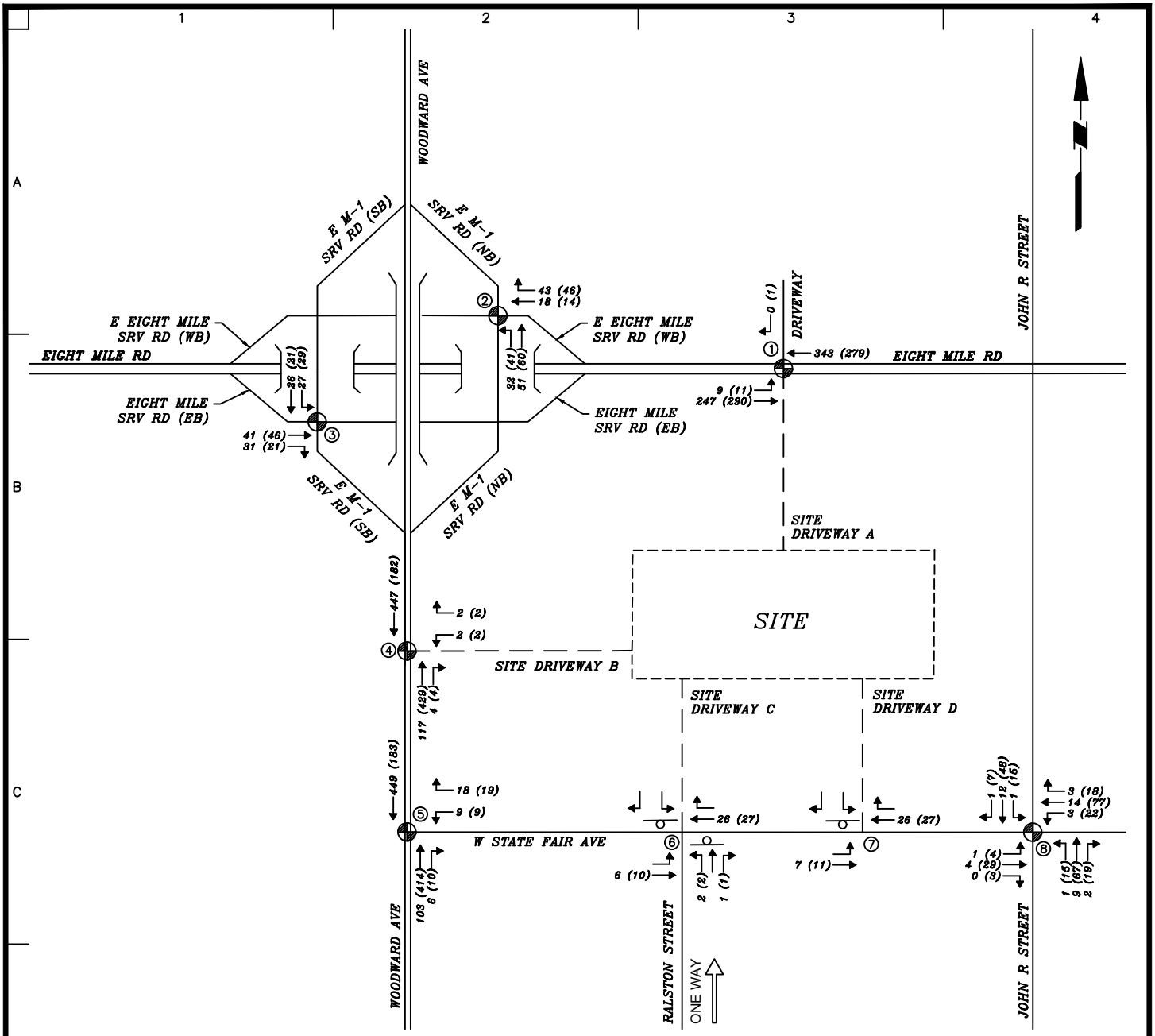
Drawing Title

2032 NO BUILD PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure **8**

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 8



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

NOTES:

(1) BASED ON THE SEMCOG REGIONAL TRAVEL FORECASTING MODEL, VEHICULAR VOLUMES ARE GENERALLY PROJECTED TO DECREASE IN THIS AREA. TO BE CONSERVATIVE, THE 2020 HISTORIC PEAK HOUR TRAFFIC VOLUMES WERE GROWN LINEARLY BY 1% PER YEAR TO REPRESENT THE VEHICULAR GROWTH TO 2032.

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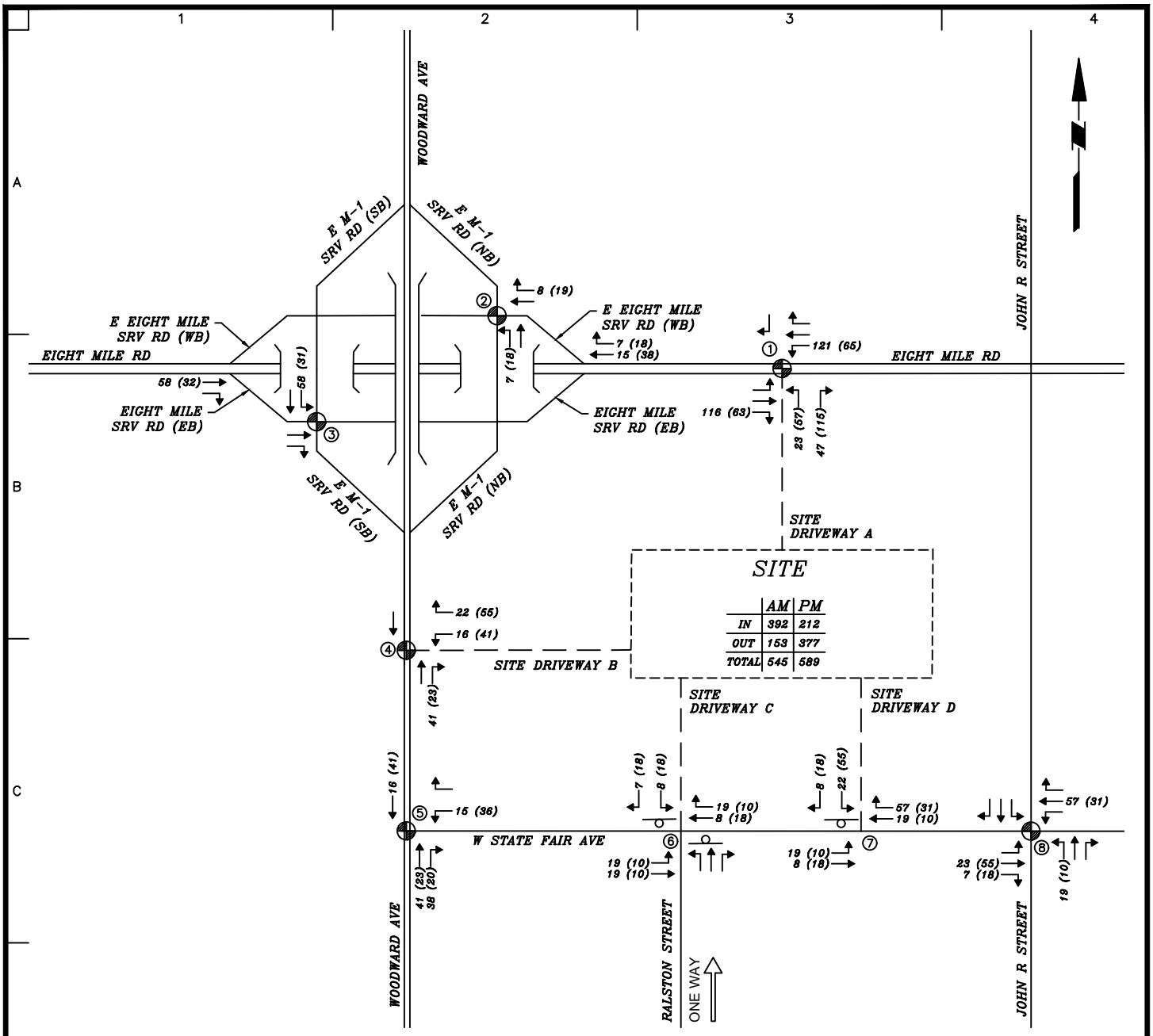
Project: PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title: 2032 REGIONAL GROWTH

Project No. 250095201
Date AUGUST 2020
Drawn By JMK
Checked By CAP

Figure 8A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:25 User: jkomp Style Table: Langan.stb Layout: FIG 8A



LEGEND

- XX – AM PEAK HOUR
- (XX) – PM PEAK HOUR
- – STOP SIGN
- – TRAFFIC SIGNAL
- # – INTERSECTION ID
- X% – TRIP DISTRIBUTION (IN | OUT)

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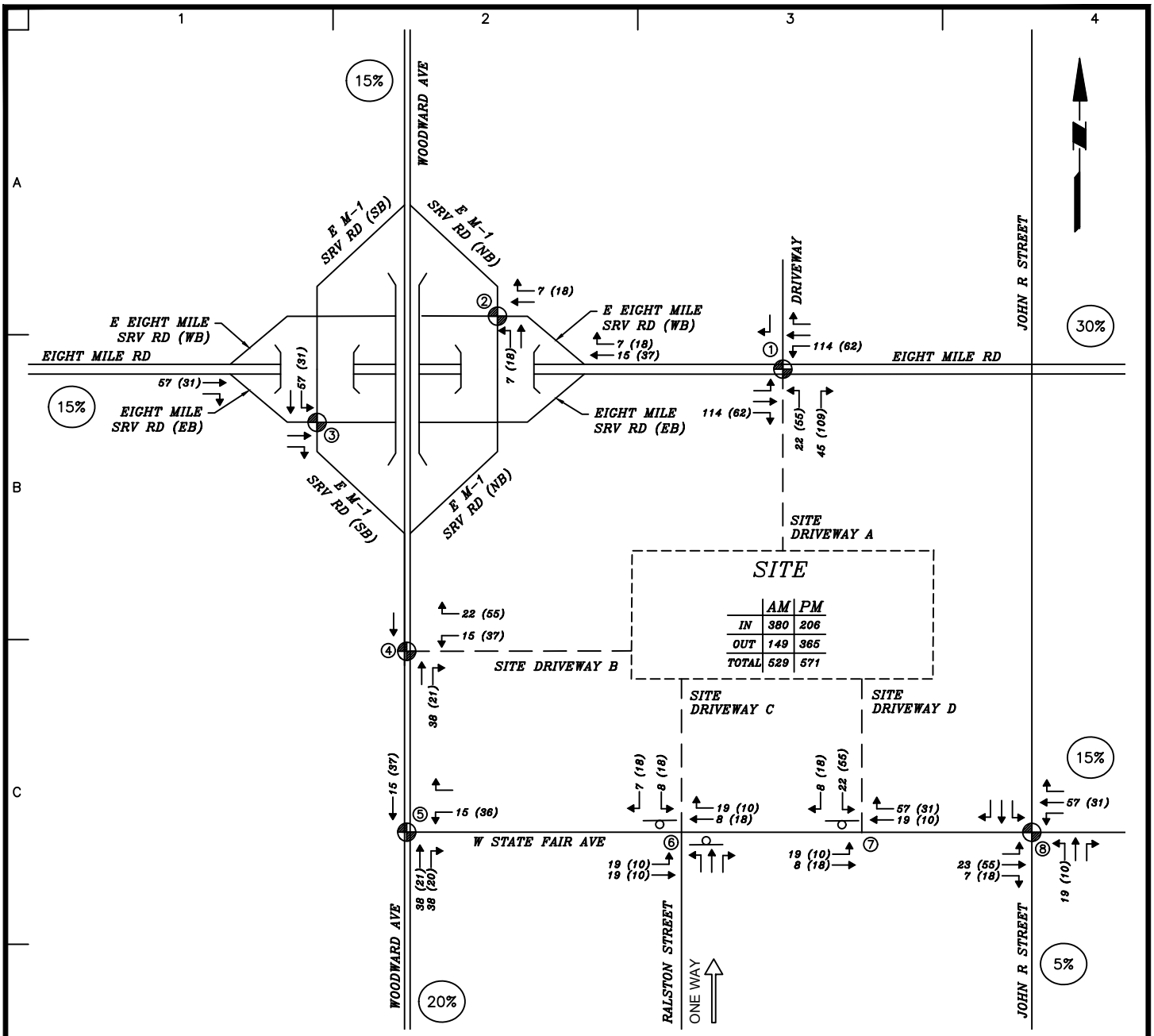
Project
PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
TOTAL PHASE 1 SITE TRIPS

Project No. 250095201
Date AUGUST 2020
Drawn By JMK
Checked By CAP

Figure 9

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 9



LEGEND

- XX – AM PEAK HOUR
- (XX) – PM PEAK HOUR
- – STOP SIGN
- – TRAFFIC SIGNAL
- # – INTERSECTION ID
- X% – TRIP DISTRIBUTION (IN | OUT)

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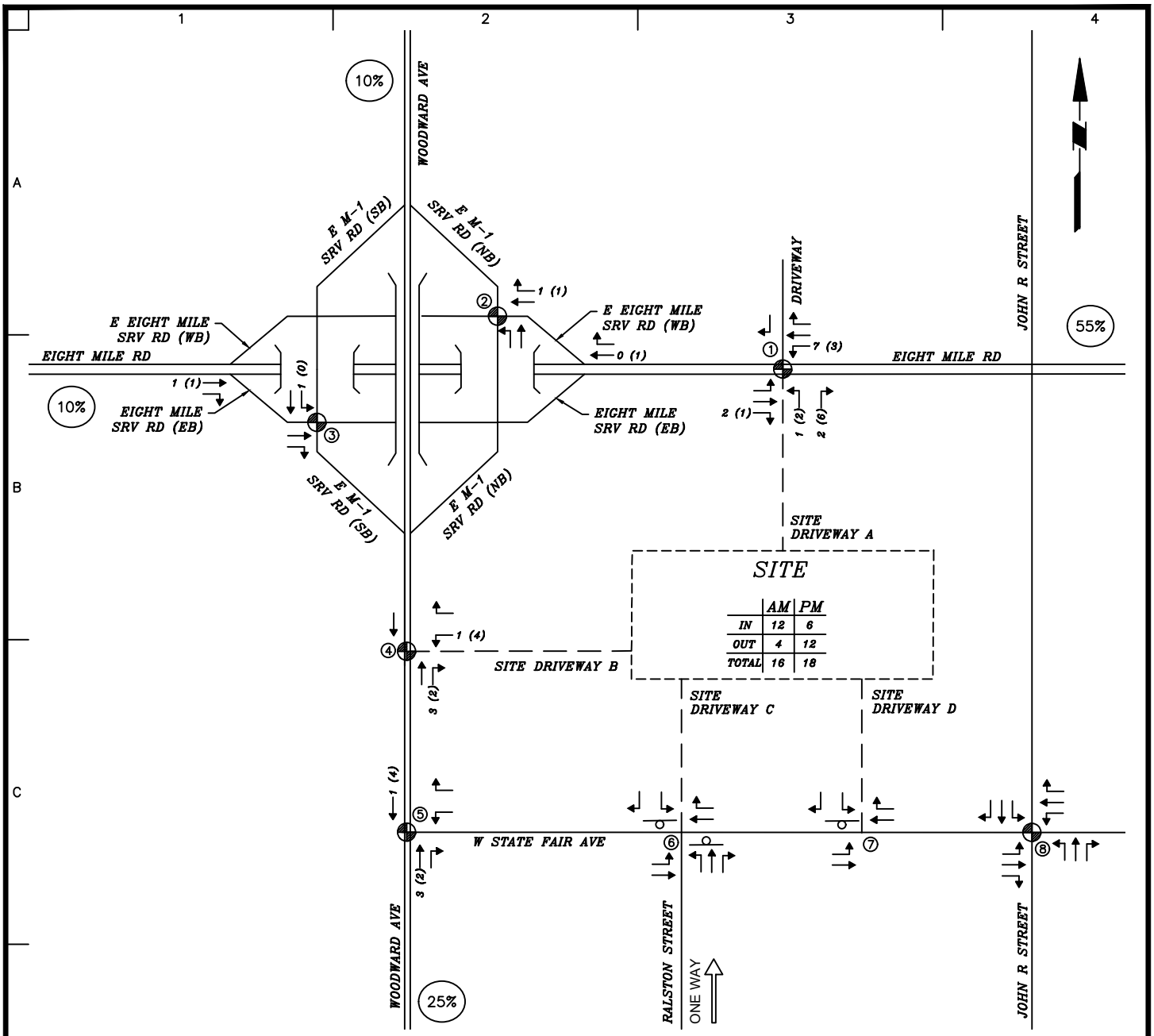
Project
PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
PHASE 1 EMPLOYEE SITE TRIPS

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure
9A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/19/2020 Time: 20:32 User: mkrushinsky Style Table: Langan.stb Layout: FIG 9A



LEGEND

- XX – AM PEAK HOUR
- (XX) – PM PEAK HOUR
- – STOP SIGN
- – TRAFFIC SIGNAL
- # – INTERSECTION ID
- X% – TRIP DISTRIBUTION (IN | OUT)

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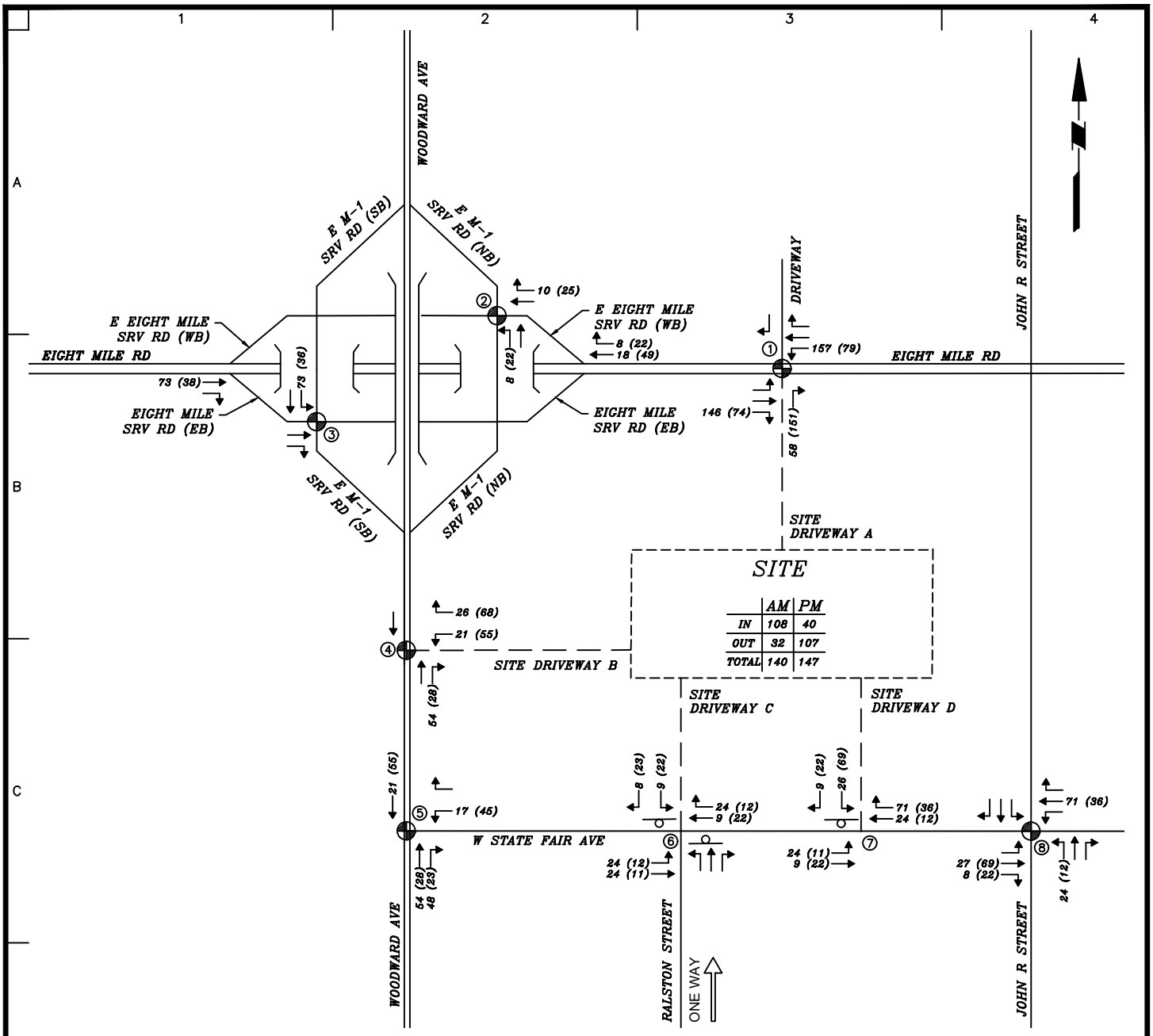
Project
PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
PHASE 1 TRUCK SITE TRIPS

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure **9B**

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 9B



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Project
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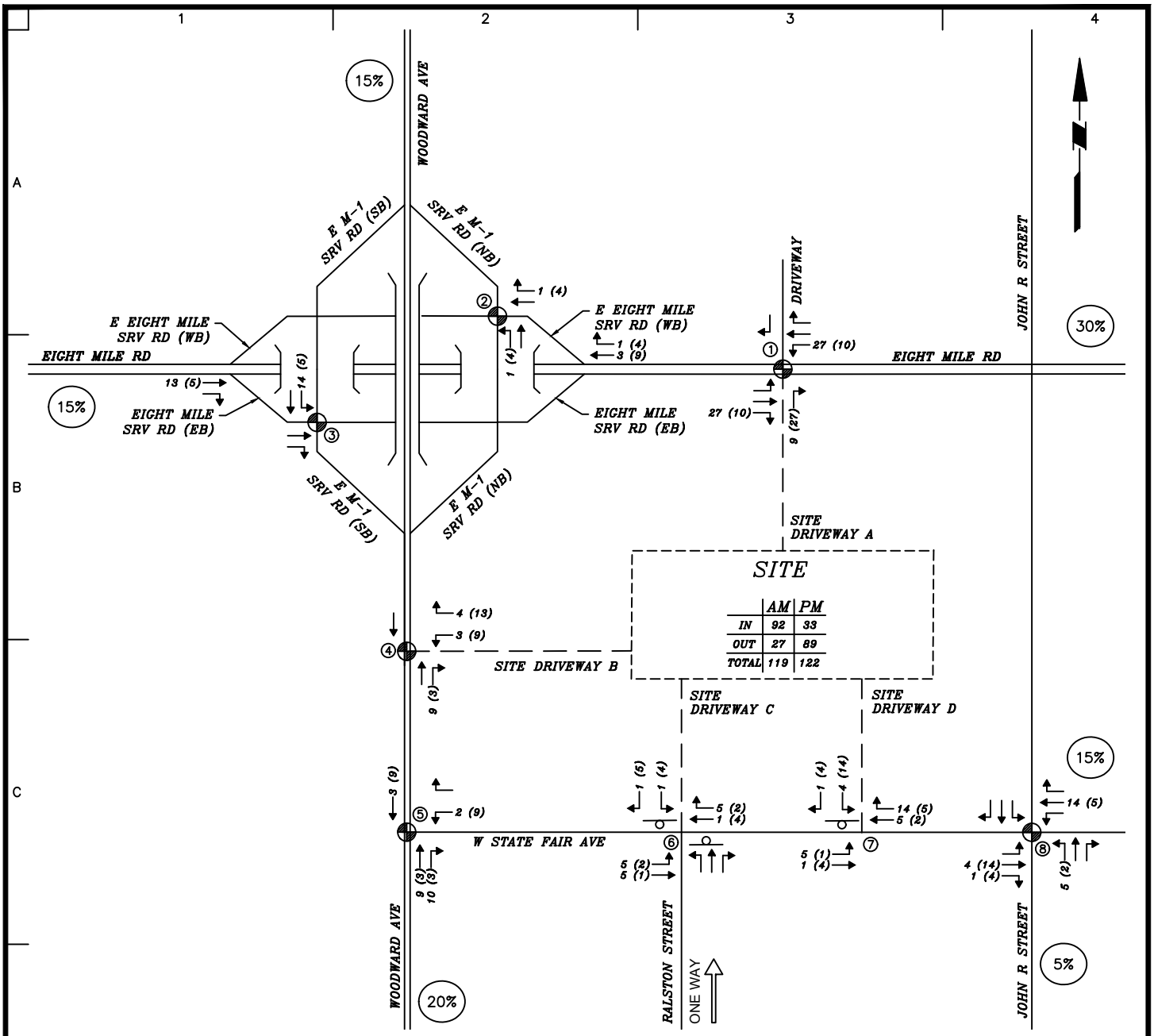
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
TOTAL PHASE 2 SITE TRIPS

Project No. 250095201
Date AUGUST 2020
Drawn By JMK
Checked By CAP

Figure 10

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 10



LEGEND

- XX – AM PEAK HOUR
- (XX) – PM PEAK HOUR
- – STOP SIGN
- – TRAFFIC SIGNAL
- # – INTERSECTION ID
- X% – TRIP DISTRIBUTION (IN | OUT)

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Project
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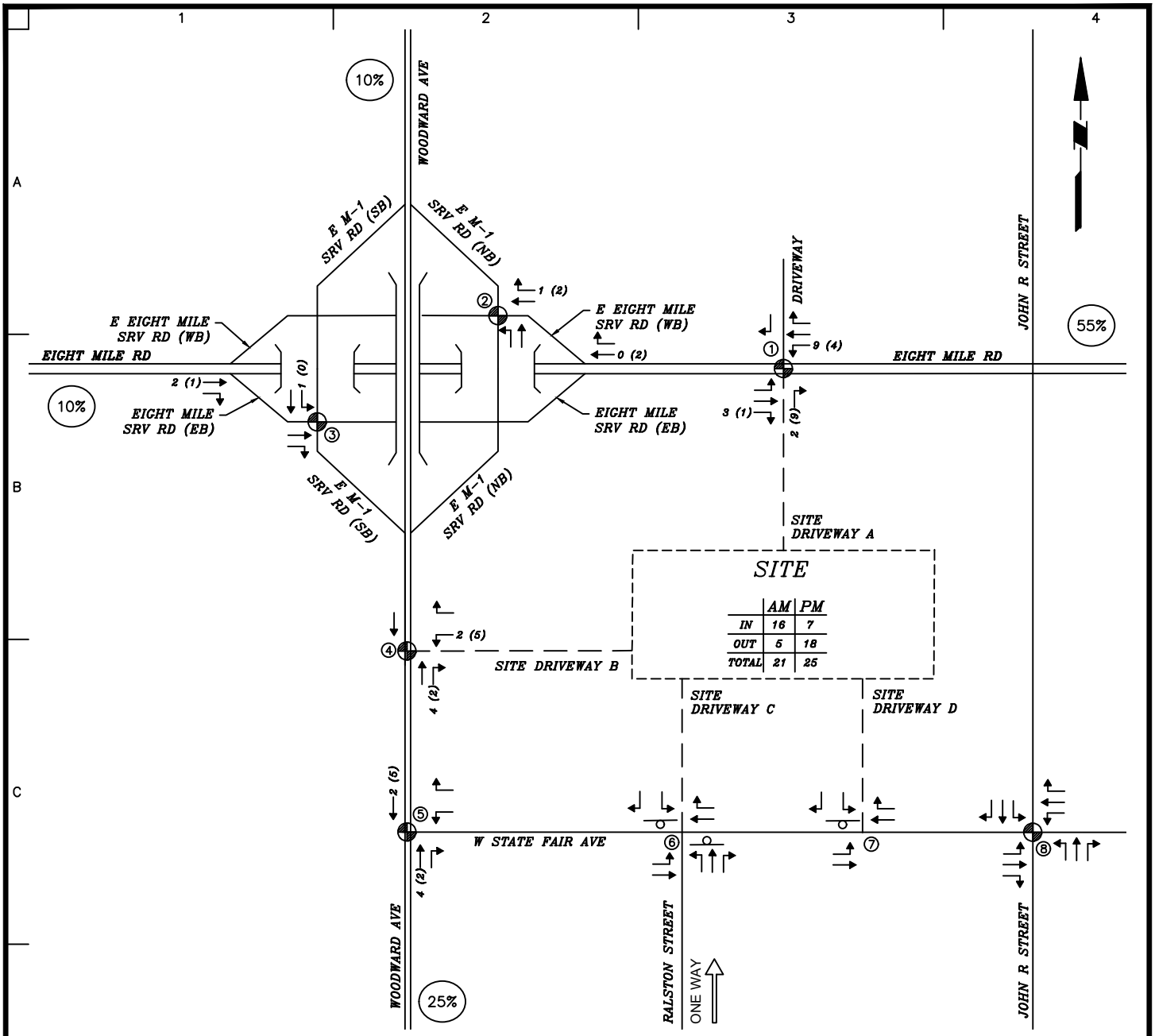
Drawing Title
PHASE 2 EMPLOYEE SITE TRIPS

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure
10A

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/19/2020 Time: 20:32 User: mkrushinsky Style Table: Langan.stb Layout: FIG 10A



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Project
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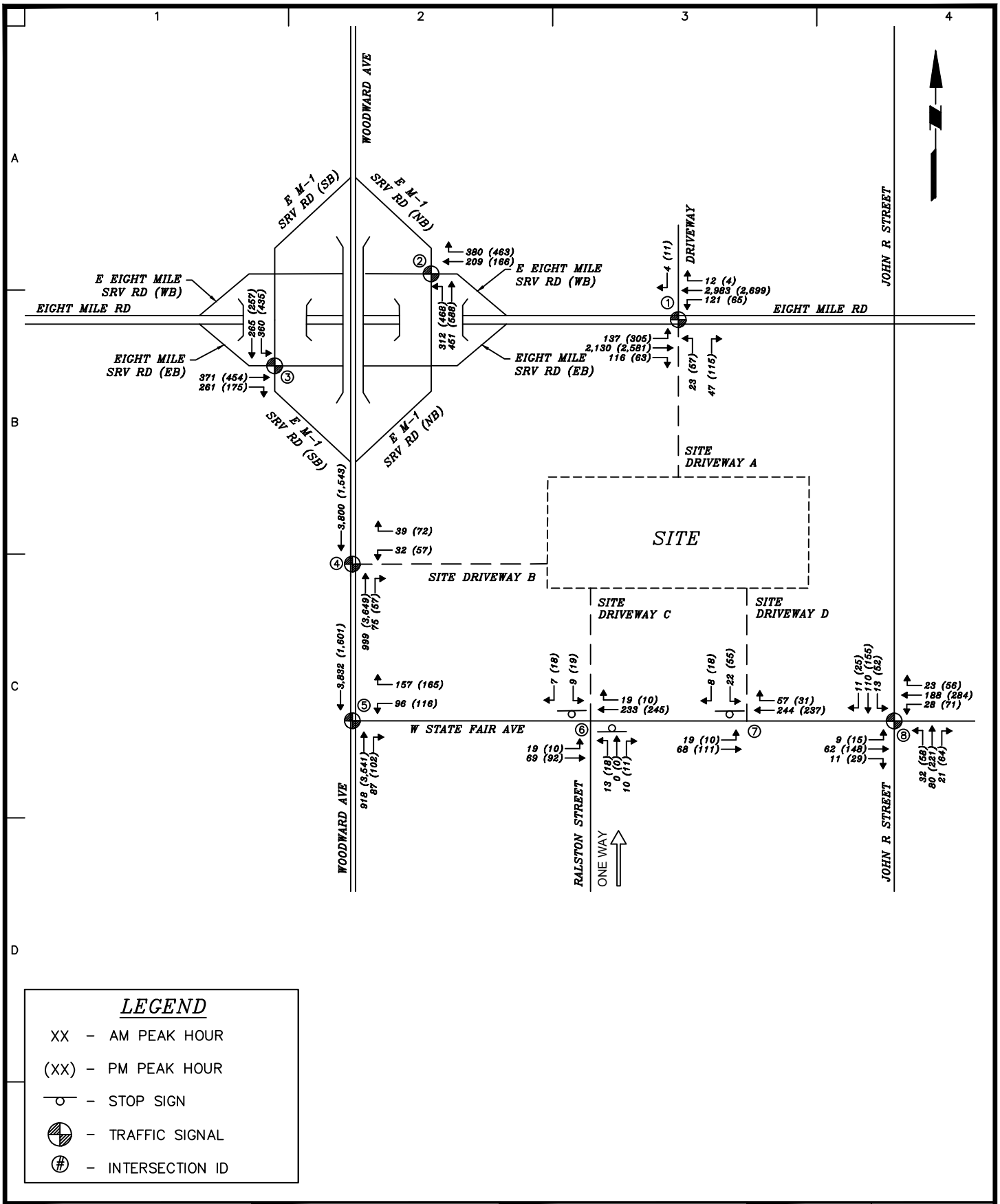
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
PHASE 2
TRUCK
SITE TRIPS

Project No. 250095201
Date AUGUST 2020
Drawn By JMK
Checked By CAP

Figure
10B

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 10B



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

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Project

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CITY OF DETROIT
WAYNE COUNTY MICHIGAN

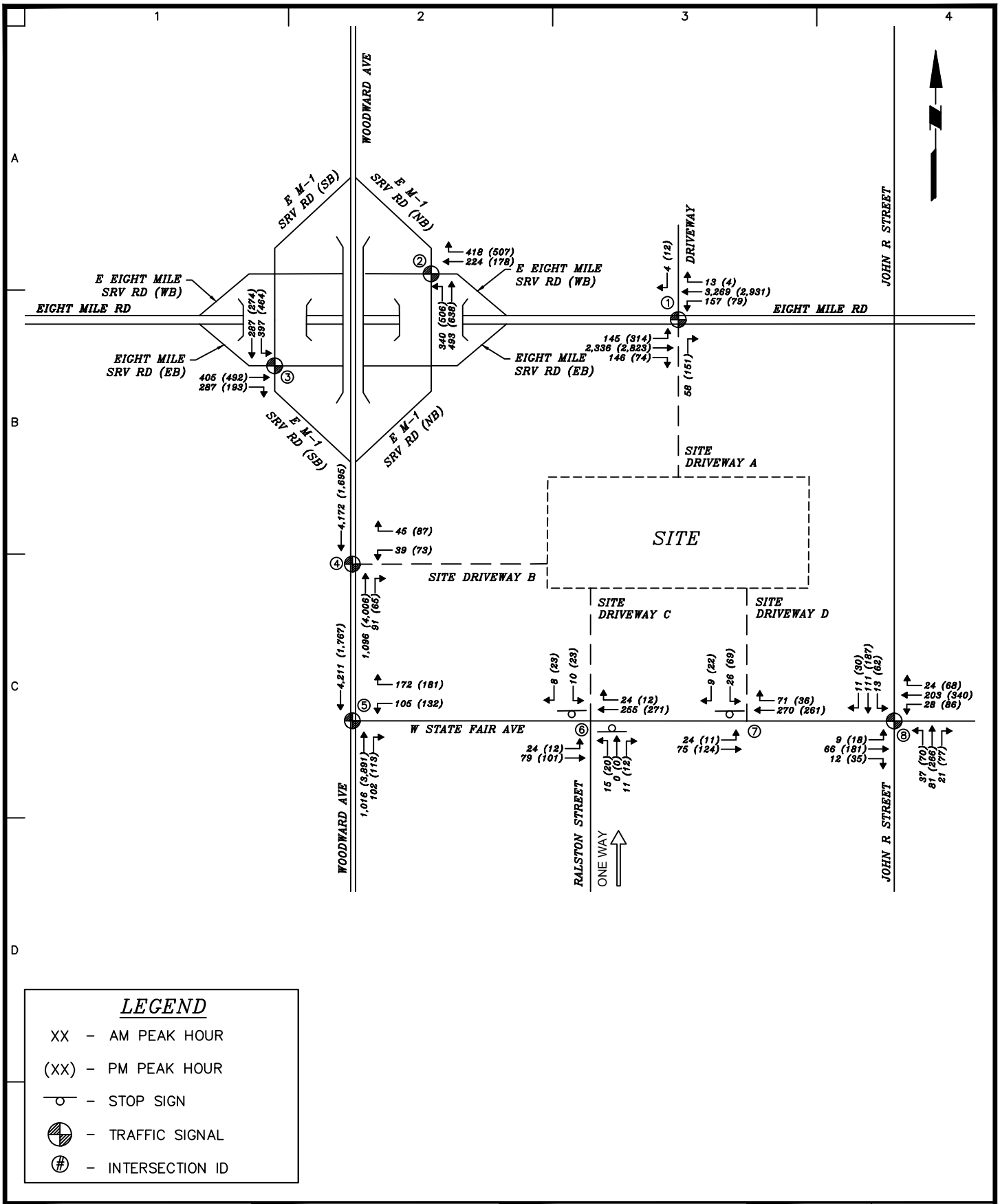
Drawing Title

2022 PHASE 1 BUILD PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure **11**

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 11



LEGEND

XX – AM PEAK HOUR

(XX) – PM PEAK HOUR

– STOP SIGN

– TRAFFIC SIGNAL

– INTERSECTION ID

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Project
PROJECT PANDA
CITY OF DETROIT
WAYNE COUNTY MICHIGAN

Drawing Title
2032 MASTER PLAN BUILD PEAK HOUR TRAFFIC VOLUMES

Project No.	250095201
Date	AUGUST 2020
Drawn By	JMK
Checked By	CAP

Figure
12

Filename: \\langan.com\data\PIT\data2\250095201\Project Data\CAD\01\2D-DesignFiles\Traffic\250095201-K-TC0104 - TIS - Public - Approved Scope.dwg Date: 8/17/2020 Time: 14:26 User: jkomp Style Table: Langan.stb Layout: FIG 12

TABLES

TABLE 1A

Project Panda

Site Trip Generation - Phase I

Land Use	ITE Code	Size	Units	AM Peak Hour IN	AM Peak Hour OUT	AM Peak Hour TOTAL	PM Peak Hour IN	PM Peak Hour OUT	PM Peak Hour TOTAL	Weekday ADT
Proposed										
Warehousing	150	993	Employees	436	170	606	236	419	655	5,015
Total Proposed Site Generated		**993**	**Employees**	**436**	**170**	**606**	**236**	**419**	**655**	**5,015**
Mode Split Reductions										
Transit, Carpooling, Bicycles, etc.		10%		44	17	61	24	42	66	502
Total Mode Split Reductions		**10%**		**44**	**17**	**61**	**24**	**42**	**66**	**502**
Total Proposed External Site Generated				**392**	**153**	**545**	**212**	**377**	**589**	**4,513**
Vehicle Classification										
Trucks		3%		12	4	16	6	12	18	451
Passenger Vehicles		97%		380	149	529	206	365	571	4,062
Total Vehicles		**100%**		**392**	**153**	**545**	**212**	**377**	**589**	**4,513**

Notes:

Total national average mode split reduction for these facilities is 19% and expected mode split in Detroit is approximately 25% based on Census Bureau's American Community Survey from 2017. A 10% mode split was approved by MDOT to provide a conservative approach.

Based on client provided data, trucks equate to approximately 3% of the peak hour site generated traffic.

Based on client provided data, trucks equate to approximately 10% of the development's ADT.

TABLE 1B

Project Panda

Site Trip Generation - Phase II

Land Use	ITE Code	Size	Units	AM Peak Hour IN	AM Peak Hour OUT	AM Peak Hour TOTAL	PM Peak Hour IN	PM Peak Hour OUT	PM Peak Hour TOTAL	Weekday ADT
Proposed										
Warehousing - Building B	150	320,000	SF	49	15	64	18	48	66	551
Warehousing - Building D1	150	195,000	SF	38	11	49	14	37	51	354
Warehousing - Building D2	150	150,000	SF	33	10	43	12	34	46	283
Total Proposed Site Generated		**665,000**	**SF**	**120**	**36**	**156**	**44**	**119**	**163**	**1,188**
Mode Split Reductions										
Transit, Carpooling, Bicycles, etc.		10%		12	4	16	4	12	16	119
Total Mode Split Reductions		**10%**		**12**	**4**	**16**	**4**	**12**	**16**	**119**
Total Proposed External Site Generated				**108**	**32**	**140**	**40**	**107**	**147**	**1,069**
Vehicle Classification										
Trucks				16	5	21	7	18	25	399
Passenger Vehicles				92	27	119	33	89	122	670
Total Vehicles				**108**	**32**	**140**	**40**	**107**	**147**	**1,069**

Notes:

Total national average mode split reduction for these facilities is 19% and expected mode split in Detroit is approximately 25% based on Census Bureau's American Community Survey from 2017. A 10% mode split was approved by MDOT to provide a conservative approach.

Truck trips calculated using the ITE Trip Generation Manual Supplement, 10th Edition.

Table 2A
Level of Service

AM / PM / SAT PEAK		AM PEAK HOUR (LOS / Delay)						
Direction	Approach / Movement	2020	2022 Phase 1			2032 Master Plan		
		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		(1) Eight Mile Rd (WB) & X/O / Site Driveway A						
Eight Mile Rd (WB)								
Westbound	Left Turn			C (33.0)			C (32.7)	
	Through	B (10.6)	B (10.9)	D (49.8)		B (12.6)	D (54.0)	
	Right Turn							
	Approach	B (10.6)	B (10.9)	D (49.1)		B (12.6)	D (53.0)	
X/O / Site Driveway A								
Northbound	Left Turn	C (30.8)	C (30.8)	A (.5)		C (30.8)	A (.7)	
	Approach	C (30.8)	C (30.8)	A (.5)		C (30.8)	A (.7)	
Southbound	Right Turn	D (41.1)	D (41.1)	B (17.2)		D (41.1)	B (19.2)	
	Approach	D (41.1)	D (41.1)	B (17.2)		D (41.1)	B (19.2)	
OVERALL		**B (11.5)**	**B (11.8)**	**D (46.7)**		**B (13.4)**	**D (50.5)**	
INTERSECTION		(1) Eight Mile Rd (EB) & X/O / Site Driveway A						
Eight Mile Rd (EB)								
Eastbound	Left Turn	A (.0)	A (.0)	C (33.0)		A (.0)	D (37.9)	
	Through	A (.0)	A (.0)	B (15.9)		A (.0)	B (18.0)	
	Approach	A (.0)	A (.0)	B (16.9)		A (.0)	B (19.1)	
X/O / Site Driveway A								
Northbound	Through			C (33.2)			C (34.8)	
	Right Turn			C (32.1)			C (33.1)	
	Approach			C (32.5)			C (33.7)	
Southbound	Left Turn			A (.8)			A (.9)	
	Through							
	Approach			A (.8)			A (.9)	
OVERALL		**A (.0)**	**A (.0)**	**B (16.5)**		**A (.0)**	**B (18.5)**	
INTERSECTION		(2)Woodward Ave Srv Rd (NB) & E 8 Mile Srv Rd (WB)						
E 8 Mile Srv Rd (WB)								
Westbound	Through	D (52.9)	D (52.7)	C (27.1)		D (46.0)	C (27.9)	
	Right Turn							
	Approach	D (52.9)	D (52.7)	C (27.1)		D (46.0)	C (27.9)	
Woodward Ave Srv Rd (NB)								
Northbound	Left Turn	A (1.1)	A (1.1)	A (1.4)		A (1.0)	A (1.2)	
	Through	A (2.8)	A (2.8)	A (2.8)		A (2.8)	A (2.8)	
	Approach	A (2.2)	A (2.2)	A (2.3)		A (2.2)	A (2.3)	
OVERALL		**C (24.3)**	**C (24.1)**	**B (13.1)**		**C (21.2)**	**B (13.4)**	
INTERSECTION		(3) Woodward Ave Srv Rd (SB) & E 8 Mile Srv Rd (EB)						
E 8 Mile Srv Rd (EB)								
Eastbound	Through	C (28.1)	C (28.3)	C (28.3)		C (29.1)	C (29.1)	
	Right Turn							
	Approach	C (28.1)	C (28.3)	C (28.3)		C (29.1)	C (29.1)	
Woodward Ave Srv Rd (SB)								
Southbound	Left Turn	A (.5)	A (.5)	A (.5)		A (.8)	A (.7)	
	Through	A (1.5)	A (1.6)	A (1.3)		A (1.8)	A (1.5)	
	Approach	A (1.2)	A (1.3)	A (1.0)		A (1.5)	A (1.2)	
OVERALL		**B (15.4)**	**B (15.5)**	**B (14.7)**		**B (16.1)**	**B (15.2)**	
INTERSECTION		(4) Woodward Ave Srv Rd (NB) & Site Driveway B						
Site Driveway B								
Westbound	Through	D (40.7)	D (40.7)	C (25.5)		D (40.8)	C (25.7)	
	Right Turn			C (25.2)			C (25.2)	
	Approach	D (40.7)	D (40.7)	C (25.3)		D (40.8)	C (25.4)	
Woodward Ave Srv Rd (NB)								
Northbound	Through	A (5.0)	A (5.0)	A (9.4)		A (5.0)	A (9.6)	
	Right Turn							
	Approach	A (5.0)	A (5.0)	A (9.4)		A (5.0)	A (9.6)	
OVERALL		**A (6.1)**	**A (6.1)**	**B (10.4)**		**A (6.1)**	**B (10.6)**	
INTERSECTION		(4) Woodward Ave Srv Rd (SB) & Site Driveway B						
Site Driveway B								
Westbound	Left Turn	B (13.8)	B (13.8)	A (.2)		B (14.7)	A (.3)	
	Approach	B (13.8)	B (13.8)	A (.2)		B (14.7)	A (.3)	
Woodward Ave Srv Rd (SB)								
Southbound	Through	B (12.6)	B (12.9)	B (19.6)		B (14.8)	C (28.2)	
	Approach	B (12.6)	B (12.9)	B (19.6)		B (14.8)	C (28.2)	
OVERALL		**B (12.6)**	**B (12.9)**	**B (19.4)**		**B (14.8)**	**C (28.0)**	

Table 2A
Level of Service

AM / PM / SAT PEAK		AM PEAK HOUR (LOS / Delay)						
Direction	Approach / Movement	2020	2022 Phase 1			2032 Master Plan		
		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		**(5) Woodward Ave (NB) & W State Fair Ave**						
W State Fair Ave								
Westbound	Through	D (52.6)	D (53.3)	D (45.1)		E (56.8)	D (47.1)	
	Right Turn							
	Approach	D (52.6)	D (53.3)	D (45.1)		E (56.8)	D (47.1)	
Woodward Ave (SB)								
Northbound	Through	A (6.3)	A (6.3)	A (8.7)		A (6.5)	A (8.9)	
	Right Turn							
	Approach	A (6.3)	A (6.3)	A (8.7)		A (6.5)	A (8.9)	
OVERALL		**B (15.9)**	**B (16.1)**	**B (16.2)**		**B (16.9)**	**B (16.6)**	
INTERSECTION		**(5) Woodward Ave (SB) & W State Fair Ave**						
W State Fair Ave								
Westbound	Left Turn	B (10.4)	B (10.1)	A (7.7)		A (9.6)	A (7.1)	
	Approach	B (10.4)	B (10.1)	A (7.7)		A (9.6)	A (7.1)	
Woodward Ave (SB)								
Southbound	Through	A (4.1)	A (4.1)	B (16.1)		A (4.2)	B (18.5)	
	Approach	A (4.1)	A (4.1)	B (16.1)		A (4.2)	B (18.5)	
OVERALL		**A (4.2)**	**A (4.2)**	**B (15.9)**		**A (4.4)**	**B (18.2)**	
INTERSECTION		**(6) W State Fair Ave & Ralston St / Site Driveway C**						
W State Fair Ave								
Eastbound	Left Turn	A (.0)	A (.0)	A (1.8)		A (.0)	A (2.0)	
	Through							
	Approach	A (.0)	A (.0)	A (1.8)		A (.0)	A (2.0)	
Westbound	Through	A (.0)	A (.0)	A (.0)		A (.0)	A (.0)	
	Right Turn							
	Approach	A (.0)	A (.0)	A (.0)		A (.0)	A (.0)	
Ralston St / Site Driveway C								
Northbound	Left Turn	A (9.8)	A (9.8)	B (10.4)		A (10.0)	B (10.8)	
	Through							
	Right Turn							
	Approach	A (9.8)	A (9.8)	B (10.4)		A (10.0)	B (10.8)	
Southbound	Left Turn	B (10.7)	B (10.8)	B (10.9)		B (11.0)	B (11.3)	
	Right Turn							
	Approach	B (10.7)	B (10.8)	B (10.9)		B (11.0)	B (11.3)	
OVERALL		**A (.8)**	**A (.8)**	**A (1.6)**		**A (.8)**	**A (1.6)**	
INTERSECTION		**(7) W State Fair Ave & Site Driveway D**						
W State Fair Ave								
Eastbound	Left Turn			A (1.9)			A (2.1)	
	Through							
	Approach			A (1.9)			A (2.1)	
Westbound	Through			A (.0)			A (.0)	
	Right Turn							
	Approach			A (.0)			A (.0)	
Site Driveway D								
Southbound	Left Turn			B (11.0)			B (11.5)	
	Right Turn			B (11.0)			B (11.5)	
	Approach			B (11.0)			B (11.5)	
OVERALL				**A (1.2)**			**A (1.3)**	
INTERSECTION		**(8) W State Fair Ave & John R St**						
Woodward Ave								
Eastbound	Left Turn	A (9.8)	A (9.8)	A (9.9)		A (9.8)	A (9.9)	
	Through	A (10.0)	A (10.0)	B (10.3)		A (10.0)	B (10.4)	
	Right Turn							
	Approach	A (9.9)	A (10.0)	B (10.3)		A (10.0)	B (10.3)	
Westbound	Left Turn	A (10.0)	B (10.1)	B (10.1)		B (10.1)	B (10.1)	
	Through	B (11.3)	B (11.5)	B (12.6)		B (11.6)	B (12.9)	
	Right Turn							
	Approach	B (11.1)	B (11.3)	B (12.3)		B (11.3)	B (12.6)	
John R St								
Northbound	Left Turn	A (9.4)	A (9.4)	A (9.8)		A (9.4)	A (9.9)	
	Through	A (10.0)	B (10.1)	B (10.1)		B (10.1)	B (10.1)	
	Right Turn							
	Approach	A (9.9)	A (10.0)	A (10.0)		A (10.0)	B (10.1)	
Southbound	Left Turn	A (9.4)	A (9.4)	A (9.4)		A (9.4)	A (9.4)	
	Through	B (10.4)	B (10.5)	B (10.5)		B (10.6)	B (10.6)	
	Right Turn							
	Approach	B (10.3)	B (10.4)	B (10.4)		B (10.4)	B (10.4)	
OVERALL		**B (10.5)**	**B (10.6)**	**B (11.1)**		**B (10.7)**	**B (11.3)**	

Table 2B
Level of Service

AM / PM / SAT PEAK		PM PEAK HOUR (LOS / Delay)						
Direction	Approach / Movement	2020	2022 Phase 1			2032 Master Plan		
		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		**(1) Eight Mile Rd (WB) & X/O / Site Driveway A**						
Eight Mile Rd (WB)								
Westbound	Left Turn			C (31.7)			C (32.0)	
	Through	A (9.5)	A (9.7)	C (27.1)		B (10.6)	C (29.7)	
	Right Turn							
	Approach	A (9.5)	A (9.7)	C (27.2)		B (10.6)	C (29.7)	
X/O / Site Driveway A								
Northbound	Left Turn	C (31.0)	C (30.9)	A (.9)		C (31.2)	A (.8)	
	Approach	C (31.0)	C (30.9)	A (.9)		C (31.2)	A (.8)	
Southbound	Right Turn	D (47.3)	D (47.3)	B (17.3)		D (47.3)	B (18.7)	
	Approach	D (47.3)	D (47.3)	B (17.3)		D (47.3)	B (18.7)	
OVERALL		**B (11.8)**	**B (12.0)**	**C (24.1)**		**B (12.7)**	**C (26.4)**	
INTERSECTION		**(1) Eight Mile Rd (EB) & X/O / Site Driveway A**						
Eight Mile Rd (EB)								
Eastbound	Left Turn	A (.0)	A (.0)	C (31.7)		A (.0)	D (41.7)	
	Through	A (.0)	A (.0)	B (19.4)		A (.0)	C (26.9)	
	Approach	A (.0)	A (.0)	C (20.7)		A (.0)	C (28.3)	
X/O / Site Driveway A								
Northbound	Through			D (36.1)			D (37.9)	
	Right Turn			C (32.7)			C (33.1)	
	Approach			C (33.9)			C (34.7)	
Southbound	Left Turn			A (.4)			A (.5)	
	Through							
	Approach			A (.4)			A (.5)	
OVERALL		**A (.0)**	**A (.0)**	**C (21.0)**		**A (.0)**	**C (28.1)**	
INTERSECTION		**(2)Woodward Ave Srv Rd (NB) & E 8 Mile Srv Rd (WB)**						
E 8 Mile Srv Rd (WB)								
Westbound	Through	D (43.6)	D (42.9)	C (28.5)		D (40.5)	C (29.5)	
	Right Turn							
	Approach	D (43.6)	D (42.9)	C (28.5)		D (40.5)	C (29.5)	
Woodward Ave Srv Rd (NB)								
Northbound	Left Turn	A (.3)	A (.4)	A (.3)		A (.4)	A (.4)	
	Through	A (2.0)	A (2.0)	A (1.9)		A (2.1)	A (2.0)	
	Approach	A (1.4)	A (1.5)	A (1.4)		A (1.6)	A (1.5)	
OVERALL		**B (17.0)**	**B (16.8)**	**B (11.5)**		**B (16.0)**	**B (12.0)**	
INTERSECTION		**(3) Woodward Ave Srv Rd (SB) & E 8 Mile Srv Rd (EB)**						
E 8 Mile Srv Rd (EB)								
Eastbound	Through	C (28.8)	C (28.9)	C (28.9)		C (29.7)	C (29.7)	
	Right Turn							
	Approach	C (28.8)	C (28.9)	C (28.9)		C (29.7)	C (29.7)	
Woodward Ave Srv Rd (SB)								
Southbound	Left Turn	A (.8)	A (.9)	A (.8)		A (1.2)	A (1.1)	
	Through	A (1.4)	A (1.5)	A (1.4)		A (1.6)	A (1.5)	
	Approach	A (1.2)	A (1.3)	A (1.2)		A (1.5)	A (1.4)	
OVERALL		**B (14.6)**	**B (14.7)**	**B (14.4)**		**B (15.4)**	**B (15.0)**	
INTERSECTION		**(4) Woodward Ave Srv Rd (NB) & Site Driveway B**						
Site Driveway B								
Westbound	Through	D (41.2)	D (41.2)	C (31.0)		D (41.4)	C (31.4)	
	Right Turn			C (31.2)			C (31.7)	
	Approach	D (41.2)	D (41.2)	C (31.1)		D (41.4)	C (31.5)	
Woodward Ave Srv Rd (NB)								
Northbound	Through	A (5.4)	A (5.5)	B (16.0)		A (5.7)	B (19.0)	
	Right Turn							
	Approach	A (5.4)	A (5.5)	B (16.0)		A (5.7)	B (19.0)	
OVERALL		**A (5.8)**	**A (5.8)**	**B (16.5)**		**A (6.1)**	**B (19.5)**	
INTERSECTION		**(4) Woodward Ave Srv Rd (SB) & Site Driveway B**						
Site Driveway B								
Westbound	Left Turn	D (37.7)	D (37.7)	A (.4)		D (37.7)	A (.6)	
	Approach	D (37.7)	D (37.7)	A (.4)		D (37.7)	A (.6)	
Woodward Ave Srv Rd (SB)								
Southbound	Through	A (7.3)	A (7.4)	A (9.2)		A (7.6)	A (9.5)	
	Approach	A (7.3)	A (7.4)	A (9.2)		A (7.6)	A (9.5)	
OVERALL		**A (7.6)**	**A (7.3)**	**A (8.9)**		**A (7.5)**	**A (9.1)**	

Table 2B
Level of Service

AM / PM / SAT PEAK		PM PEAK HOUR (LOS / Delay)						
Direction	Approach / Movement	2020	2022 Phase 1			2032 Master Plan		
		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		**(5) Woodward Ave (NB) & W State Fair Ave**						
W State Fair Ave								
Westbound	Through	E (63.1)	E (64.4)	D (51.5)		E (73.7)	E (56.7)	
	Right Turn							
	Approach	E (63.1)	E (64.4)	D (51.5)		E (73.7)	E (56.7)	
Woodward Ave (SB)								
Northbound	Through	B (10.8)	B (11.1)	B (15.3)		B (12.3)	B (17.2)	
	Right Turn							
	Approach	B (10.8)	B (11.1)	B (15.3)		B (12.3)	B (17.2)	
OVERALL		**B (14.2)**	**B (14.5)**	**B (17.9)**		**B (16.3)**	**C (20.1)**	
INTERSECTION		**(5) Woodward Ave (SB) & W State Fair Ave**						
W State Fair Ave								
Westbound	Left Turn	A (.3)	A (.3)	A (.5)		A (.3)	A (.6)	
	Approach	A (.3)	A (.3)	A (.5)		A (.3)	A (.6)	
Woodward Ave (SB)								
Southbound	Through	A (3.6)	A (3.5)	A (9.6)		A (3.6)	A (9.9)	
	Approach	A (3.6)	A (3.5)	A (9.6)		A (3.6)	A (9.9)	
OVERALL		**A (3.4)**	**A (3.4)**	**A (9.0)**		**A (3.5)**	**A (9.2)**	
INTERSECTION		**(6) W State Fair Ave & Ralston St / Site Driveway C**						
W State Fair Ave								
Eastbound	Left Turn	A (.0)	A (.0)	A (.8)		A (.0)	A (.9)	
	Through							
	Approach	A (.0)	A (.0)	A (.8)		A (.0)	A (.9)	
Westbound	Through	A (.0)	A (.0)	A (.0)		A (.0)	A (.0)	
	Right Turn							
	Approach	A (.0)	A (.0)	A (.0)		A (.0)	A (.0)	
Ralston St / Site Driveway C								
Northbound	Left Turn	B (10.2)	B (10.3)	B (11.0)		B (10.5)	B (11.4)	
	Through							
	Right Turn							
	Approach	B (10.2)	B (10.3)	B (11.0)		B (10.5)	B (11.4)	
Southbound	Left Turn	B (11.0)	B (11.1)	B (11.1)		B (11.4)	B (11.6)	
	Right Turn							
	Approach	B (11.0)	B (11.1)	B (11.1)		B (11.4)	B (11.6)	
OVERALL		**A (1.0)**	**A (.9)**	**A (2.0)**		**A (1.0)**	**A (2.1)**	
INTERSECTION		**(7) W State Fair Ave & Site Driveway D**						
W State Fair Ave								
Eastbound	Left Turn			A (.7)			A (.7)	
	Through							
	Approach			A (.7)			A (.7)	
Westbound	Through			A (.0)			A (.0)	
	Right Turn							
	Approach			A (.0)			A (.0)	
Site Driveway D								
Southbound	Left Turn			B (11.3)			B (11.9)	
	Right Turn			B (11.3)			B (11.9)	
	Approach			B (11.3)			B (11.9)	
OVERALL				**A (2.0)**			**A (2.3)**	
INTERSECTION		**(8) W State Fair Ave & John R St**						
Woodward Ave								
Eastbound	Left Turn	A (10.0)	B (10.1)	B (10.2)		B (10.4)	B (10.6)	
	Through	B (10.4)	B (10.6)	B (11.4)		B (10.8)	B (12.0)	
	Right Turn							
	Approach	B (10.4)	B (10.5)	B (11.3)		B (10.8)	B (11.9)	
Westbound	Left Turn	B (10.8)	B (10.9)	B (11.1)		B (11.3)	B (11.7)	
	Through	B (13.0)	B (13.7)	B (14.4)		B (15.2)	B (16.3)	
	Right Turn							
	Approach	B (12.6)	B (13.2)	B (13.8)		B (14.5)	B (15.5)	
John R St								
Northbound	Left Turn	B (10.2)	B (10.3)	B (10.6)		B (10.7)	B (11.1)	
	Through	B (12.1)	B (12.6)	B (12.6)		B (13.7)	B (13.7)	
	Right Turn							
	Approach	B (11.8)	B (12.2)	B (12.2)		B (13.3)	B (13.3)	
Southbound	Left Turn	B (10.4)	B (10.7)	B (10.7)		B (11.6)	B (11.6)	
	Through	B (10.9)	B (11.1)	B (11.1)		B (11.7)	B (11.7)	
	Right Turn							
	Approach	B (10.8)	B (11.0)	B (11.0)		B (11.7)	B (11.7)	
OVERALL		**B (11.7)**	**B (12.1)**	**B (12.4)**		**B (13.1)**	**B (13.5)**	

Table 3A
Queue Table

AM / PM / SAT PEAK		Storage Length	AM PEAK HOUR (Queue Length)						
			2020	2022 Phase 1			2032 Master Plan		
Direction	Approach / Movement		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		**(1) Eight Mile Rd (WB) & X/O / Site Driveway A**							
Eight Mile Rd (WB)									
Westbound	Left Turn	**(150')**			56'			69'	
	Through	**>1000'**	399'	415'	558'		502'	615'	
	Right Turn								
X/O / Site Driveway A									
Northbound	Left Turn	**325'**	6'	6'	0'		7'	0'	
Southbound	Right Turn	**50'**	11'	11'	8'		11'	8'	
INTERSECTION		**(1) Eight Mile Rd (EB) & X/O / Site Driveway A**							
Eight Mile Rd (EB)									
Eastbound	Left Turn	**325'**	---	---	51'		---	54'	
	Through	**650'**	---	---	91'		---	89'	
X/O / Site Driveway A									
Northbound	Through	**(>1000')**			34'			39'	
	Right Turn	**(75')**			0'			0'	
Southbound	Left Turn	**(150')**			0'			0'	
	Through								
INTERSECTION		**(2)Woodward Ave Srv Rd (NB) & E 8 Mile Srv Rd (WB)**							
E 8 Mile Srv Rd (WB)									
Westbound	Through	**>1000'**	102'	86'	112'		119'	84'	
	Right Turn								
Woodward Ave Srv Rd (NB)									
Northbound	Left Turn	**90'**	3'	3'	1'		4'	4'	
	Through	**90'**	32'	32'	9'		36'	36'	
INTERSECTION		**(3) Woodward Ave Srv Rd (SB) & E 8 Mile Srv Rd (EB)**							
E 8 Mile Srv Rd (EB)									
Eastbound	Through	**900'**	110'	112'	38'		127'	127'	
	Right Turn								
Woodward Ave Srv Rd (SB)									
Southbound	Left Turn	**90'**	1'	1'	24'		2'	2'	
	Through	**90'**	7'	8'	87'		10'	11'	
INTERSECTION		**(4) Woodward Ave Srv Rd (NB) & Site Driveway B**							
Site Driveway B									
Westbound	Through	**350' (25')**	30'	30'	38'		45'	43'	
	Right Turn	**350' (>1000')**			24'			27'	
Woodward Ave Srv Rd (NB)									
Northbound	Through	**775'**	83'	85'	87'		57'	97'	
	Right Turn								
INTERSECTION		**(4) Woodward Ave Srv Rd (SB) & Site Driveway B**							
Site Driveway B									
Westbound	Left Turn	**350' (25')**	5'	5'	0'		8'	0'	
Woodward Ave Srv Rd (SB)									
Southbound	Through	**>1000'**	494'	515'	515'		590'	664'	

Table 3A
Queue Table

AM / PM / SAT PEAK		Storage Length	AM PEAK HOUR (Queue Length)						
			2020	2022 Phase 1			2032 Master Plan		
Direction	Approach / Movement		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION			**(5) Woodward Ave (NB) & W State Fair Ave**						
W State Fair Ave									
Westbound	Through	**665'**	229'	235'	243'		268'	271'	
	Right Turn								
Woodward Ave (SB)									
Northbound	Through	**>1000'**	67'	68'	89'		76'	100'	
	Right Turn								
INTERSECTION			**(5) Woodward Ave (SB) & W State Fair Ave**						
W State Fair Ave									
Westbound	Left Turn	**665'**	16'	16'	17'		16'	16'	
Woodward Ave (SB)									
Southbound	Through	**775'**	424'	441'	533'		102'	646'	
INTERSECTION			**(6) W State Fair Ave & Ralston St / Site Driveway C**						
W State Fair Ave									
Eastbound	Left Turn	**665'**	0'	0'	0'		0'	3'	
	Through								
Westbound	Through	**>1000'**	---	---	---		---	---	
	Right Turn								
Ralston St / Site Driveway C									
Northbound	Left Turn	**>1000'**	3'	3'	3'		3'	3'	
	Through								
	Right Turn								
Southbound	Left Turn	**(700')**	0'	0'	3'		0'	3'	
	Right Turn								
INTERSECTION			**(7) W State Fair Ave & Site Driveway D**						
W State Fair Ave									
Eastbound	Left Turn	**>1000'**			3'			3'	
	Through								
Westbound	Through	**>1000'**			---			---	
	Right Turn								
Site Driveway D									
Southbound	Left Turn	**(>1000')**			3'			5'	
	Right Turn	**225'**			0'			0'	
INTERSECTION			**(8) W State Fair Ave & John R St**						
Woodward Ave									
Eastbound	Left Turn	**50'**	8'	9'	9'		9'	9'	
	Through	**>1000'**	21'	23'	32'		23'	34'	
	Right Turn								
Westbound	Left Turn	**50'**	16'	17'	17'		17'	17'	
	Through	**>1000'**	53'	58'	80'		59'	87'	
	Right Turn								
John R St									
Northbound	Left Turn	**70'**	10'	11'	20'		11'	22'	
	Through	**>1000'**	37'	40'	40'		40'	40'	
	Right Turn								
Southbound	Left Turn	**70'**	10'	11'	11'		11'	11'	
	Through	**>1000'**	45'	50'	50'		50'	50'	
	Right Turn								

Notes:

(XX') represents the proposed queue length under the Build conditions.

Table 3B
Queue Table

AM / PM / SAT PEAK		Storage Length	PM PEAK HOUR (Queue Length)						
			2020	2022 Phase 1			2032 Master Plan		
Direction	Approach / Movement		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION		**(1) Eight Mile Rd (WB) & X/O / Site Driveway A**							
Eight Mile Rd (WB)									
Westbound	Left Turn	**(150')**			35'			40'	
	Through	**>1000'**	336'	347'	410'		404'	449'	
	Right Turn								
X/O / Site Driveway A									
Northbound	Left Turn	**325'**	22'	22'	0'		25'	0'	
Southbound	Right Turn	**50'**	21'	21'	15'		21'	17'	
INTERSECTION		**(1) Eight Mile Rd (EB) & X/O / Site Driveway A**							
Eight Mile Rd (EB)									
Eastbound	Left Turn	**325'**	---	---	108'		---	128'	
	Through	**650'**	---	---	310'		---	357'	
X/O / Site Driveway A									
Northbound	Through	**(>1000')**			65'			79'	
	Right Turn	**(75')**			0'			3'	
Southbound	Left Turn	**(150')**			1'			0'	
	Through								
INTERSECTION		**(2)Woodward Ave Srv Rd (NB) & E 8 Mile Srv Rd (WB)**							
E 8 Mile Srv Rd (WB)									
Westbound	Through	**>1000'**	112'	115'	95'		130'	115'	
	Right Turn								
Woodward Ave Srv Rd (NB)									
Northbound	Left Turn	**90'**	0'	1'	1'		0'	0'	
	Through	**90'**	28'	29'	24'		36'	34'	
INTERSECTION		**(3) Woodward Ave Srv Rd (SB) & E 8 Mile Srv Rd (EB)**							
E 8 Mile Srv Rd (EB)									
Eastbound	Through	**900'**	127'	128'	128'		142'	142'	
	Right Turn								
Woodward Ave Srv Rd (SB)									
Southbound	Left Turn	**90'**	2'	2'	3'		9'	9'	
	Through	**90'**	9'	9'	11'		12'	14'	
INTERSECTION		**(4) Woodward Ave Srv Rd (NB) & Site Driveway B**							
Site Driveway B									
Westbound	Through	**350' (25')**	43'	43'	66'		49'	79'	
	Right Turn	**350' (>1000')**			63'			76'	
Woodward Ave Srv Rd (NB)									
Northbound	Through	**775'**	458'	476'	483'		578'	587'	
	Right Turn								
INTERSECTION		**(4) Woodward Ave Srv Rd (SB) & Site Driveway B**							
Site Driveway B									
Westbound	Left Turn	**350' (25')**	0'	0'	0'		0'	0'	
Woodward Ave Srv Rd (SB)									
Southbound	Through	**>1000'**	130'	133'	133'		149'	149'	

Table 3B
Queue Table

AM / PM / SAT PEAK		Storage Length	PM PEAK HOUR (Queue Length)						
			2020	2022 Phase 1			2032 Master Plan		
Direction	Approach / Movement		Existing	No Build	Build	Build with Mitigation	No Build	Build	Build with Mitigation
INTERSECTION			**(5) Woodward Ave (NB) & W State Fair Ave**						
W State Fair Ave									
Westbound	Through	**665'**	318'	326'	318'		375'	383'	
	Right Turn								
Woodward Ave (SB)									
Northbound	Through	**>1000'**	381'	396'	484'		474'	583'	
	Right Turn								
INTERSECTION			**(5) Woodward Ave (SB) & W State Fair Ave**						
W State Fair Ave									
Westbound	Left Turn	**665'**	0'	0'	0'		0'	0'	
Woodward Ave (SB)									
Southbound	Through	**775'**	118'	121'	149'		135'	168'	
INTERSECTION			**(6) W State Fair Ave & Ralston St / Site Driveway C**						
W State Fair Ave									
Eastbound	Left Turn	**665'**	0'	0'	0'		0'	0'	
	Through								
Westbound	Through	**>1000'**	---	---	---		---	---	
	Right Turn								
Ralston St / Site Driveway C									
Northbound	Left Turn	**>1000'**	3'	3'	5'		5'	5'	
	Through								
	Right Turn								
Southbound	Left Turn	**(700')**	0'	0'	5'		0'	8'	
	Right Turn								
INTERSECTION			**(7) W State Fair Ave & Site Driveway D**						
W State Fair Ave									
Eastbound	Left Turn	**>1000'**			0'			0'	
	Through								
Westbound	Through	**>1000'**			---			---	
	Right Turn								
Site Driveway D									
Southbound	Left Turn	**(>1000')**			8'			13'	
	Right Turn	**225'**			3'			3'	
INTERSECTION			**(8) W State Fair Ave & John R St**						
Woodward Ave									
Eastbound	Left Turn	**50'**	12'	13'	13'		14'	15'	
	Through	**>1000'**	41'	45'	69'		52'	85'	
	Right Turn								
Westbound	Left Turn	**50'**	34'	37'	37'		43'	44'	
	Through	**>1000'**	108'	123'	138'		152'	172'	
	Right Turn								
John R St									
Northbound	Left Turn	**70'**	25'	27'	31'		32'	37'	
	Through	**>1000'**	95'	106'	106'		132'	132'	
	Right Turn								
Southbound	Left Turn	**70'**	26'	29'	29'		34'	34'	
	Through	**>1000'**	62'	68'	68'		82'	82'	
	Right Turn								

Notes:

(XX') represents the proposed queue length under the Build conditions.