Bright View Engineering
Moving you forward

Traffic Impact Study

Proposed Warehouse Development
Block 701, Lot 2.01
Chesterfield Township
Block 1, Lot 5.02
Mansfield Township
Burlington County, New Jersey

April 27, 2021

Prepared For
Active Acquisitions OY LLC

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Project No.: 203112

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I. INTRODUCTION

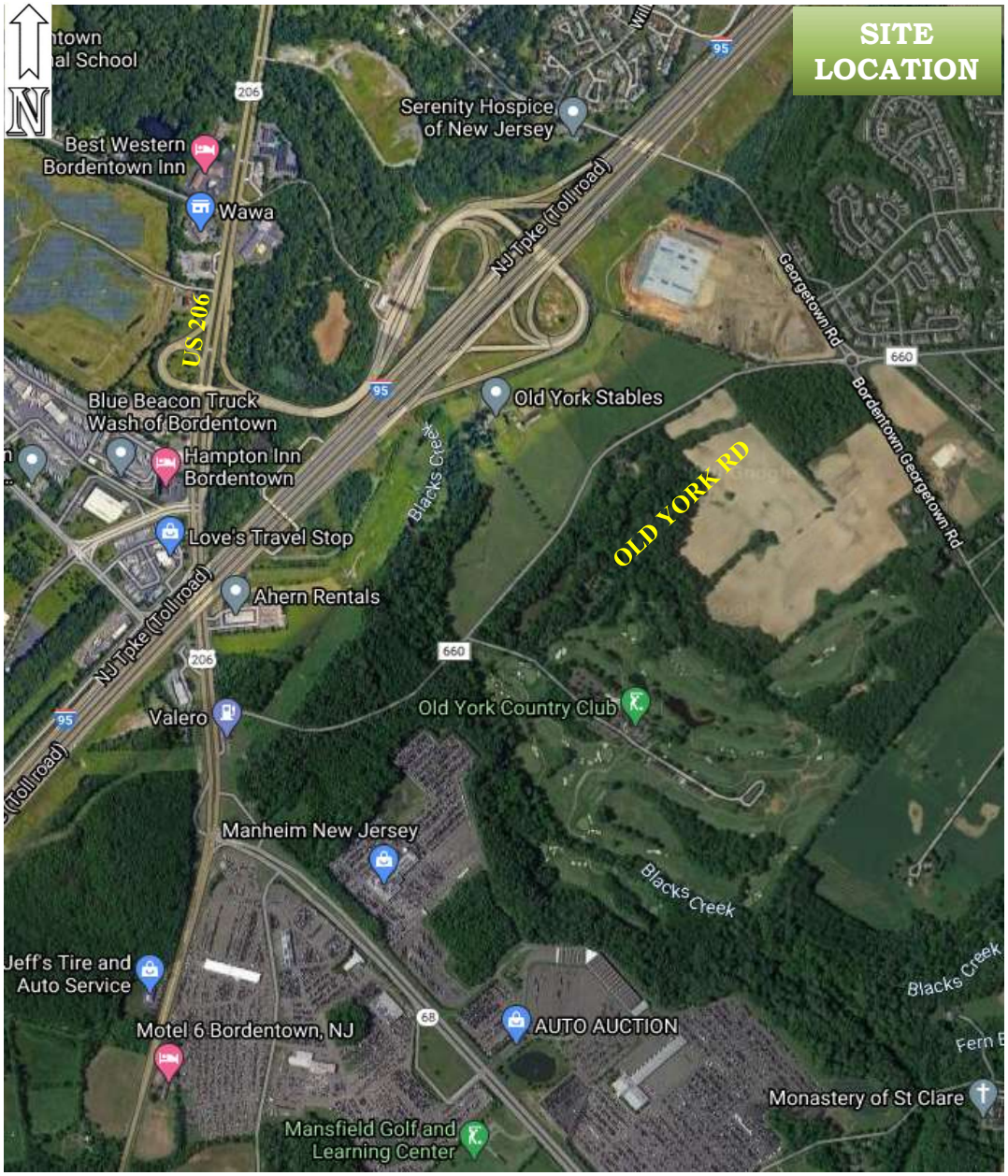
Bright View Engineering, LLC was tasked with performing a traffic impact study for a proposed approximately 1,134,000 SF warehouse development. The proposed project area is located on Old York Road (CR 660) in Chesterfield Township, Burlington County, New Jersey. This site encompasses approximately 177 acres and is designated as Block 701, Lot 2.01 in Chesterfield Township and Block 1, Lot 5.02 in Mansfield Township. The lot is currently utilized as a country club and golf course known as the Old York Country Club. A site location map is included within **Figure 1** on the following page.

The proposed development will consist of approximately 1,134,000 sf warehouse building, with passenger car parking on the northwest and southeast sides of the building and truck loading bays on the southwest and northeast sides of the building. Access to the site is proposed via two driveways along Old York Road (CR 660), which would segregate the heavy vehicle traffic from passenger vehicles. All commercial vehicles (trucks) will enter the site from the west via US Route 206 and make a right turn into the site. All commercial vehicles exiting the site will head to the west by making a left turn out of the site driveway. The site driveway has been designed so that only passenger vehicles and emergency vehicles will be permitted to make a left into the site and a right out of the site towards Bordentown-Georgetown Road (CR 545). A concept driveway plan of the proposed access conditions is attached at the end of this report.

This study presents an evaluation of the current and future traffic conditions in the vicinity of the development and provides an analysis of the traffic and parking impacts of the proposed development. Specific elements included in this study are:

- An inventory of the roadway facilities in the vicinity of the project, including the existing physical and traffic operating characteristics;
- Data Collection of the 2020 Existing Traffic Conditions;
- Adjustments to Existing Traffic Volumes for COVID as appropriate;
- Site Generated Trips using the ITE Trip Generation Manual, 10th Edition;
- Trip Distribution and Assignment of the new vehicle trips;
- Full Build Traffic Volumes for the Full-Build year of 2023;
- Peak Hour Capacity Analysis for the Existing, No Build and Full Build Conditions;
- Analysis of Internal Vehicular Circulation and Safety;
- Analysis of On-Site Parking Requirements; and,
- Summary and Conclusions.

FIGURE 1 – Site Location Map



Bright View Engineering *Moving you forward*	**PROPOSED WAREHOUSE DEVELOPMENT CHESTERFIELD TWP, BURLINGTON COUNTY, NJ**	**FIGURE** **1**

II. EXISTING CONDITIONS

A field investigation was conducted adjacent to the project site to obtain an inventory of existing roadway conditions, posted traffic controls, adjacent land uses, lane configurations of the roadways in the study area, and existing vehicular and pedestrian traffic patterns. The following is a brief description of the roadways:

Old York Road (CR 660) has a general east – west orientation in this area which connects traffic between US Route 206 and Bordentown-Georgetown Road and points east. The available NJDOT Straight-Line Diagram (*last inventoried by NJDOT April 2011*) identifies the roadway as an *Urban Major Collector* road, under Burlington County jurisdiction. The roadway has a posted speed limit of 45 mph in the vicinity of the site. Old York Road consists of a single lane in each direction with variable width shoulders. Sidewalks are not present on Old York Road.

US Route 206 has a general north-south orientation and serves to connect US Route 30 in Hammonton Township in Atlantic County to the Pennsylvania border in Montague Township in Sussex County. The roadway is under the jurisdiction of NJDOT in the vicinity of the site and is classified as an Urban Principal Arterial according to the most recent NJDOT Straight Line Diagram, *(last inventoried by NJDOT May 2019).*

III. 2020 EXISTING TRAFFIC CONDITIONS

In order to gain a better understanding of existing traffic conditions, Bright View Engineering collected traffic data at the following intersections in the vicinity of the site:

- Old York Road (CR 660) and Georgetown Road (CR 545)
- US Route 206 Northbound & Old York Road (CR 660)
- US Route 206 Southbound & Old York Road
- US Route 206 & Connector Road
- Connector Road & Rising Sun Road
- Rising Sun Road & Old York Road

Counts were conducted between the weekday hours of 7:00 AM and 9:00 AM in the morning and 4:00 PM and 6:00 PM in the evening. Based on the traffic volumes observed, the AM Peak Hour for Old York Road occurred from 7:00 AM to 8:00 AM and PM Peak Hour occurred from 4:15 PM to 5:15 PM.

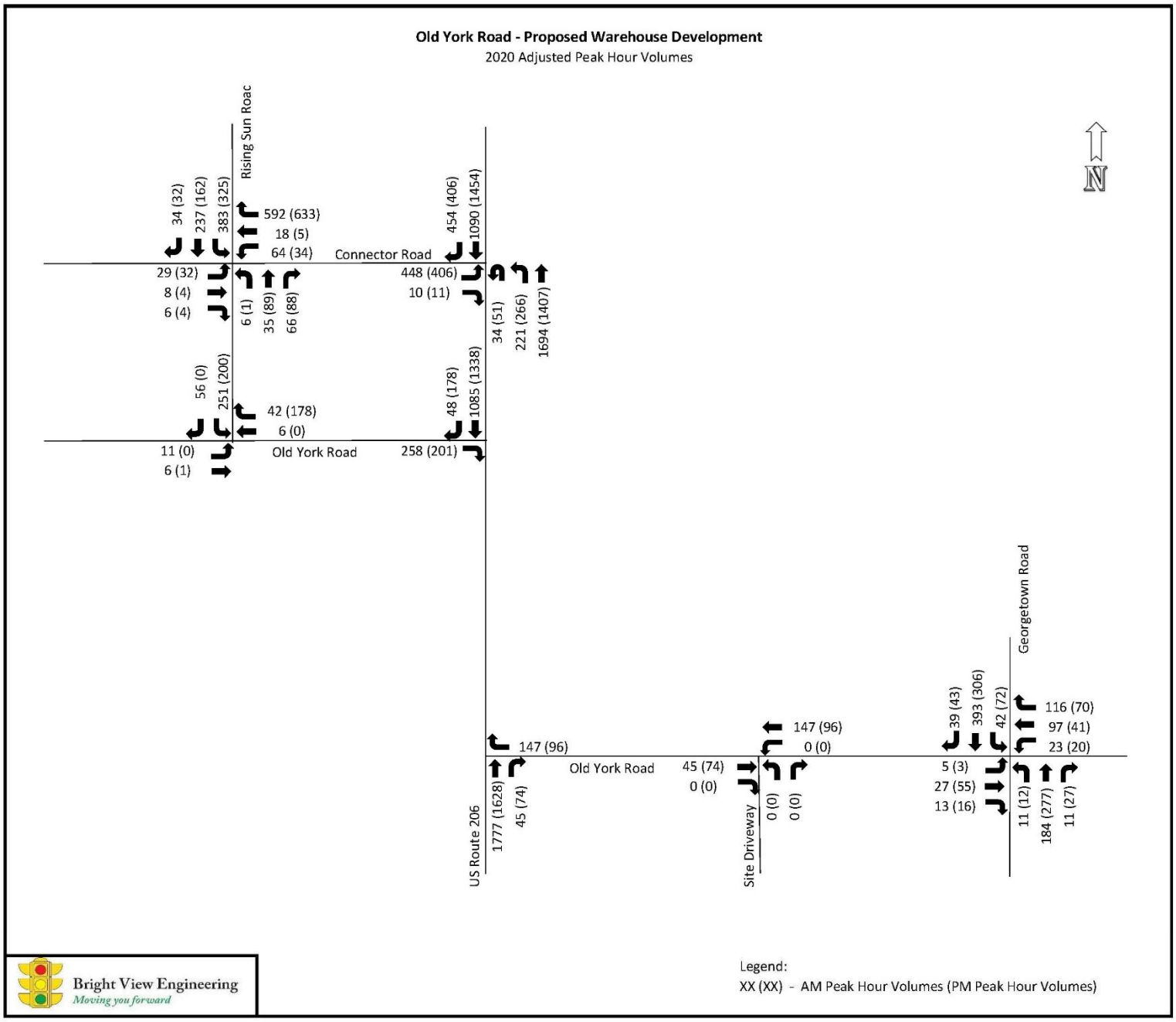
Since recent world events have caused a reduction in traffic patterns throughout the Country, available historical traffic counts were consulted to determine if adjustments to the collected traffic volumes are warranted. An Automatic Traffic Recorder (ATR) count performed by NJDOT from Tuesday, May 23rd, 2017 to Friday, May 26, 2017 on US Route 206, north of Old York Road was reviewed and compared to the data collected to determine if adjustments to the collected traffic counts was warranted. Based on our review of this historical data, all volumes in the study area were increased by 61% for the morning peak hour and 31% during the evening peak hour to bring the study area volumes to pre-COVID19 conditions. A detailed tabulation of the adjustments made to the collected traffic volumes, including any adjustments is provided in the attached appendix. The resulting adjusted 2020 existing traffic volumes are presented in Figure 2.

Establishment of Peak Hour Factor

The *peak hour factor (PHF)* is a ratio which expresses the relationship between the peak 15-minute flow rates and the full hourly volume. The PHF is calculated by multiplying the peak 15-minute flow rate at an intersection by four and then dividing the intersection hourly volume by that value. PHFs are usually observed between 0.80 and 0.98. These statistics indicate that the recorded traffic volumes approach the intersection consistently, with minimal interruption in the traffic stream.

These PHF's indicate consistent traffic progression during the peak hour, with no sudden increases in traffic during the fifteen-minute intervals counted. We noted during our field observations that traffic flow was consistent throughout the peak periods further corroborating the PHF calculation. It should be noted that based on our field observations and the resulting PHFs from our data collection, we opted to utilize the existing PHFs for the ***Existing Conditions***, ***No-Build Conditions*** and ***Build Conditions***. We felt that this was a reasonably conservative approach when examining the existing conditions at the intersection. It is our opinion that each PHF is justified based on the background growth and the trip generation. This will result in increased trips and a more even distribution of traffic volume throughout all approaches at the intersection. **Figure 2** below details the 2020 existing traffic volumes.

FIGURE 2 – 2020 Existing Conditions



IV. HCM CAPACITY ANALYSIS

The peak hour traffic operations within the project vicinity were evaluated at each of the study intersections. The analyses were performed using the latest version of *Synchro, Version 11*; a traffic analysis and simulation program. The results of these analyses provide Level of Service (LOS), volume/capacity descriptions and average seconds of delay for the intersection movements.

The efficiency with which an intersection operates is a function of volume and capacity. The capacity of an intersection is the volume of vehicles it can accommodate during a peak hour. Level of Service is a qualitative measure describing operational conditions within a traffic stream in terms of traffic characteristics such as freedom to maneuver, traffic interruption, comfort, and convenience. Six LOS are defined for each type of facility with analysis procedures available. Levels of Service range from "A" through "F", with "A" representing excellent conditions with no delays and delays exceeding 80 seconds (signalized) and 50 seconds (unsignalized) denoted by Level "F". The HCS 6th Edition LOS criteria for intersections are summarized in **Table 1**.

Table 1 – HCM 6th Edition: Signalized and Unsignalized LOS/Delay Criteria

Level of Service	Average Control Delay (sec/veh)	
	Signalized Intersection	Unsignalized Intersection
A	< 10	< 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 – 25
D	> 35 – 55	> 25 – 35
E	> 55 – 80	> 35 – 50
F	> 80	> 50

2020 Existing Conditions HCM Capacity Analysis

The existing peak hours of operation were evaluated at each of the study intersections for both AM and PM traffic volumes. Existing conditions signal timings were optimized where appropriate. The results of these analyses provide Level of Service and average seconds of delay for the intersection movements. Levels of Service (LOS) are briefly detailed for the 2020 existing conditions in the **Table 3**, attached to the end of this report. Further details regarding the operating level of service and approach delays may be observed within the Synchro Reports found within the appendices at the end of this report.

As indicated in Table 3, under 2020 adjusted existing conditions, all movements at the intersection of **Bordentown Georgetown Road & Old York Road** operate at a Level of Service 'B' or better during both the morning and evening peak hours.

At the intersection of **US Route 206 northbound and Old York Road**, the westbound right turn movement operates at a Level of Service 'F' during the morning peak hour and a Level of Service 'D' during the evening peak hour. It is worthy to note that this level of service calculation includes the 61% increase in volumes from the COVID adjustment, and does not take into account potential gaps in traffic from adjacent traffic signals.

At the intersection of **US Route 206 southbound and Old York Road**, the eastbound right turn movement operates at a Level of Service 'E' during the morning peak hour and a Level of Service 'F' during the evening peak hour. It is worthy to note that this level of service calculation includes the 61% increase in volumes from the COVID adjustment, and does not consider potential gaps in traffic from adjacent traffic signals.

At the intersection of **US Route 206 and Connector Road,** all movements operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound left turn/U-turn movement which operates at a Level of Service 'E' during both the morning and evening peak hours. Overall, the intersection operates at a Level of Service 'C' during both the morning and evening peak hours.

At the intersection of **Rising Sun Road and Connector Road,** all movements operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound and southbound through movements which operates at a Level of Service 'E' during both the evening peak hour. Overall, the intersection operates at a Level of Service 'C' during both the morning and evening peak hours.

At the intersection of **Old York Road and Rising Sun Road,** all movements operate at a Level of Service 'A' during both the morning and evening peak hours. This analysis was performed considering the intersection as an all way stop, as the HCM cannot analyze the current configuration, which includes stop signs on the Old York Road approaches and a free movement for the southbound Rising Sun Road approach.

2023 No-Build Conditions HCM Capacity Analysis

The No-Build traffic volumes refer to the Existing traffic volumes, plus background traffic growth and any additional traffic from projects in the area, not including the subject project. Applying an overall growth rate of 1.5% (as per the current NJDOT annual background growth rate table) to the existing traffic volumes over a span of three (3) years yields the 2023 No-Build traffic volumes. Levels of Service (LOS) are briefly detailed for the 2023 No-Build Conditions in the **Table 3** located at the end of this report. The adjusted volumes are included in **Figure 3** on the following page.

As indicated in Table 3, under 2023 no build conditions, all movements at the intersection of **Bordentown Georgetown Road & Old York Road** continue to operate at a Level of Service 'B' or better during both the morning and evening peak hours.

At the intersection of **US Route 206 northbound and Old York Road**, the westbound right turn movement continues to operate at a Level of Service 'F' during the morning peak hour and a Level of Service 'D' during the evening peak hour.

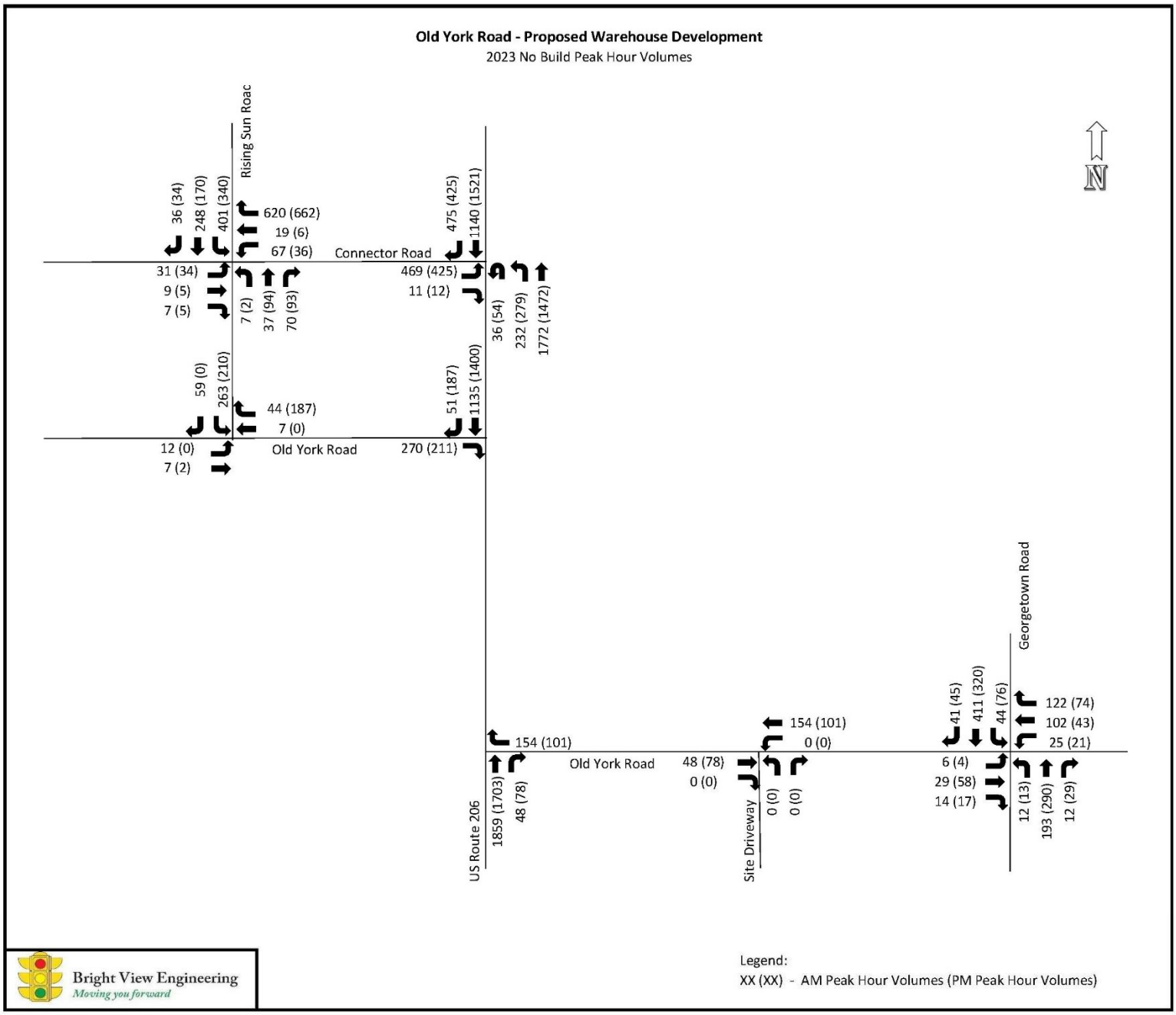
At the intersection of **US Route 206 southbound and Old York Road**, the eastbound right turn movement continues to operate at a Level of Service 'E' during the morning peak hour and a Level of Service 'F' during the evening peak hour.

At the intersection of **US Route 206 and Connector Road,** all movements continue to operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound left turn/U-turn movement which continues to operate at a Level of Service 'E' during both the morning and evening peak hours. Overall, the intersection continues to operate at a Level of Service 'C' during both the morning and evening peak hours.

At the intersection of **Rising Sun Road and Connector Road,** all movements continue to operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound and southbound through movements which continue to operate at a Level of Service 'E' during both the evening peak hour. Overall, the intersection continues to operate at a Level of Service 'C' during both the morning and evening peak hours.

At the intersection of **Old York Road and Rising Sun Road,** all movements continue to operate at a Level of Service 'A' during both the morning and evening peak hours with the exception of the southbound approach during the morning peak hour, which operates at a Level of Service 'B.'

FIGURE 3 – 2023 No-Build Conditions



V. TRIP GENERATION & DISTRIBUTION

The proposed site is located on the south side of Old York Road (CR 660), east of US Route 206. The area surrounding the project intersection was observed to be a mix of industrial and agricultural land uses. As part of our analysis we examined the surrounding land uses in order to gain a better understanding as to the trip assignment in the project area. Trip distribution and generation were calculated based upon *Institute of Transportation Engineers* (ITE) accepted design standards, applicable Township ordinances and the naturally occurring traffic patterns observed during our data collection period.

Trip Distribution and Assignment

Trip distribution methodology is developed based on a variety of factors. These factors include the size and type of land use generating trips, the existing travel patterns within the adjacent roadway network, adjacent land uses, and the proximity of major arterials within the project vicinity.

Access to the site is proposed via two driveways along Old York Road (CR 660), which would segregate the heavy vehicle traffic from passenger vehicles. All commercial vehicles (trucks) will enter the site from the west via US Route 206 and make a right turn into the site. All commercial vehicles exiting the site will head to the west by making a left turn out of the site driveway. The site driveway has been designed so that only passenger vehicles and emergency vehicles will be permitted to make a left into the site and a right out of the site towards Bordentown-Georgetown Road (CR 545).

A gravity model, utilizing Journey to Work data from the "2011-2015 ACS Survey" conducted by the United States Census Board, was prepared to determine the paths of passenger vehicles (employees) to and from the proposed site. The gravity model utilizes the ACS survey data to identify where people live who work in a given community. We then, utilizing Google Maps, determine the optimum route to/from the site for each town the ACS survey identifies workers live in. A weighted average is used, so towns with more workers coming to a given area is accounted for appropriately. Because of the site's proximity to Bordentown and Mansfield, we elected to utilize Workplace data for Chesterfield, Bordentown and Mansfield to determine the gravity model based distribution. The resulting distribution is provided on the following page.

As indicated in the No Build analysis, delays exist on the westbound right turn movement from Old York Road to US Route 206 northbound which could have the potential to redirect passenger vehicles to approach and depart the site using other area roadways. While this is typically accounted for in the gravity model routing, BVE has prepared a supplemental analysis, referred herewith as a sensitivity analysis, to estimate the effect such a diversion has on the study area. Specifically, we modeled a higher distribution north and south on Bordentown Georgetown Road to model conditions if more employees approach the site from Bordentown Georgetown Road than the gravity model predicts. This diversion could be due to congestion on US Route 206 or if drivers with local knowledge of the area seek alternative routes to the site. Our main assumption in the sensitivity analysis was that drivers would avoid Route 206. The distribution identified for the sensitivity analysis is also indicated below, and the subsequent results provided in the technical appendix to this report. In short, we found that the sensitivity analysis indicates that even with an increased distribution to Bordentown Georgetown Road, there are only nominal increases in vehicle trips utilizing Bordentown Georgetown Road to access the site due to the construction of the project in question.

Gravity Model Based Distribution

To/From US Route 206 to the North	63.1%
To/From US Route 206 to the South	20.3%
To/From Georgetown Road to the North	3.2%
To/From Georgetown Road to the South	5.1%
To/From Old York Road to the East	8.3%

Sensitivity Analysis Distribution

To/From US Route 206 to the North	45%
To/From US Route 206 to the South	15%
To/From Georgetown Road to the North	21%
To/From Georgetown Road to the South	9%
To/From Old York Road to the East	10%

The site generated trip distribution utilizing the gravity model distribution is detailed within **Figures 4a** below, with 4a showing passenger car distribution based on the gravity model and 4b showing the utilized truck distribution. Since all trucks are being directed to the west, the truck distribution was separated out from the gravity model. The sensitivity analysis distribution is provided in in graphical form in the appendix to this report.

FIGURE 4a – Proposed Site Trip Distribution – Passenger Vehicles

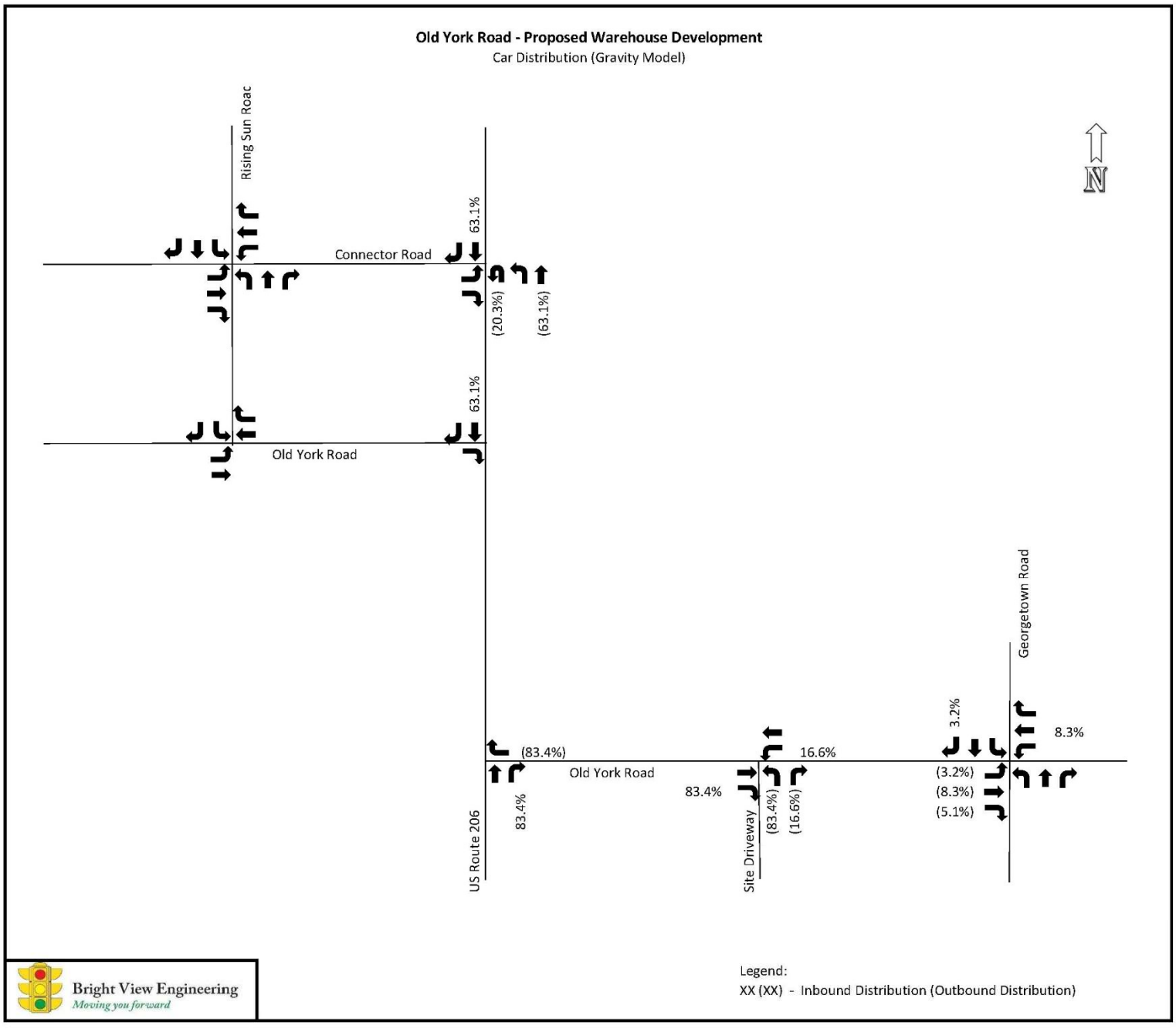
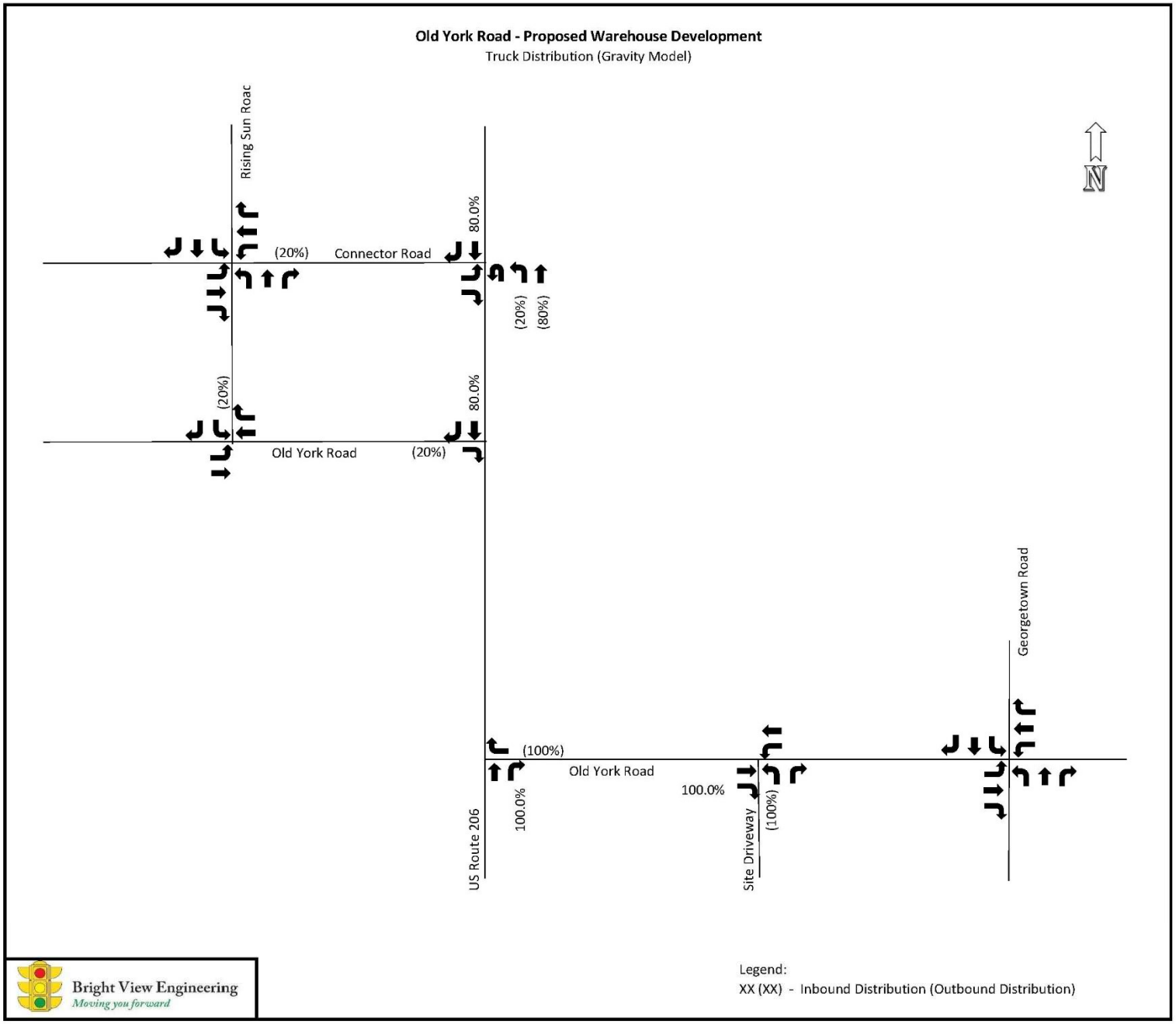


FIGURE 4b – Proposed Site Trip Distribution – Trucks



In order to better understand the trip generation for the proposed use, we examined various land use codes within the 10TH Edition of the ITE Trip Generation Manual and determined that Land Use Code 150, Warehousing is the most appropriate land use for the site. We also considered Land Use Code 154 (High Cube Transload and Short-Term Storage) and Land Use 157 (High Cube Cold Storage Warehouse) and note that each of these land uses are projected to generate less peak hour trips than Land Use Code 150 (Warehousing).

Thus the use of Land Use Code 150 is the most appropriate estimate of the trips for this development. **Table 3** and **Figures 5a, 5b and 5c** below depicts the trip generation rates utilized:

Table 2 – ITE 10TH Edition – Trip Generation Rates

Peak Hour	150: Warehousing		
	IN	OUT	TOTAL
AM	119 cars 30 trucks	35 cars 9 trucks	154 cars 39 trucks
PM	46 cars 12 trucks	125 cars 32 trucks	171 cars 44 trucks
Daily	1,973 total vehicles		

Please note that in order to be conservative in our analysis of the project site we utilized average rates for the proposed land use as provided by the Institute of Transportation Engineers (*ITE*) Trip Generation Manual, 10TH Edition which are higher than the predicted equations for the proposed land use. We also reviewed the NJDOT Highway Access Permit rates for this land use (LU Code 150, Warehouse), noting that the rates selected result in higher trip generation volumes than the NJDOT HAPS rates. As such, our analysis utilizes the figures provided by the trip generation reference for average rates for the peak hour of adjacent street traffic. This represents a conservative estimate of the traffic associated with is use by using the highest published rates for this land use and development intensity. The corresponding data sheets are included within the appendices at the end of this report.

Traffic Impacts on the Crosswicks Section of Chesterfield

As noted on Figure 5c, approximately 13 cars during the morning peak hour and 15 cars during the evening peak hour are anticipated to utilize Old York Road east of Bordentown Georgetown Road. These trips have the ability to disperse at the intersection of Old York Road and Bordentown Chesterfield Road, and again at the intersection of Old York Road / Margerum Road and Crosswicks Chesterfield Road. Due to the multiple roadways between the Crosswicks neighborhood and the site, the new trips associated with the project in the Crosswalks neighborhood will be minimal. We estimate approximately 4 to 5 vehicle trips attributable to the proposed project will travel through the Crosswicks neighborhood in peak hours.

Site Driveway

In order to provide safe and efficient site access while addressing the potential concerns regarding heavy vehicle turning movements, BVE analyzed various driveway options between the Site and Old York Road. In particular, the site driveway has been designed so all commercial vehicles (trucks) are oriented to/from the west towards US Route 206 and the New Jersey Turnpike. Thus, we came up with a driveway concept which proposes to create one new curb opening as well as re-using the existing curb cut which currently serves the Old York Country Club. These two access points diverge from one another approximately 600' south of their driveway openings. The main (*west*) access road would accommodate left turns into the site for passenger vehicles, right turns into the site for passenger vehicles and trucks and left turns out for passenger vehicles and trucks.

Right turns out of the site will be limited to passenger vehicles only via the second egress driveway. This connector road would be height restricted by a steel, monotube structure directing heavy vehicles onto the main access road which would only permit left turns out of the site driveway. To reinforce the truck restriction for vehicles traveling westbound on Old York Road, an illuminated sign, activated by an advance height sensor would supplement static 'truck no left turn' signs for westbound Old York Road.

In addition to the regulatory and physical restrictions discussed above, BVE recommends the applicant, with support from Chesterfield Township and/or Burlington County, contact Transcom to inform them of the proposed truck restrictions when implemented. Transcom is the regional coalition of transportation agencies in the New York – New Jersey – Connecticut region and provides traffic management data to public agencies and 'big data' organizations such as Google Maps. Since many roadway users, especially trucks, utilize routing data ultimately provided by Transcom, this will help to inform trucks approaching and leaving the site of the restrictions in place.

In order to be conservative in our analysis, we analyzed the site driveway as a single, full-movement driveway with all site traffic utilizing this access point. The results of our analysis are detailed in the 2023 Full-Build Conditions provided below.

FIGURE 5a – 2023 Build Conditions – Proposed Site Trip Generation - Cars

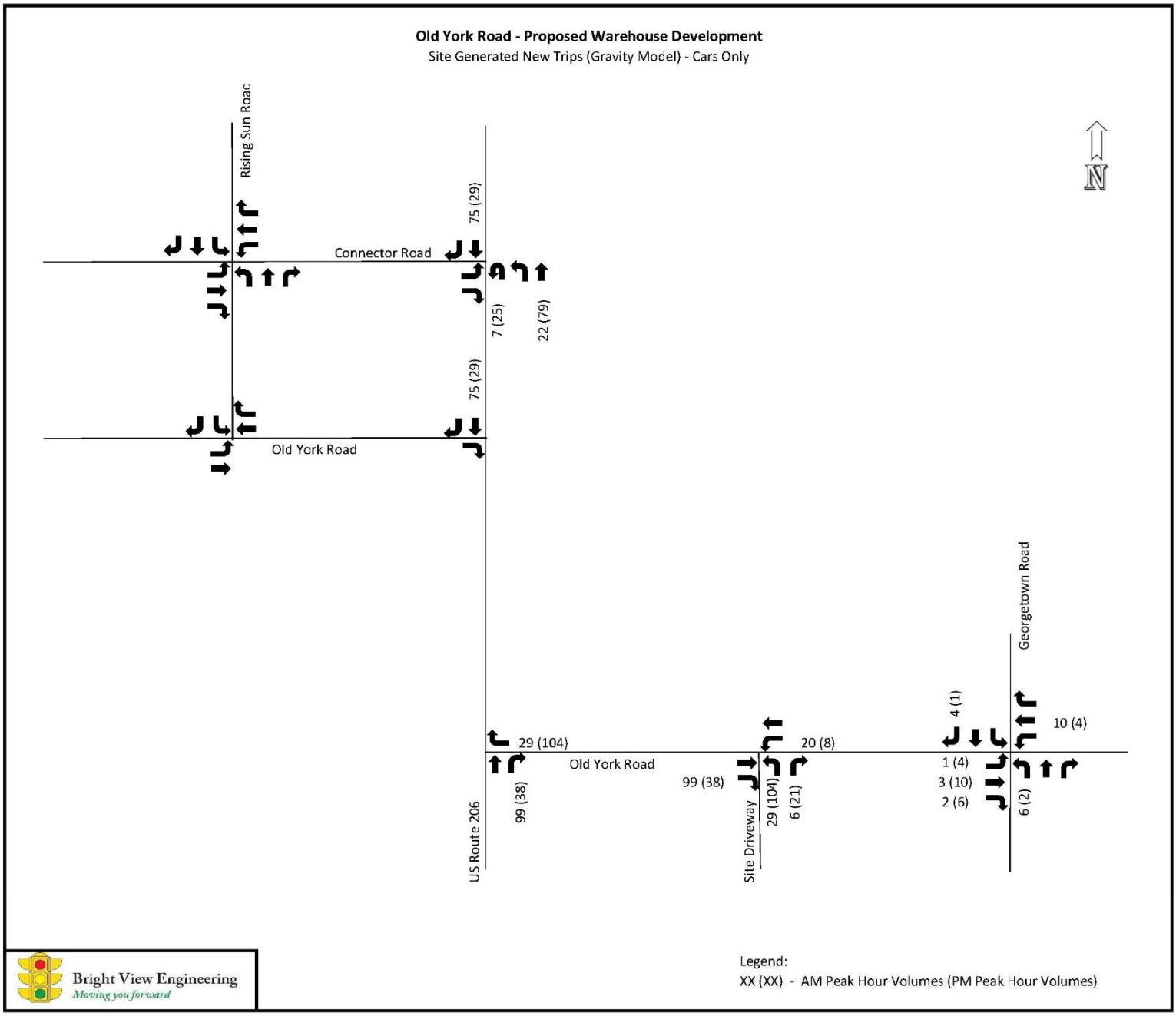


FIGURE 5b – 2023 Build Conditions – Proposed Site Trip Generation - Trucks

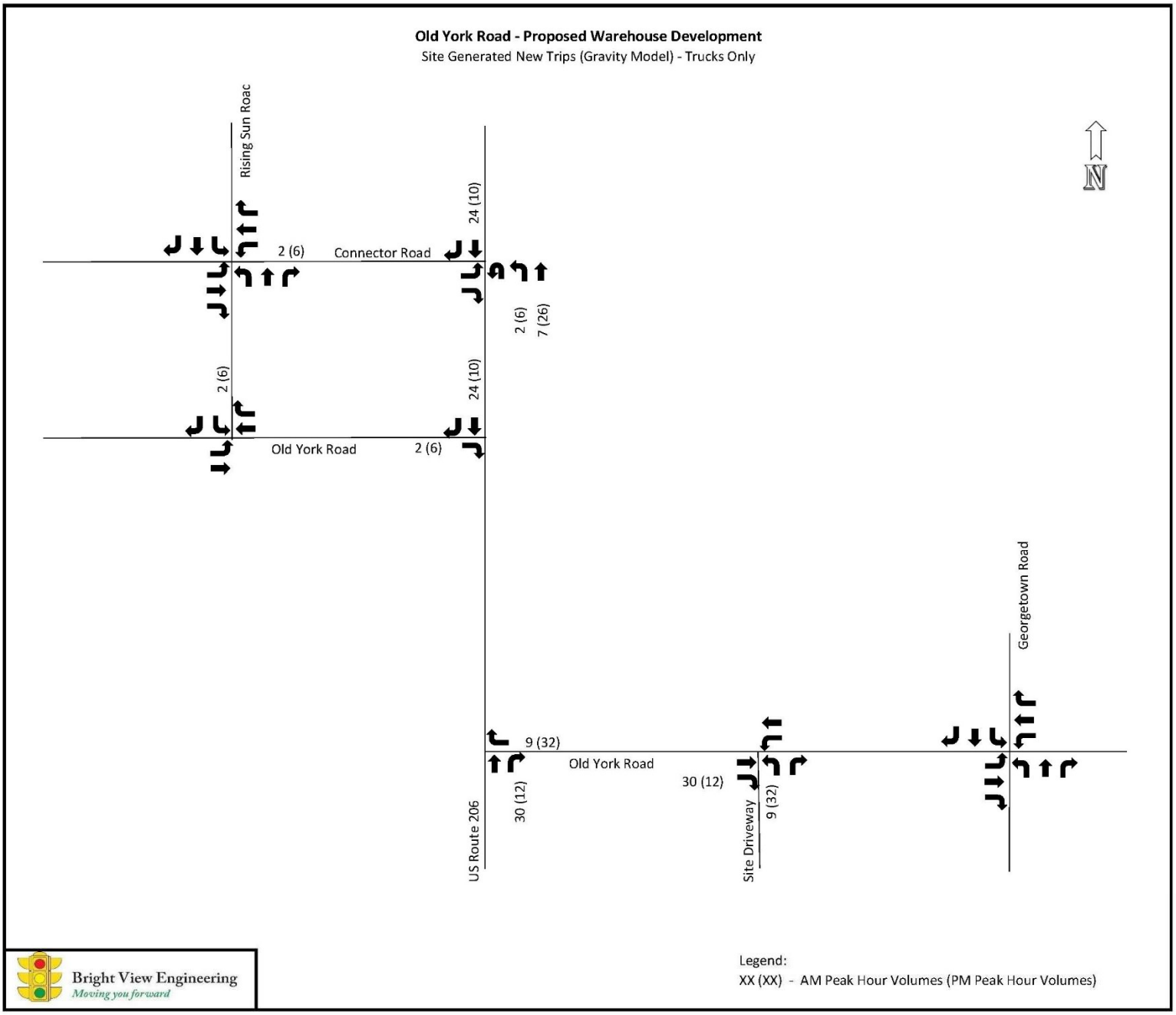
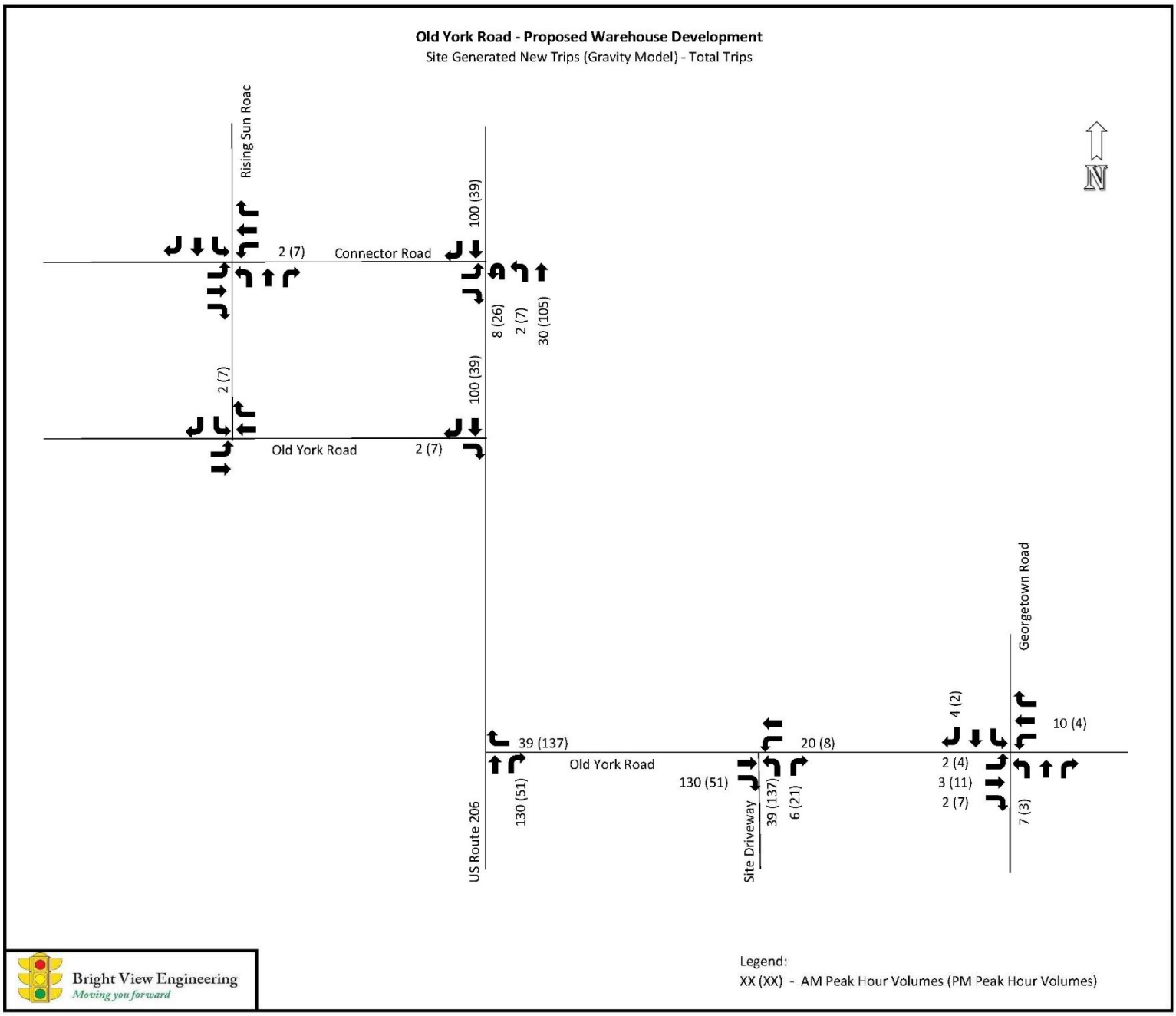


FIGURE 5c – 2023 Build Conditions – Proposed Site Trip Generation - Total



VI. 2023 FULL-BUILD TRAFFIC CONDITIONS

In the Full-Build scenario the intersections in the study area were analyzed using *Synchro* similar to the existing and No Build conditions discussed above, adding the trips identified in above the roadway network. Below are the results of our analysis:

Table 3 – Level of Service Comparison

Level of Service Summary - Gravity Model

Bordentown Georgetown Road & Old York Road

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBLTR	a (07)	a (07)	a (07)
WBLTR	a (06)	a (08)	a (08)
NBLTR	a (06)	a (06)	a (06)
SBLTR	b (12)	b (13)	b (13)

Evening Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBLTR	a (07)	a (07)	a (08)
WBLTR	a (07)	a (07)	a (07)
NBLTR	a (08)	a (09)	a (9)
SBLTR	a (10)	a (10)	b (10)

US Route 206 NB & Old York Road

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build	2023 Build with Mitigation
WBR	f (51)	f (64)	f (102)	a(0)

Evening Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build	2023 Build with Mitigation
WBR	d (31)	d (35)	f (146)	a(0)

US Route 206 SB & Old York Road

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBR	e (38)	e (48)	f (63)

Evening Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBR	f (137)	f (188)	f (227)

US 206 & Connector Road

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBLR	D (51)	D (51)	D (51)
NBUL	E (60)	E (60)	E (60)
NBT	A (08)	A (09)	A (09)
SBT	C (25)	C (26)	C (28)
SBR	A (03)	A (04)	A (05)
Overall	C (21)	C (21)	C (22)

Evening Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBLR	D (52)	D (52)	D (52)
NBUL	E (59)	E (60)	E (61)
NBT	A (07)	A (07)	A (08)
SBT	C (33)	D (35)	D (38)
SBR	A (04)	A (05)	A (05)
Overall	C (25)	C (26)	C (27)

Rising Sun Road & Connector Road

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBL	D (52)	D (53)	D (53)
EBTR	B (16)	B (16)	B (16)
WBL	B (14)	B (14)	B (14)
WBT	C (23)	C (23)	C (23)
WBR	A (05)	A (05)	A (05)
NBL	D (47)	D (47)	D (47)
NBT	D (52)	D (53)	D (53)
NBR	A (02)	A (02)	A (02)
SBL	D (40)	D (40)	D (40)
SBTR	D (52)	D (54)	D (54)
Overall	C (26)	C (26)	C (26)

Evening Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBL	D (55)	E (56)	E (56)
EBTR	B (16)	B (15)	B (15)
WBL	B (13)	B (13)	B (13)
WBT	C (22)	C (22)	C (22)
WBR	A (05)	A (05)	A (05)
NBL	D (45)	D (45)	D (45)
NBT	E (56)	E (57)	E (58)
NBR	A (02)	A (03)	A (03)
SBL	D (49)	D (50)	D (51)
SBTR	E (58)	E (59)	E (60)
Overall	C (27)	C (28)	C (28)

Old York Road & Rising Sun Rd

Morning Peak Hour

	2020 Adjusted Existing	2023 No Build	2023 Build
EBLT	a (08)	a (08)	a (08)
WBTR	a (08)	a (08)	a (08)
SBLR	a (10)	b (10)	b (10)

Evening Peak Hour

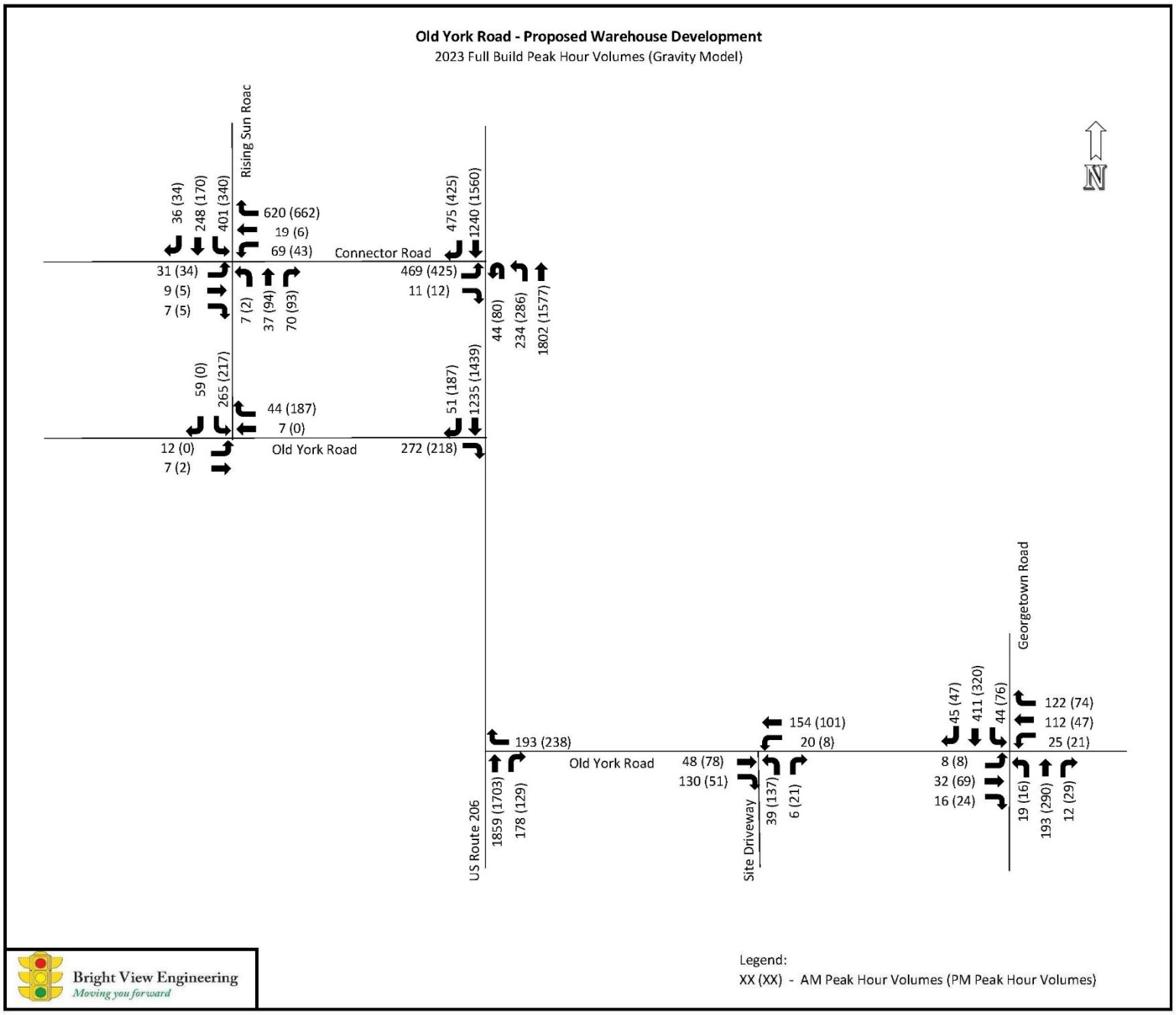
	2020 Adjusted Existing	2023 No Build	2023 Build
EBLT	a (08)	a (08)	a (08)
WBTR	a (08)	a (08)	a (09)
SBLR	a (10)	a (10)	b (10)

Old York Road & Site Driveway

2023 Build

	Morning Peak Hour	Evening Peak Hour
NBLR	b (11)	b (11)
WBLT	a (08)	a (08)

FIGURE 6 – 2023 Build Conditions



As indicated in Table 3, under 2023 build conditions, all movements at the intersection of **Bordentown Georgetown Road & Old York Road** continue to operate at a Level of Service 'B' or better during both the morning and evening peak hours.

At the intersection of **US Route 206 northbound and Old York Road**, the westbound right turn movement continues to operate at a Level of Service 'F' during the morning peak hour with an increase in delay from 64 to 102 seconds and operates at a Level of Service 'F' during the evening peak hour with an increase in delay of 111 seconds. Although there is a paved shoulder on US Route 206 in the vicinity of the intersection, the analysis assumes all vehicles make the right turn movement from a full stop. We anticipate that actual delays will be less than predicted as cars utilize the shoulder to accelerate before merging into traffic. Reconstruction of the shoulder US Route 206 to provide formal acceleration lane can be considered to mitigate the increase in vehicles at this intersection by the proposed development. By eliminating the stop condition and replacing it with a free flow operation and an acceleration lane, the calculated delay associated with this movement is reduced to zero. However, we would like to note that traffic volumes upstream of this location on Route 206 will cause delay and back up at this location. While there may still be some delay associated with this movement, the proposed improvement will mitigate any increases in delay associated with the proposed project. The addition of this improvement will make it significantly easier for vehicles to merge/weave onto Route 206. To effectuate this improvement, a street improvement application will need to be filed with the NJDOT. Since this is an intersection between a State and County roadway, the improvement will require the support of both NJDOT and Burlington County.

At the intersection of **US Route 206 southbound and Old York Road**, the eastbound right turn movement operates at a Level of Service 'F' during both the morning and evening peak hours with an increase in delay of 15 seconds during the morning peak hour and an increase in delay of 39 seconds during the evening peak hour. Although there is a paved shoulder on US Route 206 in the vicinity of the intersection, the analysis assumes all vehicles make the right turn movement from a full stop. We anticipate that actual delays will be less than predicted as cars utilize the shoulder to accelerate before merging into traffic. Since the volumes utilized in this analysis were adjusted up due to temporary reductions in traffic volumes due to COVID additional studies may be appropriate to quantify the benefit of the paved shoulder once the project is complete and traffic volumes return to pre-COVID conditions.

At the intersection of **US Route 206 and Connector Road,** all movements continue to operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound left turn/U-turn movement which continues to operate at a Level of Service 'E' during both the morning and evening peak hours. Overall, the intersection continues to operate at a Level of Service 'C' during both the morning and evening peak hours with an average increase in overall intersection delay of approximately 1 second during both the morning and evening peak hours.

At the intersection of **Rising Sun Road and Connector Road,** all movements continue to operate a Level of Service 'D' or better during both the morning and evening peak hours with the exception of the northbound and southbound through movements which continue to operate at a Level of Service 'E' during both the evening peak hour. Overall, the intersection continues to operate at a Level of Service 'C' during both the morning and evening peak hours with increases in overall intersection delays of less than 1 second.

At the intersection of **Old York Road and Rising Sun Road,** all movements continue to operate at a Level of Service 'A' during both the morning and evening peak hours with the exception of the southbound approach during the morning peak hour, which operates at a Level of Service 'B.' All increase in delay at this intersection are 1 second or less.

At the intersection of **Old York Road and the Site Driveway**, all movements operate at a Level of Service 'B' or better during both the morning and evening peak hours, with single lane approaches at each leg of the intersection. Please keep in mind that these LOS grades are conservative in that the driveway is analyzed as a single access point processing all site traffic, whereas the provided driveway concept plan proposes to segregate passenger and heavy vehicle traffic exiting the Site.

Table 4 below provides a comparison between the traditional gravity model analysis and the sensitivity analysis discussed previously. As table 4 indicates, the intersection of Bordentown Georgetown Road, east of the site operates at identical levels of service with very minor (approximately 1 second) increases in delay with the sensitivity analysis model. All intersections east of the site also operate at similar levels of service, with the level of service 'F' conditions at Old York Road and US Route 206 without improvements experiencing a smaller increase in delay under the sensitivity analysis condition.

Table 4 – Level of Service Comparison Gravity Model vs Sensitivity Analysis

Level of Service Comparison- Gravity Model vs Sensitivity Analysis

Bordentown Georgetown Road & Old York Road

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLTR	a (07)	a (07)
WBLTR	a (08)	a (09)
NBLTR	a (06)	a (06)
SBLTR	b (13)	b (15)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLTR	a (08)	a (08)
WBLTR	a (07)	a (08)
NBLTR	a (9)	a (10)
SBLTR	b (10)	b (10)

US Route 206 NB & Old York Road

Morning Peak Hour (with Mitigation)

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
WBR	a(0)	a(0)

Evening Peak Hour (with Mitigation)

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
WBR	a(0)	a(0)

US Route 206 SB & Old York Road

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBR	f (63)	f (60)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBR	f (227)	f (232)

US 206 & Connector Road

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLR	D (51)	D (51)
NBUL	E (60)	E (60)
NBT	A (09)	A (09)
SBT	C (28)	C (28)
SBR	A (05)	A (04)
Overall	C (22)	C (22)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLR	D (52)	D (52)
NBUL	E (61)	E (61)
NBT	A (08)	A (08)
SBT	D (38)	D (37)
SBR	A (05)	A (05)
Overall	C (27)	C (27)

Rising Sun Road & Connector Road

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBL	D (53)	D (53)
EBTR	B (16)	B (16)
WBL	B (14)	B (14)
WBT	C (23)	C (23)
WBR	A (05)	A (05)
NBL	D (47)	D (47)
NBT	D (53)	D (53)
NBR	A (02)	A (02)
SBL	D (40)	D (40)
SBTR	D (54)	D (54)
Overall	C (26)	C (26)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBL	E (56)	E (56)
EBTR	B (15)	B (15)
WBL	B (13)	B (13)
WBT	C (22)	C (22)
WBR	A (05)	A (05)
NBL	D (45)	D (45)
NBT	E (58)	E (58)
NBR	A (03)	A (03)
SBL	D (51)	D (51)
SBTR	E (60)	E (60)
Overall	C (28)	C (28)

Old York Road & Rising Sun Rd

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLT	a (08)	a (08)
WBTR	a (08)	a (08)
SBLR	b (10)	b (10)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
EBLT	a (08)	a (08)
WBTR	a (09)	a (09)
SBLR	b (10)	b (10)

Old York Road & Site Driveway

Morning Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
NBLR	b (11)	b (11)
WBLT	a (08)	a (08)

Evening Peak Hour

	2023 Build - Gravity Model	2023 Build - Sensitivity Analysis
NBLR	b (11)	b (11)
WBLT	a (08)	a (08)

VII. SUMMARY AND CONCLUSIONS

We believe based upon our analysis and firsthand knowledge of the existing traffic conditions within the study area, that the proposed warehouse development will pose minimal traffic impact on the surrounding areas and that the proposed access will provide for adequate site distance for traffic to safely enter and exit the site.

We recommend the Township consider the following in their evaluation of this proposed development:

- We find that the proposed 1,134,000 sf warehouse use would have a very minor impact on the surrounding area in terms of traffic when compared to the No-Build Conditions. We note that most intersections operate at similar Levels of Service to existing conditions with the exception of the right turn movements onto US Route 206 from Old York Road, both eastbound and westbound.

- At the intersection of US Route 206 northbound & Old York Road, conversion of the existing shoulder to a formal acceleration lane should be considered to mitigate the increase in delay associated with the additional traffic from the proposed site. With the addition of the acceleration lane, the calculated delay for this movement is reduced to zero. While some delay may remain due, the addition of the acceleration lane will more than offset the increases from the proposed development. Implementation of such an improvement will need the cooperation of NJDOT and Burlington County.

- Traffic Volumes on Old York Road are relatively light, with two-way peak hour volumes after the proposed development are completed of between 300 and 400 vehicles per hour.

- Based upon our analysis, it is our engineering judgement that the development of the subject site to 1,134,000 SF of Warehouse use will have minimal impact upon the study intersection and the surrounding roadway network with the majority of trips approaching and departing the site using regional roadways.

- Based on the trip projections presented herewith as based on the gravity model for the site, we anticipate 26 passenger cars in the morning peak hour and 29 passenger cars in the evening peak hour to approach and depart the site using local roadways, resulting in a minimal increase in trips to local roadways in the vicinity of the site. Of those trips, 13 trips in the morning peak hour and 15 trips in the evening peak hour stay on Old York Road past Bordentown Georgetown Road.

- A sensitivity analysis was also conducted, contemplating a higher percentage of trips with origins and destinations to local roadways (40% as opposed to 16.6% per the gravity model). The sensitivity analysis indicates that even with the higher percentage routed to towards Bordentown Georgetown Road, the intersection of Old York Road and Georgetown Road operates at comparable Levels of Service with only minor changes in delays.

- The proposed access configuration on Old York Road will direct all truck traffic associated with the site to utilize US Route 206 for both inbound and outbound movements. This will limit the impact of the proposed development on local area streets.

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