DEL MAR COLLEGE SOUTHSIDE CAMPUS
CORPUS CHRISTI, TEXAS
TRAFFIC IMPACT ANALYSIS (TIA)

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Executive Summary

A. Purpose

The purpose of this Traffic Impact Analysis (TIA) is to address the traffic and transportation impacts of the proposed Del Mar College Southside Campus on the adjacent street network and recommend any capacity related improvements. The site is located on Yorktown Boulevard with Rodd Field Road. One specific objective of this study is to determine if Bronx Drive roadway extension from Master Channel 31 Ditch to Yorktown Boulevard can be eliminated from the City's Urban Transportation Plan (UTP) without having sufficient traffic impacts on adjacent streets and intersections with ultimate build-out of land use in the area. This study will also determine the existing and future Level of Service (LOS) associated with the new development at selected study intersections of: (1.) Yorktown Boulevard @ Cimarron Boulevard, (2.) Yorktown Boulevard @ Rodd Field Road, (3.) Rodd Field Road @ Presidents Drive, (4.) Rodd Field Road @ Airline Road/Slough Road, (5) Airline Road @ Lipes Boulevard, (6.) Bronx Drive @ Lipes Boulevard and (7.) Cimarron Boulevard @ Lipes Boulevard. This study also includes the five (5) proposed driveways from the new development.

On March 27, 2017 Del Mar College officially requested the City Transportation Advisory Commission (CTAC) to consider the deletion of Bronx Drive between Master Channel 31 Ditch to Yorktown Boulevard from the UTP. The outcome was to expand this TIA to support Del Mar College's request.

B. Development

The planned development will include the following:

- Bronx Drive extension possible removal from UTP.
- Phase 1: 6,000 Students (Year 2020). 720 AM and 720 PM peak-hour trips generated.
- Phase 2: 12,000 Total Students (Year 2025). 1440 AM and 1440 PM peak-hour trips generated.
- Phase 3: 20,000 Total Students Year 2030). 2400 AM and 2400 PM peak-hour trips generated.
- The new development will generate 24,600 trips for a typical weekday.

The 95.4 Acre Del Mar College Southside Campus will have five (5) access points. Three (3) on Yorktown Boulevard and two (2) on Rodd Field Road.

C. Studies

Studies include gathering 24 HR traffic data, AM & PM peak hour turning movement counts, traffic signal warrants, queuing and intersection LOS for seven (7) intersections and five (5) new driveways.

D. Findings

Scenario 1: (without Bronx Drive Extension)

- Phase 1 (2020) – LOS C or better.
- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

Scenario 2: (with Bronx Drive Open)

- Phase 1 (2020) – LOS B or better.
- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

Scenario 3: (with LJA Rodd Field roadway design)

- Phase 1 (2020) – LOS C or better.

- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

E. Conclusions

The City of Corpus Christi has Rodd Field Road scheduled for pavement rehabilitation construction for late 2017. The improvements will include a T-Intersection at Yorktown Boulevard, a new traffic signal and proposed improvements to intersection #2, #3, #4, #DW4 and #DW5.

The Del Mar Southside Campus will generate a significant number of trips for both the AM and PM peaks for all Phases of development. The LOS for the roadway transportations system remains at LOS D or better with recommended improvements for phases 1, 2 and 3.

Del Mar College has officially requested the City Transportation Advisory Commission (CTAC) to consider the deletion of Bronx Drive from Master Channel 31 Ditch to Yorktown Boulevard from the UTP. Bronx Drive removal from the UTP will have some traffic impact to the existing roadway network. Local traffic heading to Yorktown Boulevard will have to continue to use Cimarron Boulevard or Airline Road to get to Yorktown. Fire Station No.17 would have a longer response time for all emergency calls for the Bronx Drive neighborhood. At an average speed of 30 MPH, emergency response time to Bronx Drive @ Lipes Boulevard would be 1 minute and 22 seconds with Bronx Drive open as opposed to 2 minutes and 55 seconds with Bronx Drive closed. The LOS for the roadway network will be the same with or without Bronx Drive extension. Scenario 1 (without Bronx), Scenario 2 (with Bronx) and Scenario 3 (with LJA design) will operate at a LOS D or better, for all Phases of construction.

The removal of Bronx Drive from Master Channel 31 Ditch to Yorktown Boulevard will have no major adverse impact to the street network.

F. Recommendations

Proposed Site Plan

Recommend the Developer to consider providing circulation access within the proposed site plan for better internal traffic movements. Recommend that the Developer provide transit, Pedestrian and Bicyclist facilities. Recommend the developer prepare a letter of intent allowing for a multi-use path for bicycles and pedestrians along Bronx Drive/ DW1. See **Appendix** for a copy of Del Mar College letter of intent.

Street Improvements

For Intersection #DW5 (Rodd Field Road with DW5) an intersection design with a traffic signal will handle traffic better than a U-turn configuration on Rodd Field Road. Existing traffic from Del Mar Southside Campus heading north on Rodd Field Road from DW5 will create a traffic backup on the campus without a traffic signal. Signal Warrants are justified for Phase 2 (2025) of development. A Synchro output comparison was conducted with the U-turn design versus the intersection at DW5. Synchro output showed the two comparisons to be very similar. See **Appendix** for comparison U-turn versus intersection design report.

Due to the analysis preformed for the street network for all Scenarios and Phases of construction, we recommend Scenario 1: (without Bronx Drive Extension) be implemented. Recommend the City to consider the removal of Bronx Drive extension from Master Channel 31 Ditch to Yorktown Boulevard. The removal of Bronx Drive will have some; but not sufficient impact to the existing roadway network to

warrant its continued inclusion in the UTP. The deletion of Bronx Drive will have an acceptable LOS of D or better to the existing roadway network and will be in compliance with the UDC.

Recommend traffic signals be coordinated and maintained for signals along Yorktown Boulevard and Rodd Field Road.

I.Introduction

A. Purpose

Maldonado-Burkett Intelligent Transportation Systems, LLP (MBITS) has been retained by Urban Engineering to perform a Traffic Impact Analysis (TIA) for the new Del Mar College Southside Campus. The project site is located on Yorktown Boulevard with Rodd Field Road. The new development is bound by Yorktown Boulevard on the South, Airline Road on the North, Cimarron Boulevard on the West and Rodd Field Road on the East.

The purpose of this study is to address the traffic and transportation impacts of the proposed development on the adjacent street network and recommend any capacity related improvements. The specific objectives of this study is to determine if Bronx Drive roadway extension from Master Channel 31 Ditch to Yorktown Boulevard can be eliminated from the City's Urban Transportation Plan (UTP) without having any traffic impacts on adjacent streets and intersections with ultimate build-out of land use in the area. This study will also determine the existing and future Level of Service (LOS) associated with the new development at selected study intersections of: (1.) Yorktown Boulevard @ Cimarron Boulevard, (2.) Yorktown Boulevard @ Rodd Field Road, (3.) Rodd Field Road @ Presidents Drive, (4.) Rodd Field Road @ Airline Road/Slough Road, (5) Airline Road @ Lipes Boulevard, (6.) Bronx Drive @ Lipes Boulevard and (7.) Cimarron Boulevard @ Lipes Boulevard. This study also includes the five (5) proposed driveways from the new development.

On March 27, 2017 Urban Engineering, representing Del Mar College, officially requested the City Transportation Advisory Commission (CTAC) to consider the deletion of Bronx Drive between Master Channel 31 Ditch to Yorktown Boulevard from the UTP.

B. Studies

Studies include gathering 24 HR traffic data, AM & PM peak hour turning movement counts, traffic signal warrants, queuing and intersection LOS.

C. Methodology

The traffic evaluation was comprised of AM and PM peak hour Level of Service (LOS) analyses. This included the existing conditions, background (opening day) conditions for the three (3) phases of construction. Analysis was accomplished via Synchro 9 and OTISS software. All of the information was completed in accordance with Trip Generation, 9th Edition, Highway Capacity Manual 2010 designing to a LOS Standard – D or better.

OTISS is a cloud-based application for traffic and transportation engineers who need to perform traffic impact assessments. Featuring data from over 5,500 studies included in the *9th Edition Institute of Transportation Engineering (ITE) Trip Generation Manual,* OTISS is the most complete trip generation and analysis tool available today with 24-hour availability. OTISS software was used for the AM and PM peak period analysis reports.

Synchro Studio 9 provides the best in traffic analysis, optimization, and simulation applications. It combines the modeling capabilities of Synchro and the microsimulation and animation capabilities of SimTraffic to create the ultimate tool kit for viewing**.** Synchro 9 is a macroscopic analysis and optimization software application. Synchro supports the *Highway Capacity Manual's methodology (2000 & 2010 methods)* for signalized intersections and roundabouts. Synchro also implements the intersection Capacity Utilization method for determining intersection capacity. Synchro's signal optimization routine allows the user to weight specific phases, thus providing users more options when developing signal timing plans.

II.Proposed Development

A. Site Location/Study Area

This TIA studies the adverse traffic impacts of the new development. The project site is located on Yorktown Boulevard with Rodd Field Road. See **Exhibit 1** for a location map within the City of Corpus Christi. See **Exhibit 2** for the new Del Mar College Southside Conceptual Campus site plan as of February 23, 2017.

B. Proposed Zoning (Del Mar College Southside Campus) (95.4 Acres)

The planned development will include the following:

- Phase 1: 6,000 Students (Year 2020)
- Phase 2: 6,000 Additional Students (Year 2025)
- Phase 3: 8,000 Additional Students Year 2030)

The 95.4 Acre Del Mar College Southside Campus will have five (5) access points. Three (3) on Yorktown Boulevard and two (2) on Rodd Field Road. **Exhibit 3** illustrates existing AM and PM peak hour volumes, prior to opening day. The proposed development was analyzed using 3 Scenarios for this report; Scenario 1; (without Bronx Drive), Scenario 2: (with Bronx Drive) and Scenario 3: (with LJA Rodd Field Road design).

This area is currently zoned as mixed use acreage:
The proposed educational facility was studied using Code 540 – Junior/Community College land use.

III. Existing Area Conditions

A. Existing Traffic Volumes

The following are documented traffic volumes gathered from the Corpus Christi Metropolitan Planning Organization (CCMO).

- Rodd Field Road – YR 2012 – 8,400 ADT
  YR 2015 – 15,550 ADT
- Yorktown Boulevard – YR 2011 – 9,577 ADT
  YR 2012 – 9,780 ADT
  YR 2012 – 9,560 ADT
  YR 2012 – 6,060 ADT
- Airline Road – YR 2013 – 3,301 ADT

B. Proposed Zoning Codes and Land Uses

The Del Mar Southside Campus is zoned as an educational facility, CODE 540, Junior/Community College land use.

C. Approved Developments in Area

Manhattan Apartments located on 7001 Lipes Boulevard is under construction and should be fully functional within mid-2017. The 300 dwelling units Apartment Complex is expected to generate **164** AM trips and **195** PM trips. These trips were incorporated within this study and distributed throughout the roadway network.

D. Existing Street System

The existing roadway network within the study area includes the following un-signalized & signalized intersections:

- Intersection 1: Yorktown Boulevard @ Cimarron Boulevard (Existing Signal)
- Intersection 2: Yorktown Boulevard @ Rodd Field Road (City Programmed Signal)
- Intersection 3: Rodd Field Road @ President Drive (Stop Control)
- Intersection 4: Rodd Field Road @ Airline Road/Slough Road (Existing Signal)
- Intersection 5: Airline Road @ Lipes Boulevard (Stop Control)
- Intersection 6: Lipes Boulevard @ Bronx Drive (Stop Control)
- Intersection 7: Cimarron Boulevard @ Lipes Boulevard (Existing Signal)

There are several major roadways within the study area. The following is a description of the existing conditions as of January 2017.

Yorktown Boulevard (A3 Primary Arterial) is a four-lane divided arterial, with raised median containing left turn lanes, curb and gutter, bike lanes and sidewalks. The street runs in an east-west direction on the south side of development. The posted speed limit is 45 mph.

Rodd Field Road (A3 Primary Arterial) is a two-lane undivided arterial; that runs generally in a north-south direction and is located to the east of the project area and intersects Yorktown Boulevard. The posted speed limit is 50 mph.

Cimarron Boulevard (A1 Undivided Minor Arterial) is a five-lane un-divided arterial, with left turn lanes, curb and gutter, and sidewalks. The street runs in a north-south direction on the west side of the development. The posted speed limit is 35 mph.

Airline Road (A1 Undivided Minor Arterial) is a five-lane un-divided arterial, with left turn lanes, curb and gutter, bike lanes and sidewalks. The street runs generally in a north-south direction on the north side of development. The posted speed limit is 40 mph.

Lipes Boulevard (C3 Primary Collector) is a two-lane un-divided collector, with curb and gutter and sidewalks on the north side. The street runs generally in an east-west direction on the north side of development. The posted speed limit is 30 mph.

Bronx Drive (C1 Minor Residential Collector) is a two-lane un-divided collector with curb and gutter and sidewalks. The street runs generally in a north-south direction on the north side of development. The posted speed limit is 30 mph.

E. Scheduled Projects in the Area

CCMPO's Strategic Plan for Active Mobility – Bicycle Mobility Plan, adopted by City Council, includes various bicycle infrastructures in the area:

- One-way cycle tracks on Rodd Field Road.
- One-way cycle tracks on Yorktown Boulevard.
- One-way cycle tracks on Bronx Drive.
- Off-road multi-use trail on Master Channel 31.

Projects planned in "Mobility CC" are:

- ADA Master Plan Pedestrian Infrastructure Improvements Phase 3 ADA Accessible Routes interconnecting places of Public Accommodation: Yorktown Road from Staples Street to Rodd Field Road.
- Hike Bike CC – Bill Witt Trail. See **Appendix** for Proposed Bill Witt Trail Priority Network recommendations and Plan Layout.

Projects planned in the "Bond" street are:

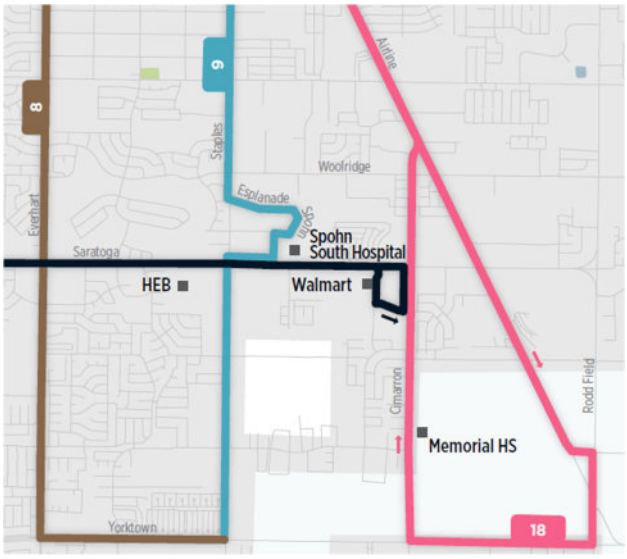
- Bond 2012 – E10100 – Yorktown Blvd (Rodd Field to Cimarron) (Landscape) -Complete.
- Bond 2014 – E15112 – Rodd Field Road Expansion – Scheduled late 2017.

Projects planned in the "FY 2017-2020 Transportation Improvement Plan (TIP)/2015-2040 Metropolitan Transportation Plan (MTP) Amendment 1":

- Rodd Field Road Extension from Yorktown Boulevard to South of Oso Creek.

CCRTA current transit services is Route 26 from Airline Road to Cimarron Boulevard to Lipes Boulevard to Staples Street.

CCRTA transit plan for YR 2020 is shown below:



Emergency routes for CCFD and CCPD to respond to a 911-emergency call within the Bronx Drive/Lipes Boulevard intersection are Yorktown Boulevard, Cimarron Boulevard, Rodd Field Road and Airline Road. Fire Station No. 17 is located on 6869 Yorktown Boulevard.

For demonstration purposes only, responding to a 911-emergency call to the focus point of Lipes Boulevard @ Bronx Drive using Bronx Drive would take 1 minute 22 seconds at an average speed of 30 mph (44'/Second). See table below for several routes arrival times.

Start	Route	FT	Avg Speed	Arrival time
Fire Station 17	(1) New Bronx Drive (UTP) to Lipes @ Bronx	3,612	30 MPH	1 min 22 sec
Fire Station 17	(2) Yorktown West to Cimarron North to Lipes @ Bronx	7,688	30 MPH	2 min 55 sec
Fire Station 17	(3) Yorktown East to Rodd Field North to Airline Northwest to Lipes @ Bronx	8,518	30 MPH	3 min 14 sec

IV. Projected Traffic

A. Proposed Street Improvements

The following are new proposed driveways within the study area:

- **Driveway DW1:** Yorktown Boulevard @ Bill Witt Entrance/ Bronx Drive/DW1
- **Driveway DW2:** Yorktown Boulevard @ Bichon Drive/ DW2
- **Driveway DW3:** Yorktown Boulevard @ Bay Drive/DW3
- **Driveway DW4:** Rodd Field Road @ DW4
- **Driveway DW5:** Rodd Field Road @ DW5

The Proposed driveways are critical to maintain a decent traffic pattern flow coming in and out of the Campus. See **Table 1, 2 and 3** for driveway distribution.

B. Data Used for Intersection Analysis

MBITS and the City of Corpus Christi collected data for this study.

Collected 24-hour radar volume traffic counts:

- Yorktown Boulevard (2 locations), Rodd Field Road, Airline Road (Short Section), Bill Witt Park Entrance, Bichon Drive, Bay Drive, Lipes Boulevard and Bronx Drive.

Collected AM & PM turning movement traffic counts:

- Yorktown Boulevard @ Cimarron Boulevard, Yorktown Boulevard @ Rodd Field Road, Rodd Field Road @ Presidents Drive, Rodd Field Road @ Airline Road/ Slough Road, Airline Road @ Lipes Boulevard and Cimarron Boulevard @ Lipes Boulevard.

C. Existing Traffic Data

Proposed Regional Parkway Study identifies traffic volumes of:

- 2035 Future No Build – Yorktown Boulevard 16,150 and 18,374 ADT. Rodd Field Road 22,396 ADT.
- 2035 Future Build – Yorktown Boulevard 11,915 and 12,616 ADT. Rodd Field Road 28,306 ADT. Rodd Field Road Extension 17,674 ADT.

The following are 2040 projected traffic volumes from the regional demand model by CCMPO:

- Rodd Field Road – 23,775 and 13,227 ADT.
- Yorktown Boulevard – 22,154, 19,912 and 17,771 ADT.
- Airline Road – 11,547 and 22,062 ADT.

D. Proposed Trip Generation

The Del Mar College Southside Campus development includes the following facilities: Phase 1: 6,000 Students, Phase 2: 6,000 Students and Phase 3: 8,000 Students. Trips were generated by applying the appropriate land use codes found in the *Institute of Transportation Engineers (ITE) Trip Generation, 9th Edition.*

The Del Mar College Southside Campus development is expected to generate **720** AM peak-hour trips and **720** PM peak-hour trips for Phase 1development.

For the completion of Phase 2 development the trip generation shall increase to **1440** AM peak-hour trips and **1440** PM peak-hour trips.

For the completion of Phase 3 development the trip generation shall increase to **2400** AM peak-hour trips and **2400** PM peak-hour trips. Trip Generation for a typical weekday is **24,600** trips per day.

The 300 dwelling units Manhattan Apartments Construction is expected to generate **164** AM trips and **195** PM trips. These trips were incorporated within this study and distributed throughout the roadway network.

See **Appendix** for the trip generation rates for all 3 Scenarios for Phase 1, Phase 2 and total trips generated by land use assuming full development and occupancy for Phase 3. Trip reductions were not used for this study per recommendations of the Institute of Transportation Engineers OTISS software and *Institute of Transportation Engineers Trip Generation Manual, 9th Edition*.

V. Transportation Analysis

A. Amendment to Urban Transportation Plan (UTP)

Del Mar College has officially requested the City of Corpus Christi for the removal of Bronx Drive extension from Master Channel 31 Ditch to Yorktown Boulevard.

As proposed in the UTP it would serve as a minor residential collector for the area south of Lipes Boulevard and would provide access to Yorktown Boulevard just across Bill Witt Park.

Without Bronx Drive the network connectivity for residents north of Yorktown Boulevard will have to use Cimarron Boulevard or Airline Road to get to Yorktown Boulevard. Bronx Drive extension is currently planned for a one-way cycle track tying in to Master Channel 31 Ditch and South to Yorktown Boulevard. The Build-out of neighborhood was included in this report by using the growth rate factor. Bronx Drive extension would also be utilized by the CCFD as an emergency route to the neighborhood.

Existing trails were identified along Master Channel 31 Ditch and along Bill Witt Park south to south of LaSalle Drive. Currently, there are sidewalks that run east and west on Yorktown Boulevard. These facilities should not be affected much by the proposed development. All facilities affected during construction should be adjusted accordingly to city specifications and requirements.

Sidewalks are proposed on Rodd Field Road under the programmed street improvements. The MPO's Bicycle Mobility Plan has programmed a one-way cycle tracks on both sides of Bronx Drive from Yorktown Boulevard to Brockhampton Street. The Transportation Planning Director will consider an alternative off-road multi-use path infrastructure independent of the proposed roadway for the section of proposed UTP amendment. Del Mar Collage has expressed consent to accommodating a multi-use path within Del Mar property and will prepare a letter of intent. See **Appendix** for a copy of Del Mar College letter of intent.

B. Background (Opening Day) Trip Generation

Based on the City of Corpus Christi Travel Demand Model, a 1.3% for Airline Road, 2.3% for Rodd Field Road and a 2.6% for Yorktown Boulevard annually compounded growth rates were used to reflect the growth of the background traffic. These rates were applied to the background traffic volumes for each year to determine the traffic volume growth that can be expected throughout all 3 phases of development within the study area.

The following is a breakdown of anticipated neighborhood traffic using Bronx Drive from Lipes Boulevard to Yorktown Boulevard:

BRONX DRIVE												
YEAR	2020				2025				2030			
PEAK VOLUMES	AM		PM		AM		PM		AM		PM	
	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
PROJECTED VOLUMES	37	75	52	112	39	80	55	119	42	85	59	127

Scenario 1: Development Phase 1, 2 and 3 were analyzed **without** Bronx Drive extension build-out. Lipes Boulevard extension to Bronx Drive was analyzed as open for this Scenario.

See **Exhibit 4** for generated traffic data Scenario 1 without Bronx Drive for Phase 1 (2020) peak hour volumes. See **Exhibit 5** for generated traffic data Scenario 1 without Bronx Drive for Phase 2 (2025) peak hour volumes. See **Exhibit 6** for generated traffic data Scenario 1 without Bronx Drive for Phase 3 (2030) peak hour volumes.

Scenario 2: Development Phase 1, 2 and 3 were analyzed **with** Bronx Drive and Lipes Boulevard extended as proposed in the Urban Transportation Plan (UTP).

See **Exhibit 7** for generated traffic data Scenario 2 with Bronx Drive for Phase 1 (2020) peak hour volumes. See **Exhibit 8** for generated traffic data Scenario 2 with Bronx Drive for Phase 2 (2025) peak hour volumes. See **Exhibit 9** for generated traffic data Scenario 2 with Bronx Drive for Phase 3 (2030) peak hour volumes.

Scenario 3: Development Phase 1, 2 and 3 were analyzed **with** LJA's Rodd Field Road design utilizing a U-turn lane near Yorktown Boulevard. See **Exhibit 16** for LJA's roadway design.

See **Exhibit 10** for generated traffic data Scenario 3 with LJA's Design on Rodd Field Road for Phase 1 (2020) peak hour volumes. See **Exhibit 11** for generated traffic data Scenario 3 with LJA's Design on Rodd Field Road for Phase 2 (2025) peak hour volumes. See **Exhibit 12** for generated traffic data Scenario 3 with LJA's Design on Rodd Field Road for Phase 3 (2030) peak hour volumes.

All projected traffic does not include the Rodd Field Road Extension from Yorktown Boulevard to future Regional Parkway. See **Exhibit 14** for the vicinity LAND USE within the proposed development. The surrounding area has approximately 103 acres of undeveloped residential and approximately 10 acres of undeveloped commercial. The growth rates used for this study should encumber the final buildout of all undeveloped LAND USE.

C. Queuing

Queuing analysis was performed for the intersection of Rodd Field Road with Yorktown Boulevard, Rodd Field Road with Driveway DW4, Rodd Field Road with Airline Road, Yorktown Boulevard with Bronx Drive / DW1 and Yorktown Boulevard with Cimarron Boulevard. See **Appendix** for each intersection describing the Queue length 50th (ft) and 95th (ft) stacking for each approach. Synchro output shows excessive queuing for Yorktown Boulevard @ DW1 eastbound for Phase 3 of construction. See recommendations for corrective measures.

D. Net Increased Trip Generation, Distribution and Assignment

The additional site-generated traffic associated with the development was assigned to the study area roadway network. See **Exhibit 13** for Existing Transportation System. The distribution and assignment were determined based on engineering judgment through generated traffic counts, knowledge of the study area network, and the proposed access locations to and from the development. See **Table 1** for distribution percentage (%) Scenario 1 for the new driveways. See **Table 2** for distribution percentage (%) Scenario 2 for the new driveways. See **Table 3** for distribution percentage (%) Scenario 3 for the new driveways. See **Appendix** for Trip Generation, Distribution and Assignments for all Scenarios.

E. Level of Service (LOS) Evaluations

The analysis consists of both AM and PM intersection LOS analyses for all 3 Scenarios. The purpose of this analysis was to determine if any deficiencies within the network exist and to establish a standard condition.

"Level-of-Service (LOS)" represents the capacity or volume of traffic that a roadway can accommodate. LOS is a qualitative measure used to relate to the quality of traffic service. LOS is used to analyze highways by categorizing traffic flow and assigning quality levels of traffic based on performance measure such as speed, density, etc. These levels range from LOS A (free flowing) to LOS F (a congested, forced flow condition). The target LOS for this study area is a LOS D or better with all improvements and development resulting from the Del Mar College Southside Campus development. A description of each operational state for signalized intersections, as defined by *2010 Highway Capacity Manual,* is presented in **Table 4**.

Table 5 summarizes the LOS results of the existing signalized intersections, **Table 6** summarizes the LOS results of Phase 1 (2020) background signalized intersections for Scenarios 1, 2 and 3, **Table 7** summarizes the LOS results of Phase 2 (2025) background signalized intersections for Scenarios 1, 2 and 3 and **Table 8** summarizes the LOS results of Phase 3 (2030) background signalized intersections for Scenarios 1, 2 and 3. Signal timings were assumed optimized and actuated. Synchro output reports are provided in the **Appendix**.

For Two-Way Stop Control, LOS for non-signalized two-way intersections is defined as the total elapsed time from when a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to first-in-queue position. The levels of service criteria are given in **Table 9**.

Table 10 summarizes the LOS results of the existing un-signalized intersections. **Table 11** summarizes the LOS results of the Phase 1 (2020) background un-signalized intersections for Scenarios 1, 2 and 3, **Table 12** summarizes the LOS results of the Phase 2 (2025) background un-signalized intersections for Scenarios 1, 2 and 3. **Table 13** summarizes the LOS results of the Phase 3 (2030) background un-signalized intersections for Scenarios 1, 2 and 3.

Synchro output sheets are provided in the **Appendix for all Scenarios**.

Based on the analysis of the new development and Bronx Drive amendment from the UTP, the LOS outcome for each Scenario are as follows:

- Existing conditions for signalized intersections – LOS C or better.
- Existing conditions for un-signalized intersections – LOS C or better.

Scenario 1: (without Bronx Drive Extension)

- Phase 1 (2020) – LOS C or better.
- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

Scenario 2: (with Bronx Drive Open)

- Phase 1 (2020) – LOS B or better.
- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

Scenario 3: (with LJA Rodd Field roadway design)

- Phase 1 (2020) – LOS C or better.
- Phase 2 (2025) – LOS C or better.
- Phase 3 (2030) – LOS D or better.

VI. Improvement Analysis

A. Transportation Improvements

Traffic impacts for all Phases of the Del Mar Southside Campus development will have an impact to the existing roadway network. The existing roadway network, with the proposed Rodd Field Road improvements were analyzed with additional improvements to improve the LOS throughout the study area.

For each Phase of Construction and for three different Scenarios, the LOS was analyzed with network improvements consisting of left-turn lanes, right-turn lanes, right-in right-outs, right out only, stop control and signalization control to accomplish the Cities requirements of LOS as stated in the Unified Development Code (UDC).

For Scenario 1: (without Bronx Drive Extension), See **Exhibit 17a**, **Exhibit 17b** and **Exhibit 17c** for recommended transportation improvements for Phase 1, Phase 2 and Phase 3 of Development.

For Scenario 2 (with Bronx Drive), See **Exhibit 18a, Exhibit 18b** and **Exhibit 18c** for recommended transportation improvements for Phase 1, Phase 2 and Phase 3 of development.

For Scenario 3 (with LJA Rodd Field Road Design), See **Exhibit 19** for recommended transportation improvements for Phase 1 of development. No improvements required for Phase 2 and Phase 3 on Rodd Field Road.

Proposed driveways for the Del Mar Southside Campus are located within the recommended spacing as per the UDC and TxDOT Access Management Manual.

The proposed driveways within the site circulate around the student parking only and share only one connection from the east parking to the west parking.

The City's policy for funding proposed improvements normally falls on the Developer.

B. Signal Warrant Studies and Applications:

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* defines nine warrants, or justifying sets of conditions, which at least one should be fully satisfied before signalization is considered as an option for traffic control. Traffic volumes, the number of traffic lanes, the prevailing traffic speeds, traffic accident experience, and measure delay for minor street traffic are the factors included in the evaluation of these warrants. The traffic volumes used for the analysis will be the existing traffic plus a projection of traffic exiting and entering the opening day occupied by the Del Mar College Southside Campus development. Traffic was projected using standard trip generation and traffic assignment procedures.

Signal Warrant Analysis that **DID MEET** Signal Warrants:

- **Yorktown Boulevard with Bill Witt Entrance/Bronx Drive/DW1 for Phase 1 development, Scenario 1, 2 and 3.**
- **Rodd Field Road with DW5 for Phase 2 development, Scenario 1 and 2.**
- **Airline Road with Lipes Boulevard for Phase 3 development, Scenario 1 and 2.**

Signal Warrant Analysis that **DID NOT MEET** Signal Warrants:

- **Rodd Field Road with Presidents Drive.**

The detailed warrant analysis worksheets, including the warrant curves are included in the **Appendix**.

Spacing Between proposed traffic signals

- On **Yorktown Boulevard** traffic signal spacing's are as follows:

Rodd Field Road to Bill Witt Entrance/Bronx Dr/DW1 is approximately 2,958 feet.
Bill Witt Entrance/Bronx Dr/DW1 to Cimarron Boulevard is approximately 2,270 feet.

- On **Rodd Field Road** traffic signal spacing's are as follows:

Yorktown Boulevard to DW5 is approximately 1,080 feet.
DW5 to Airline Road/Slough Road is approximately 1,578 feet.

The posted speed limit on Yorktown Boulevard is 45 MPH. Rodd Field Road has a posted speed limit of 50 MPH and proposed speed zone of 40 MPH after construction.

C. Driveway Design Guidelines

The proposed driveway locations balances spacing with the other adjacent driveway within the project site. The proposed driveways are essential to handle the projected traffic volumes for full occupancy. Examples of practical driveway designs to accommodate the type of vehicles expected is shown on **Exhibit 15**. Recommend a minimum Type 2 design for all proposed driveways.

VII. Conclusions

A. Site Accessibility

The Del Mar Southside Campus will have 3 access driveways on Yorktown Boulevard and 2 access Driveways on Rodd Field Road.

B. Transportation Impacts

The City of Corpus Christi has Rodd Field Road scheduled for pavement rehabilitation construction for late 2017. The improvements will include a T-Intersection at Yorktown Boulevard, a new traffic signal and proposed improvements to intersection #2, #3, #4, #DW4 and #DW5.

The Del Mar Southside Campus will generate a significant number of trips for both the AM and PM peaks for all Phases of development. The LOS for the roadway transportations system remains at LOS D or better with recommended improvements for phases 1, 2 and 3.

Del Mar College has officially requested the City Transportation Advisory Commission (CTAC) to consider the deletion of Bronx Drive from Master Channel 31 Ditch to Yorktown Boulevard from the UTP. Bronx Drive removal from the UTP will have some traffic impact to the existing roadway network. Local traffic heading to Yorktown Boulevard will have to continue to use Cimarron Boulevard or Airline Road to get to Yorktown. Fire Station No.17 would have a longer response time for all emergency calls for the Bronx Drive neighborhood. At an average speed of 30 MPH, emergency response time to Bronx Drive @ Lipes Boulevard would be 1 minute and 22 seconds with Bronx Drive open as opposed to 2 minutes and 55 seconds with Bronx Drive closed. The LOS for the roadway network will be the same with or without Bronx Drive extension. Scenario 1 (without Bronx), Scenario 2 (with Bronx) and Scenario 3 (with LJA design) will operate at a LOS D or better, for all Phases of construction.

The removal of Bronx Drive from Master Channel 31 Ditch to Yorktown Boulevard will have no major adverse impact to the street network.

C. Need for Improvements

Depending on which Scenario for all 3 phases of constructions, recommended roadway improvements, signalization, right-in right-out designs are recommended as detailed in **Exhibits 17a, 17b, 17c, 18a, 18b, 18c and 19**.

This study was prepared in compliance with applicable local codes and plans, Unified Development Code and Urban Transportation Plan (UTP).

VIII. Recommendations:

A. Proposed Site Plan

Recommend the Developer to consider providing circulation access within the proposed site plan for better internal traffic movements. Recommend that the Developer provide transit, Pedestrian and Bicyclist facilities. Recommend the developer prepare a letter of intent allowing for a multi-use path for bicycles and pedestrians along Bronx Drive/ DW1. See **Appendix** for a copy of Del Mar College letter of intent.

B. Street Improvements

For Intersection #DW5 (Rodd Field Road with DW5) an intersection design with a traffic signal will handle traffic better than a U-turn configuration on Rodd Field Road. Existing traffic from Del Mar Southside Campus heading north on Rodd Field Road from DW5 will create a traffic backup on the campus without a traffic signal. Signal Warrants are justified for Phase 2 (2025) of development. A Synchro output comparison was conducted with the U-turn design versus the intersection at DW5. Synchro output showed the two comparisons to be very similar. See **Appendix** for comparison U-turn versus intersection design report.

Due to the analysis preformed for the street network for all Scenarios and Phases of construction, we recommend **Scenario 1: (without Bronx Drive Extension)** be implemented. Recommend the City to consider the removal of Bronx Drive extension from Master Channel 31 Ditch to Yorktown Boulevard. The removal of Bronx Drive will have some; but not sufficient impact to the existing roadway network to warrant its continued inclusion in the UTP. The deletion of Bronx Drive will have an acceptable LOS of D or better to the existing roadway network and will be in compliance with the UDC.

Recommend traffic signals be coordinated and maintained for signals along Yorktown Boulevard and Rodd Field Road.

Below is a breakdown of proposed improvements for Scenario 1.

Phase 1: Improvements

Intersection #DW1 (Yorktown Boulevard @ Bill Witt Ent/Bronx Drive/DW1)

Recommend a 300’ storage left turn lane on Yorktown Boulevard EB, a 150’ storage right-turn lane on Yorktown Boulevard WB, 2 out-bound lanes, a left-turn lane and a shared straight-right lane on Bronx Drive/DW1, 2 in-bound lanes and traffic signal control.

Intersection #DW2 (Yorktown Boulevard with Bichon Drive/DW2)

Recommend a 150’ storage right-turn lane on Yorktown WB, 2 out-bound lanes, a left-turn lane and a shared straight-right lane on DW2, at least 1 in bound lane and stop sign control.

Intersection #DW3 (Yorktown Boulevard with Bay/DW3)

Recommend a 150’ storage left turn lane on Yorktown Boulevard EB, a 150’ storage right-turn lane on Yorktown Boulevard WB, 2 out-bound lanes, a left-turn lane and a shared straight-right lane on DW3, at least 1 in-bound lane and stop sign control.

Intersection #DW4 (Rodd Field Road with DW4)

Recommend a 150’ storage right-turn lane on Rodd Field Road SB, a right in right out on DW4, 1 in-bound lane and stop sign control.

Intersection #DW5 (Rodd Field Road with DW5)
Recommend a 150' storage left turn lane on Rodd Field Road NB, a 150' right-turn lane on Rodd Field Road SB, 2 out-bound lanes, a left-turn lane and a right-turn lane on DW5, 2 in-bound lanes and stop sign control.

Intersection #3 (Rodd Field Road with Presidents Drive)
Recommend a right-in right-out on Presidents Drive and stop sign control.

Phase 2: Improvements

Intersection #DW2 (Yorktown Boulevard with Bichon Drive/DW2)
Recommend a right-out only on Bichon Drive and DW2 and stop sign control.

Intersection #DW3 (Yorktown Boulevard with Bay/DW3)
Recommend a right-out only on Bay Drive and DW3 and stop sign control.

Intersection #DW5 (Rodd Field Road with DW5)
Recommend a traffic signal control.

Phase 3: Improvements

Intersection #DW1 (Yorktown Boulevard @ Bill Witt Ent/Bronx Drive/ DW1

Recommend 300' storage dual left-turn lanes on Yorktown Boulevard EB.

Modify traffic signal to accommodate dual left turns.

Intersection #5 (Airline Road with Lipes Boulevard)

Recommend a traffic signal control. Installation and maintenance shall be the responsibility of the City of Corpus Christi.

C. Funding

Based on prior projects the Cities funding practices required Developer participation to fund improvements necessary to the on-site and off-site street network. Recommended improvements are necessary in order to provide a functioning street network for the City to maintain. Discussions between Del Mar College and City of Corpus Christi concerning funding are necessary and encouraged.

References:

1. *Trip Generations, 9th Edition, by the Institute of Transportation Engineers (ITE) and the Highway Capacity Manual* 2010.
2. *American Association of State Highway and Transportation Officials (AASHTO) and published in the 2004 edition of A Policy on Geometric Design of Highways and Streets (Green Book).*
3. *Highway Capacity Manual, (SR 209), Transportation Research Board, Washington, DC, 2010.*
4. *Texas Department of Transportation's, Transportation Divisions Statewide Planning Map, 2013.*
5. *Texas Department of Transportation's Guidelines for Conducting a Traffic Signal Warrant Analysis, 2nd Edition.*
6. *Texas Manual on Uniform Traffic Control Device (TMUTCD).*
7. *Texas Department of Transportation's Access Management Manual.*
8. *Regional Parkway – Planning and Environmental Linkages (PEL) Study Traffic Analysis Technical Memorandum*

Exhibits

EXHIBIT 1
LOCATION MAP

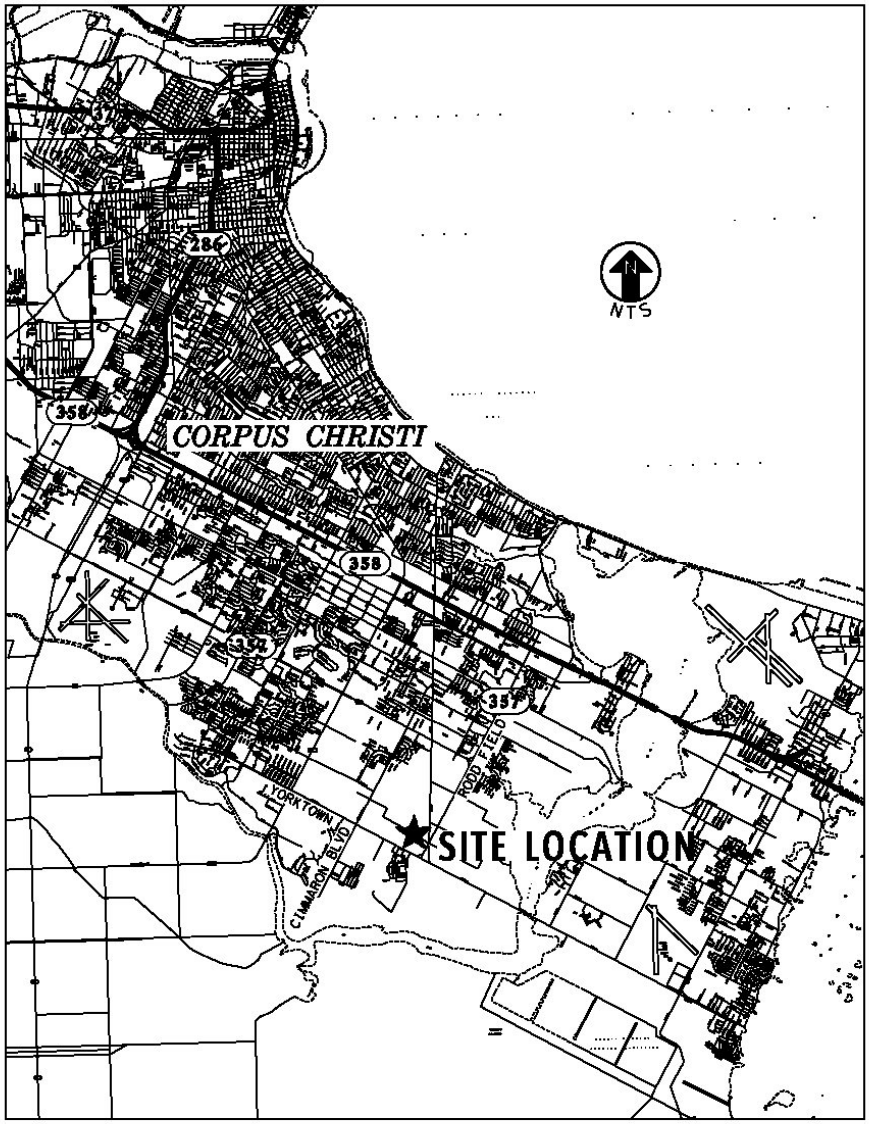
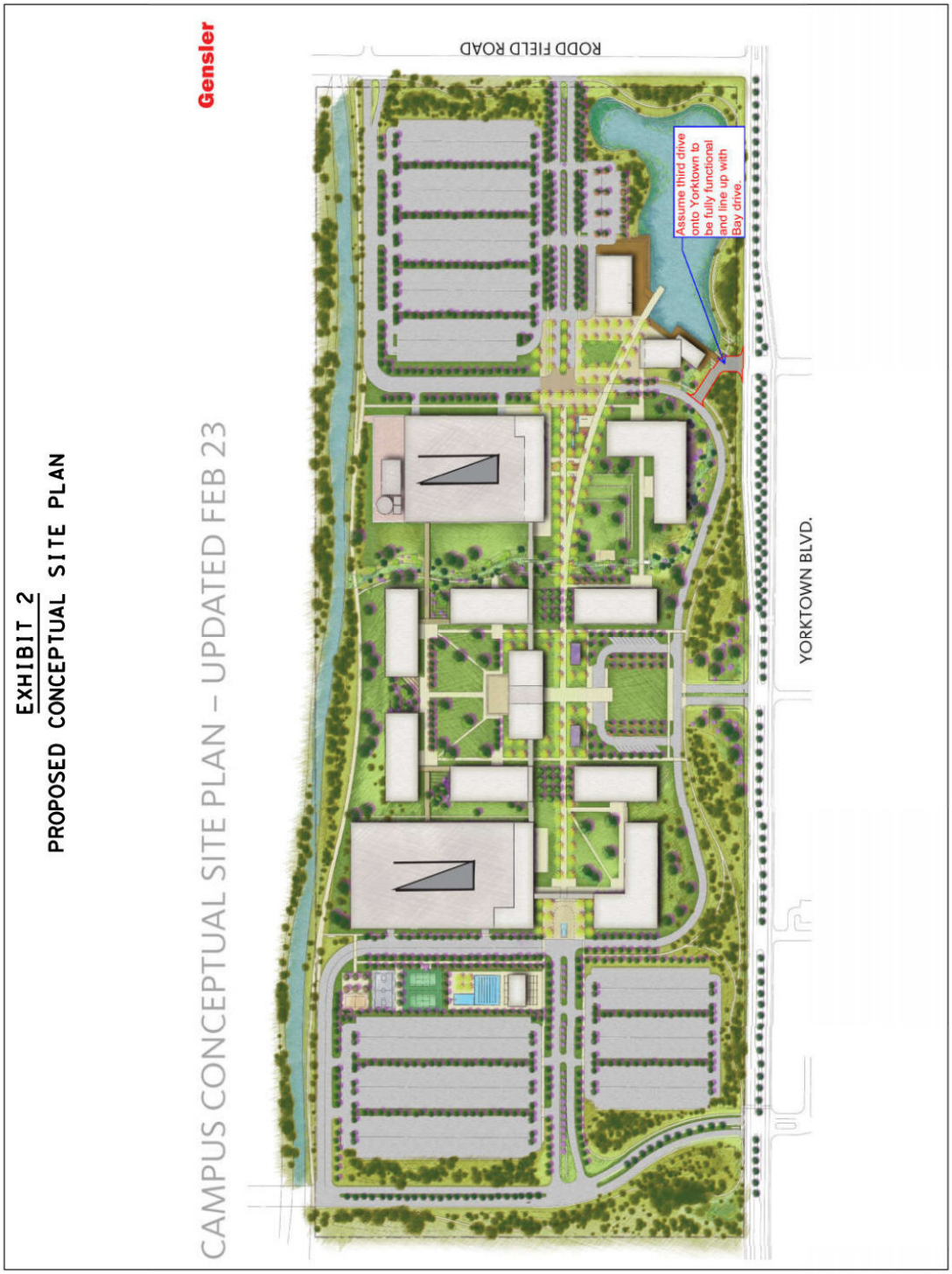


EXHIBIT 2
PROPOSED CONCEPTUAL SITE PLAN



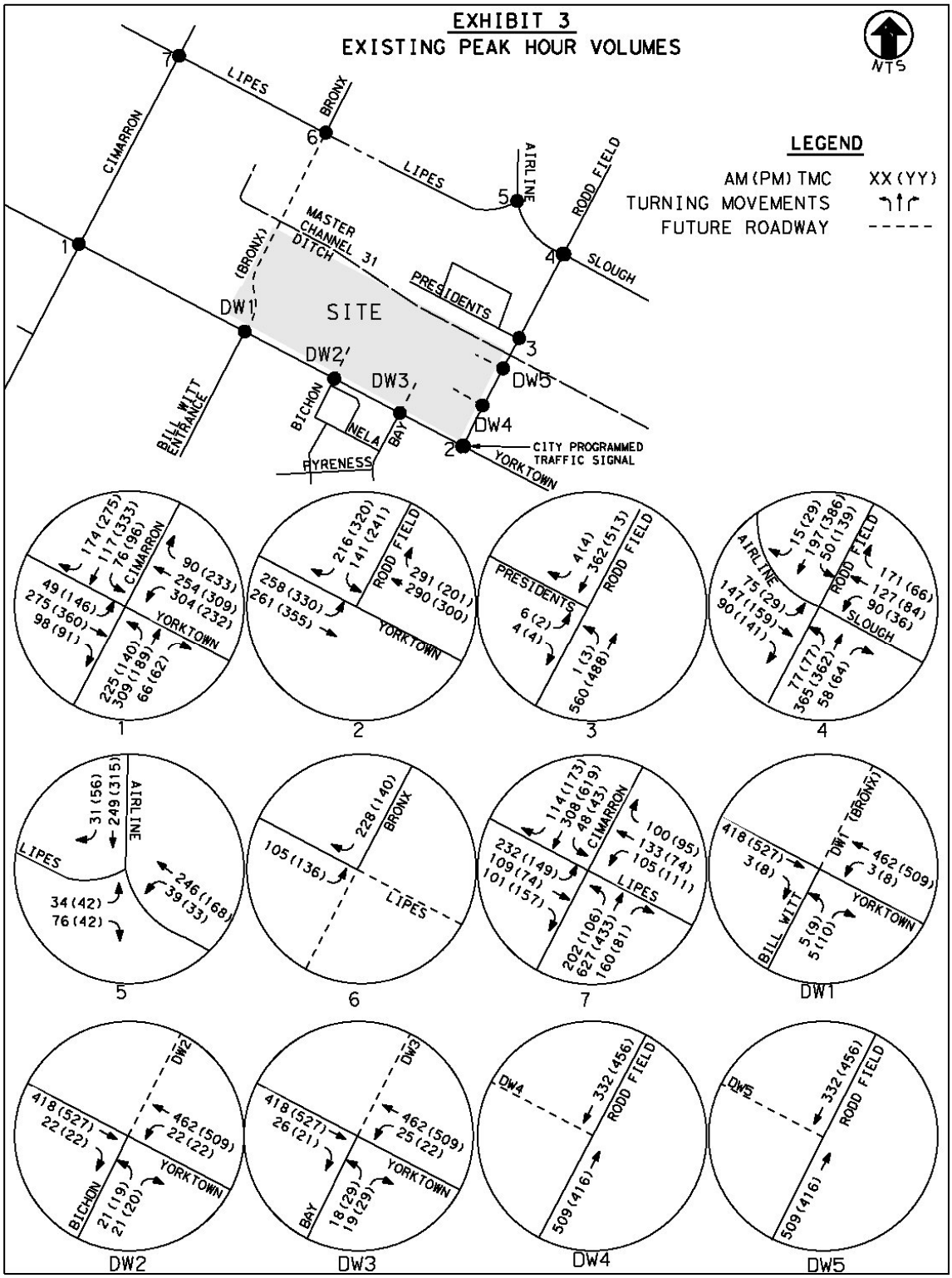


EXHIBIT 3
EXISTING PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
LIPES
BRONX
CIMARRON
AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
SLOUGH
PRESIDENTS
SITE
DW1
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
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NELA
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HYRENESS
YORKTOWN
CITY PROGRAMMED TRAFFIC SIGNAL
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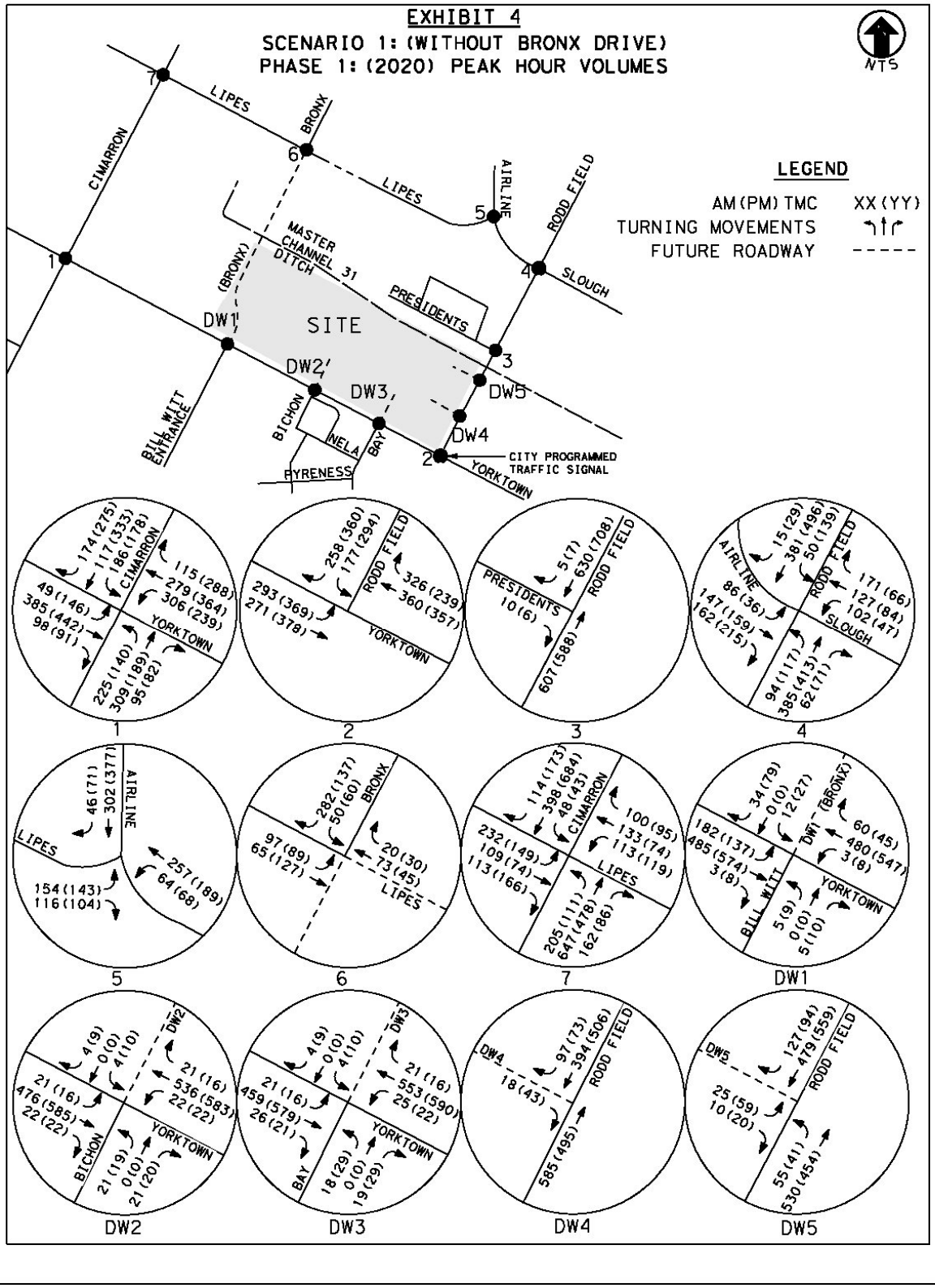
EXHIBIT 4
SCENARIO 1: (WITHOUT BRONX DRIVE)
PHASE 1: (2020) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
LIPES
BRONX
CIMARRON
AIRLINE
ROOD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
PRESIDENTS
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DW4
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BILL WITT ENTRANCE
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CITY PROGRAMMED TRAFFIC SIGNAL
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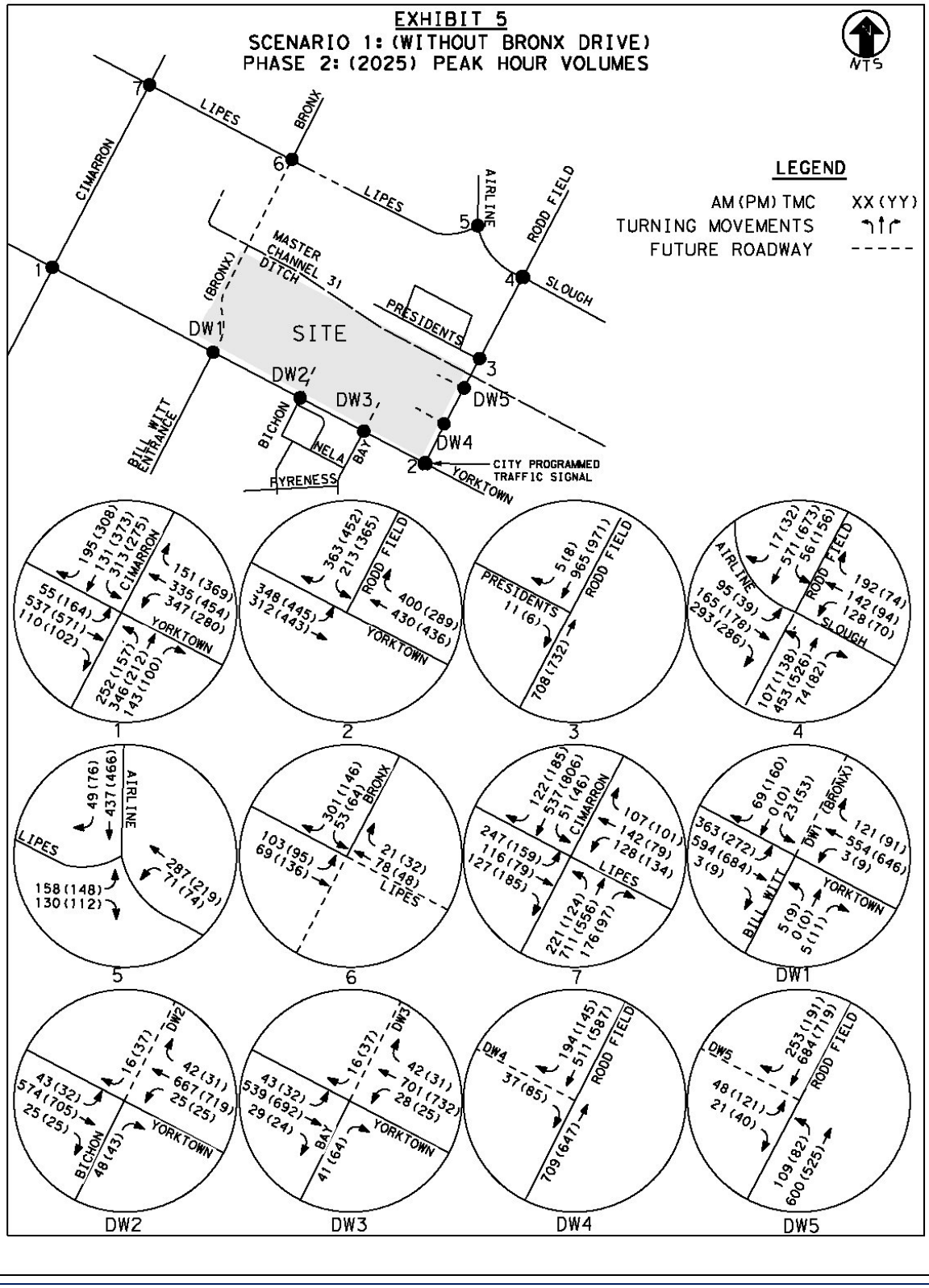
EXHIBIT 5
SCENARIO 1: (WITHOUT BRONX DRIVE)
PHASE 2: (2025) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
LIPES
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CIMARRON
AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
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BAY
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CITY PROGRAMMED TRAFFIC SIGNAL
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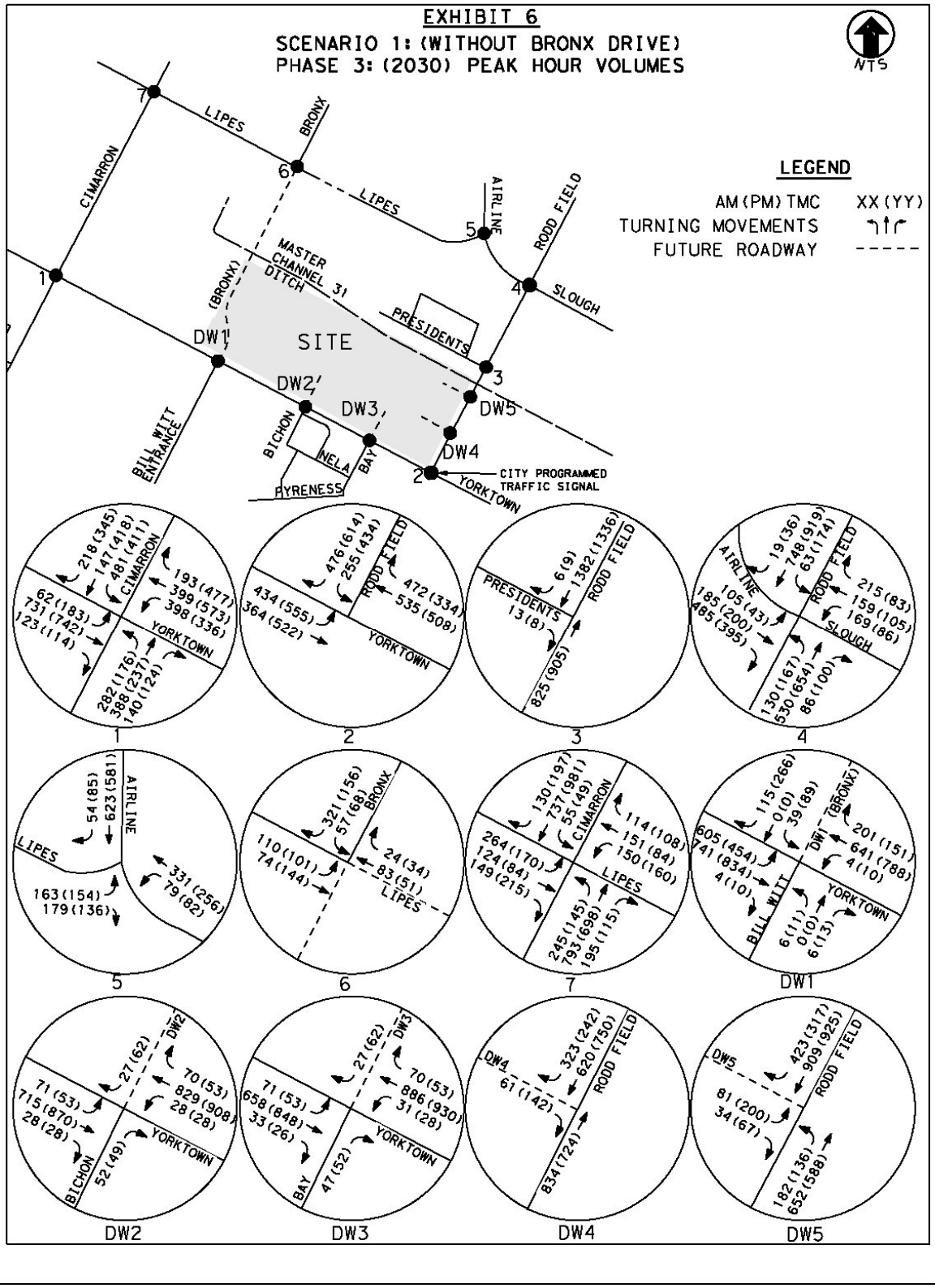
EXHIBIT 6
SCENARIO 1: (WITHOUT BRONX DRIVE)
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LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
LIPES
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AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
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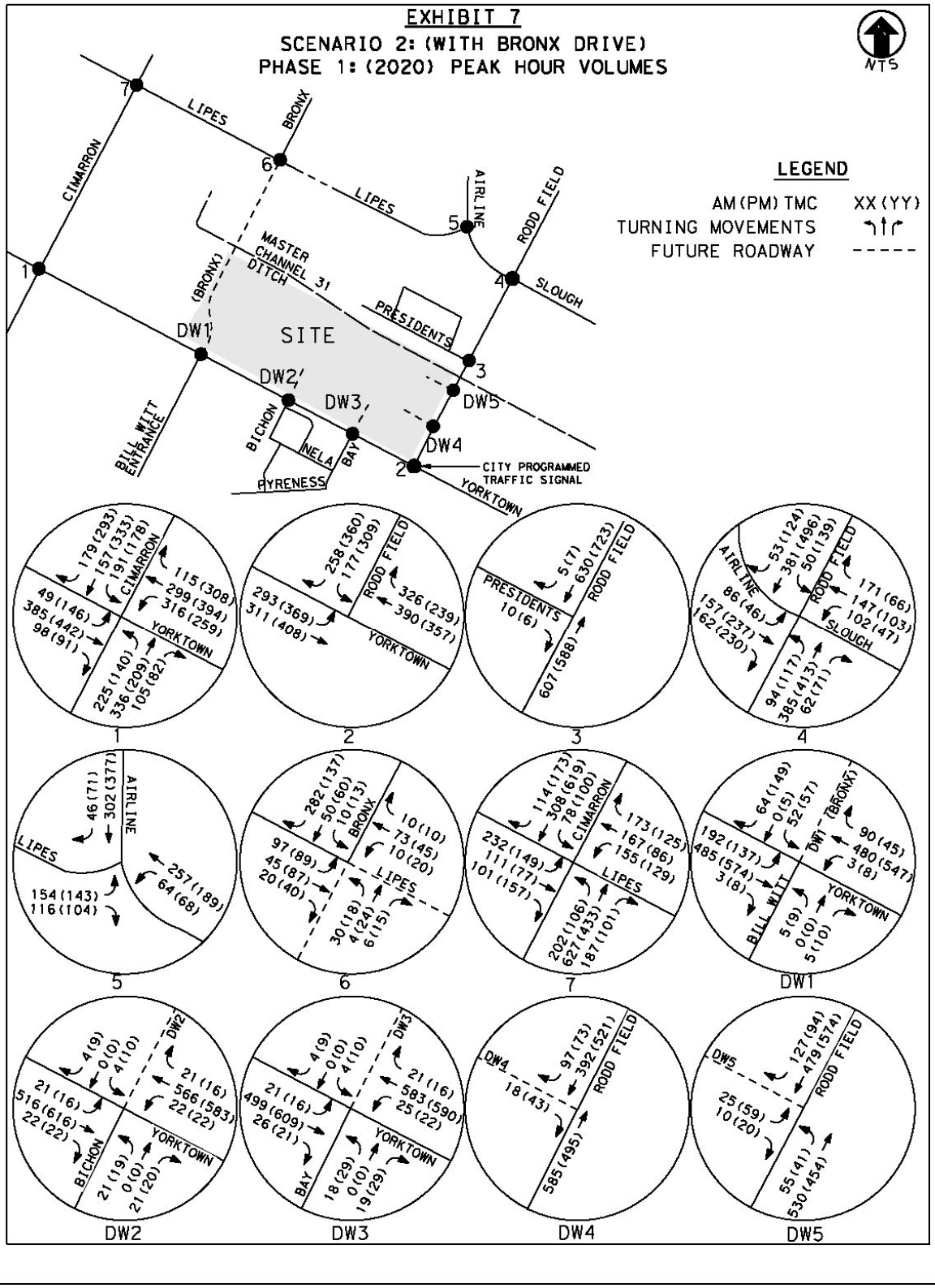
EXHIBIT 7
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 1: (2020) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
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AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
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BILL WITT ENTRANCE
BICHON
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BAY
PYRENESS
YORKTOWN
CITY PROGRAMMED TRAFFIC SIGNAL

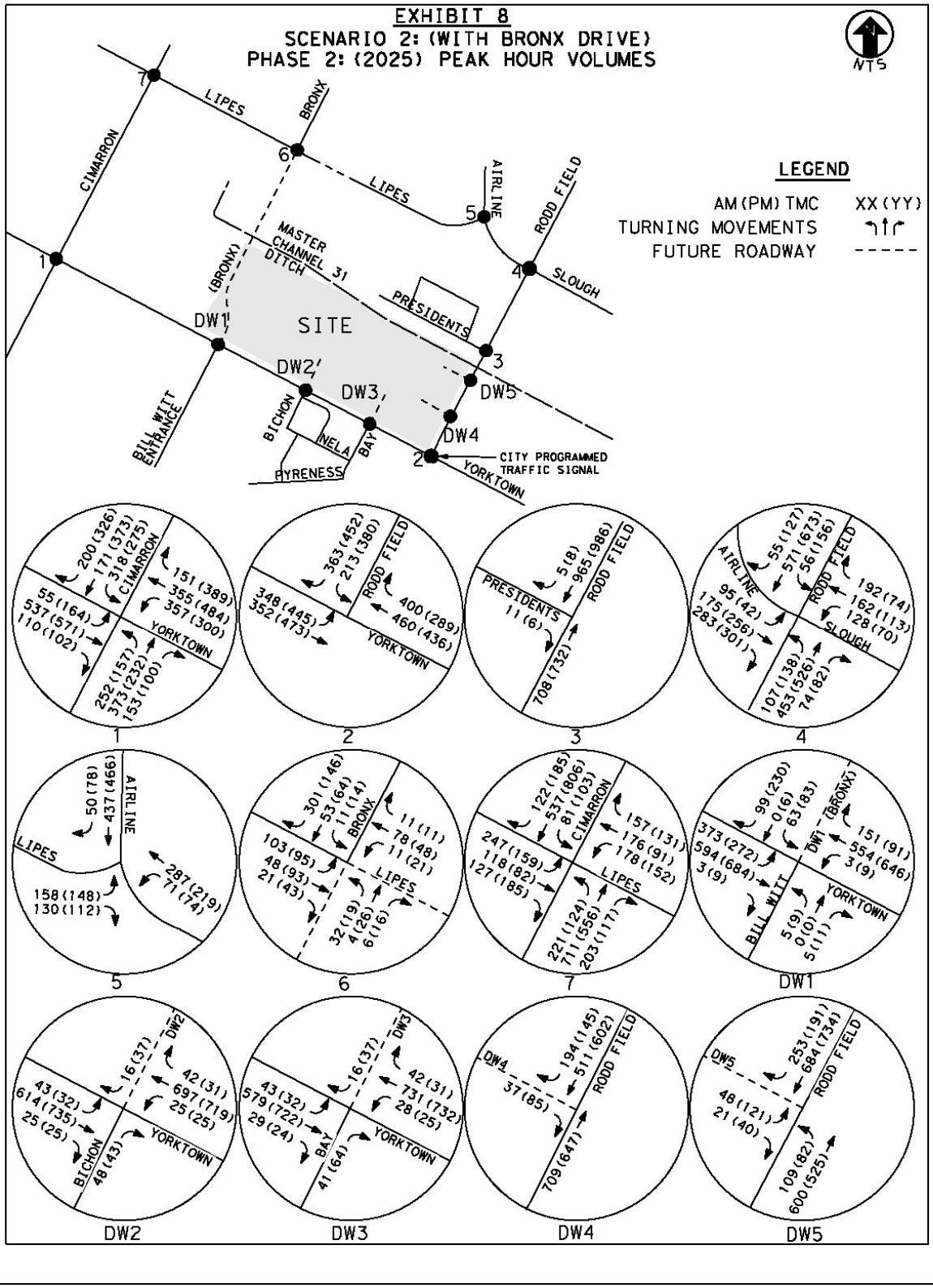
EXHIBIT 8
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 2: (2025) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
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ROOD FIELD
MASTER CHANNEL 31 DITCH
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CITY PROGRAMMED TRAFFIC SIGNAL
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DW5

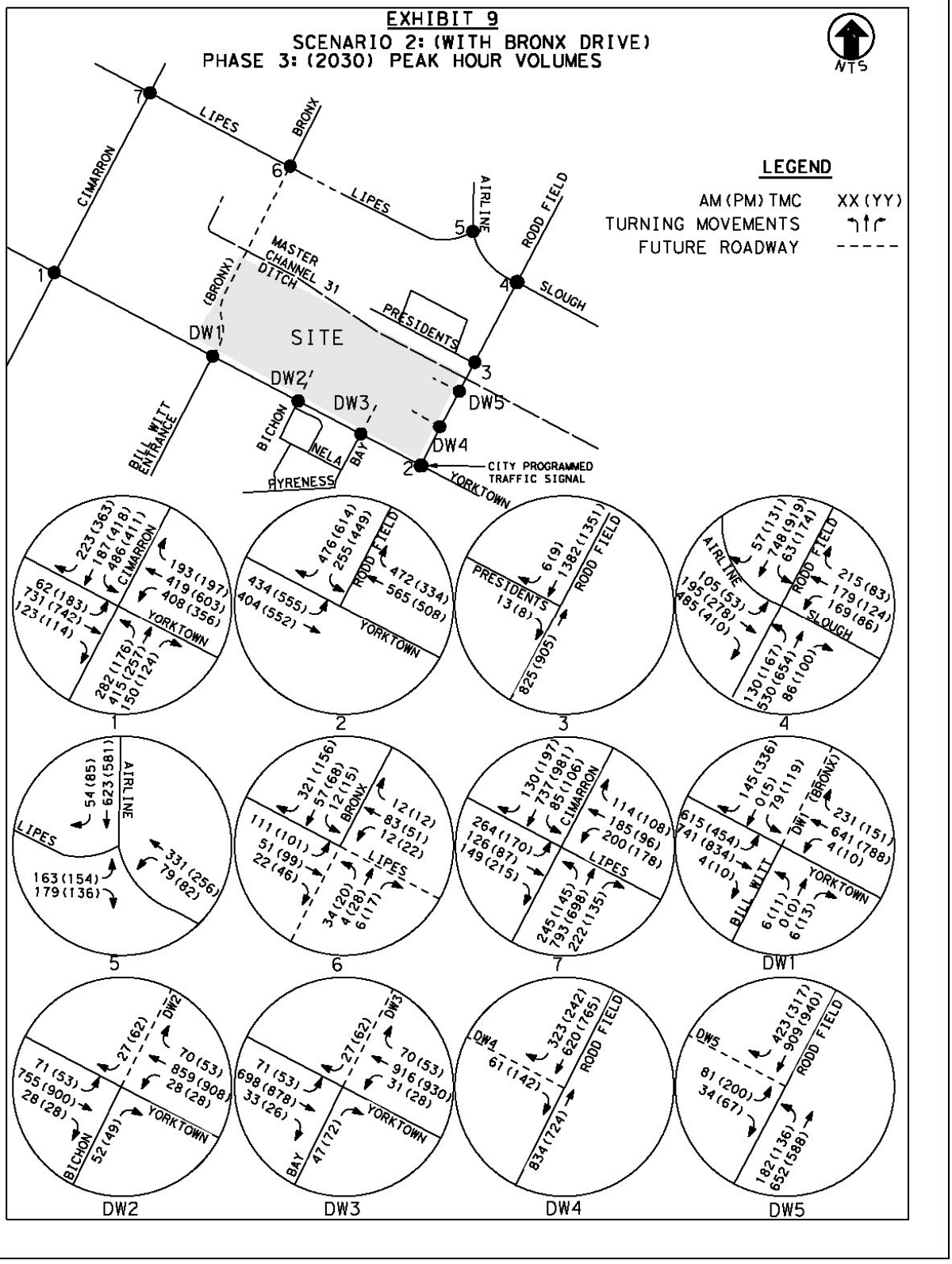
EXHIBIT 9
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 3: (2030) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
LIPES
BRONX
CIMARRON
AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
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BILL WITT ENTRANCE
BICHON
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BAY
BYRENESS
YORKTOWN
CITY PROGRAMMED TRAFFIC SIGNAL

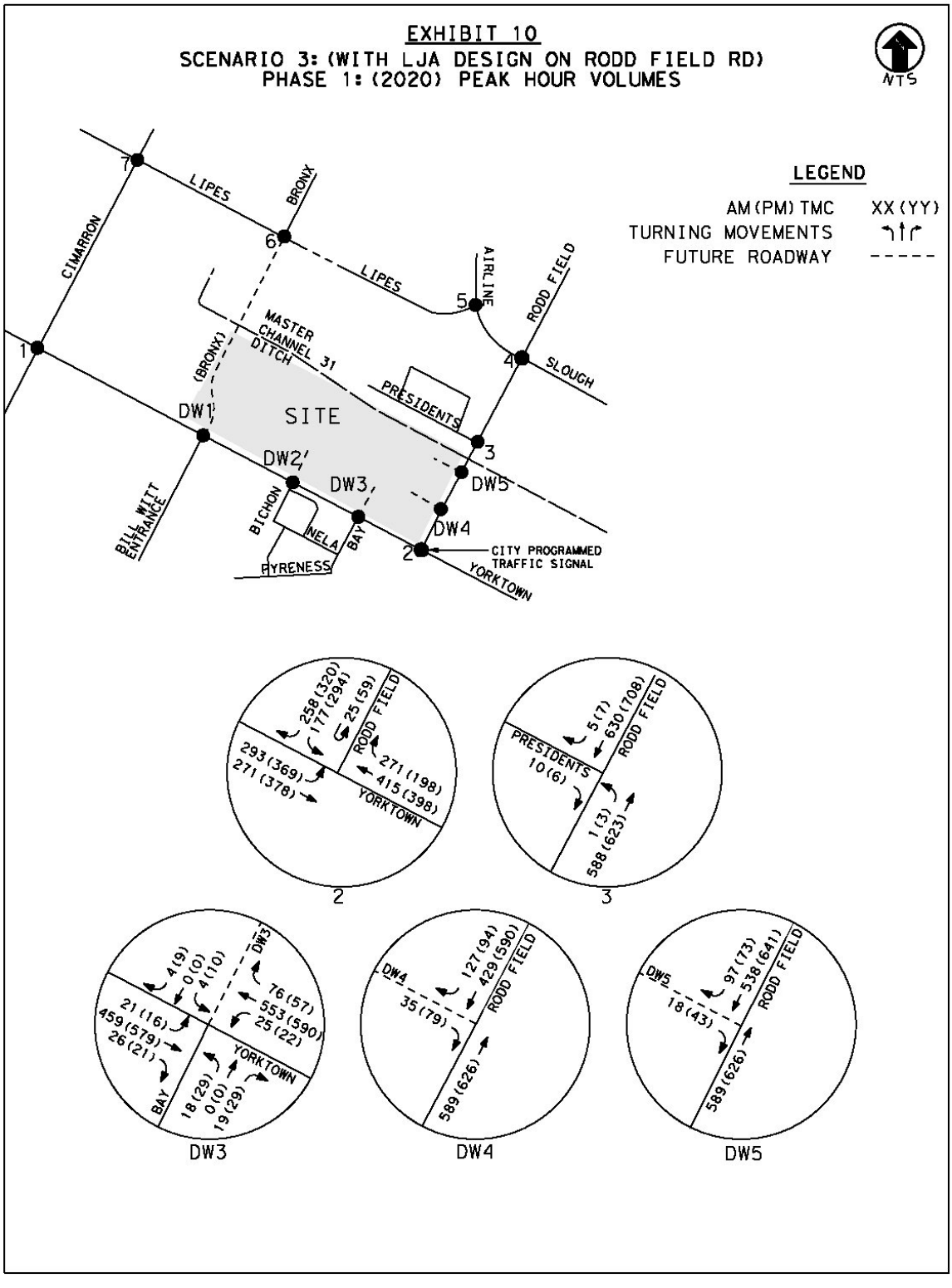
EXHIBIT 10
SCENARIO 3: (WITH LJA DESIGN ON RODD FIELD RD)
PHASE 1: (2020) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
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CIMARRON
AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
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DW4
DW5
BICHON
INELA
BAY
BILL WITT ENTRANCE
PYRENESS
YORKTOWN
CITY PROGRAMMED TRAFFIC SIGNAL
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177 (294)
25 (59)
271 (198)
415 (398)
293 (369)
271 (378)
5 (7)
630 (708)
10 (6)
1 (3)
588 (623)
4 (9)
0 (0)
4 (10)
76 (57)
553 (590)
25 (22)
21 (16)
459 (579)
26 (21)
18 (29)
0 (0)
19 (29)
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429 (590)
35 (79)
589 (626)
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DW3
DW4
DW5

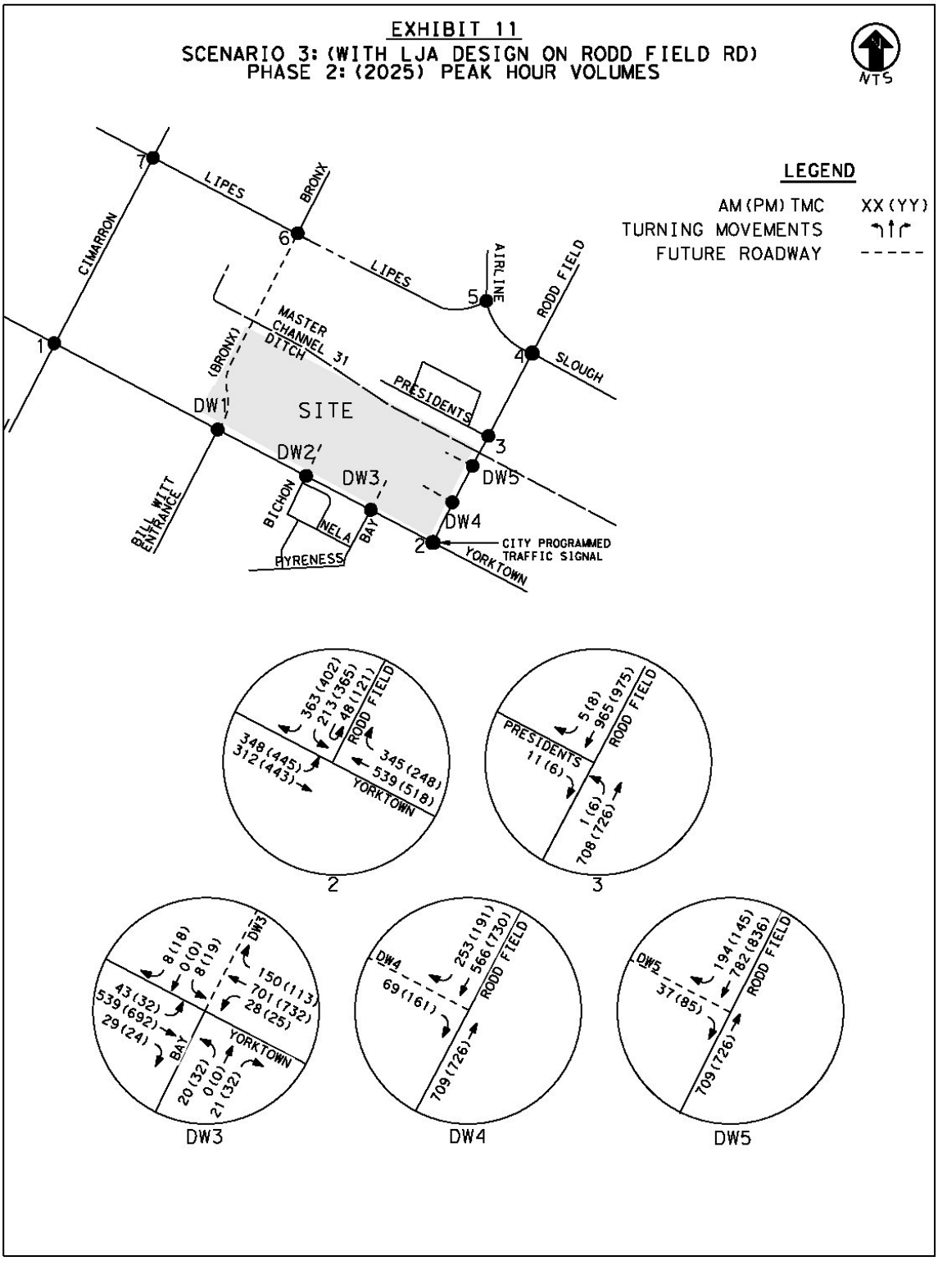
EXHIBIT 11
SCENARIO 3: (WITH LJA DESIGN ON RODD FIELD RD)
PHASE 2: (2025) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
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BRONX
CIMARRON
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AIRLINE
ROD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
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PRESIDENTS
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DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
HYRENESS
CITY PROGRAMMED TRAFFIC SIGNAL
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363 (402)
213 (365)
48 (121)
ROD FIELD
348 (445)
312 (443)
345 (248)
539 (518)
YORKTOWN
2
5 (8)
965 (975)
ROD FIELD
PRESIDENTS
11 (6)
1 (6)
708 (726)
3
DW3
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701 (732)
28 (25)
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29 (24)
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0 (0)
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DW3
DW4
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566 (730)
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DW4
DW5
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37 (85)
709 (726)
DW5

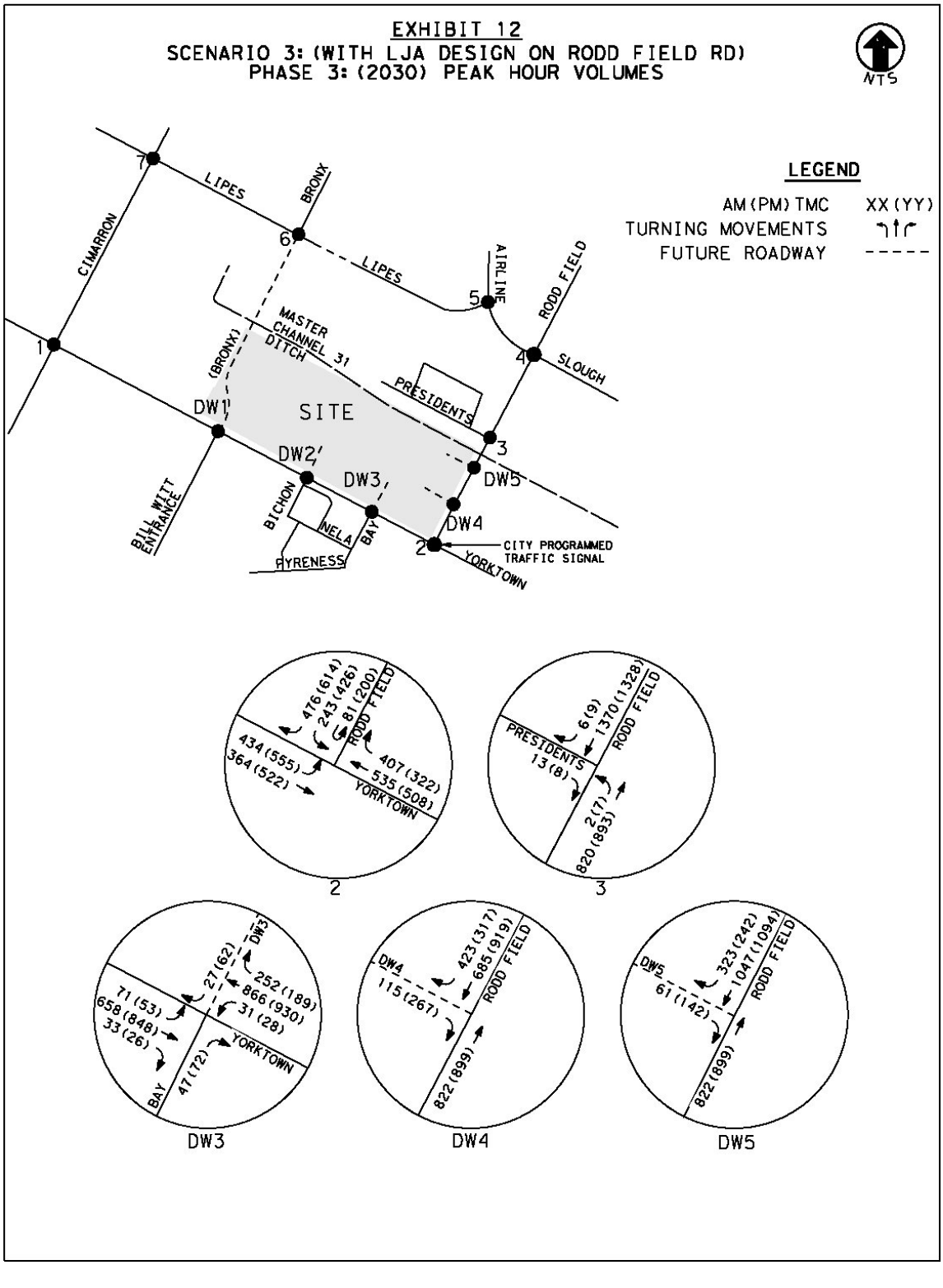
EXHIBIT 12
SCENARIO 3: (WITH LJA DESIGN ON RODD FIELD RD)
PHASE 3: (2030) PEAK HOUR VOLUMES
NTS
LEGEND
AM (PM) TMC XX (YY)
TURNING MOVEMENTS
FUTURE ROADWAY
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RODD FIELD
MASTER CHANNEL DITCH 31
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DW4
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BILL WITT ENTRANCE
BICHON
NELA
BAY
PYRENESS
CITY PROGRAMMED TRAFFIC SIGNAL
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476 (614)
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81 (200)
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1370 (1328)
RODD FIELD
PRESIDENTS
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DW3
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252 (189)
866 (930)
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YORKTOWN
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BAY
DW3
DW4
423 (317)
685 (919)
RODD FIELD
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DW5

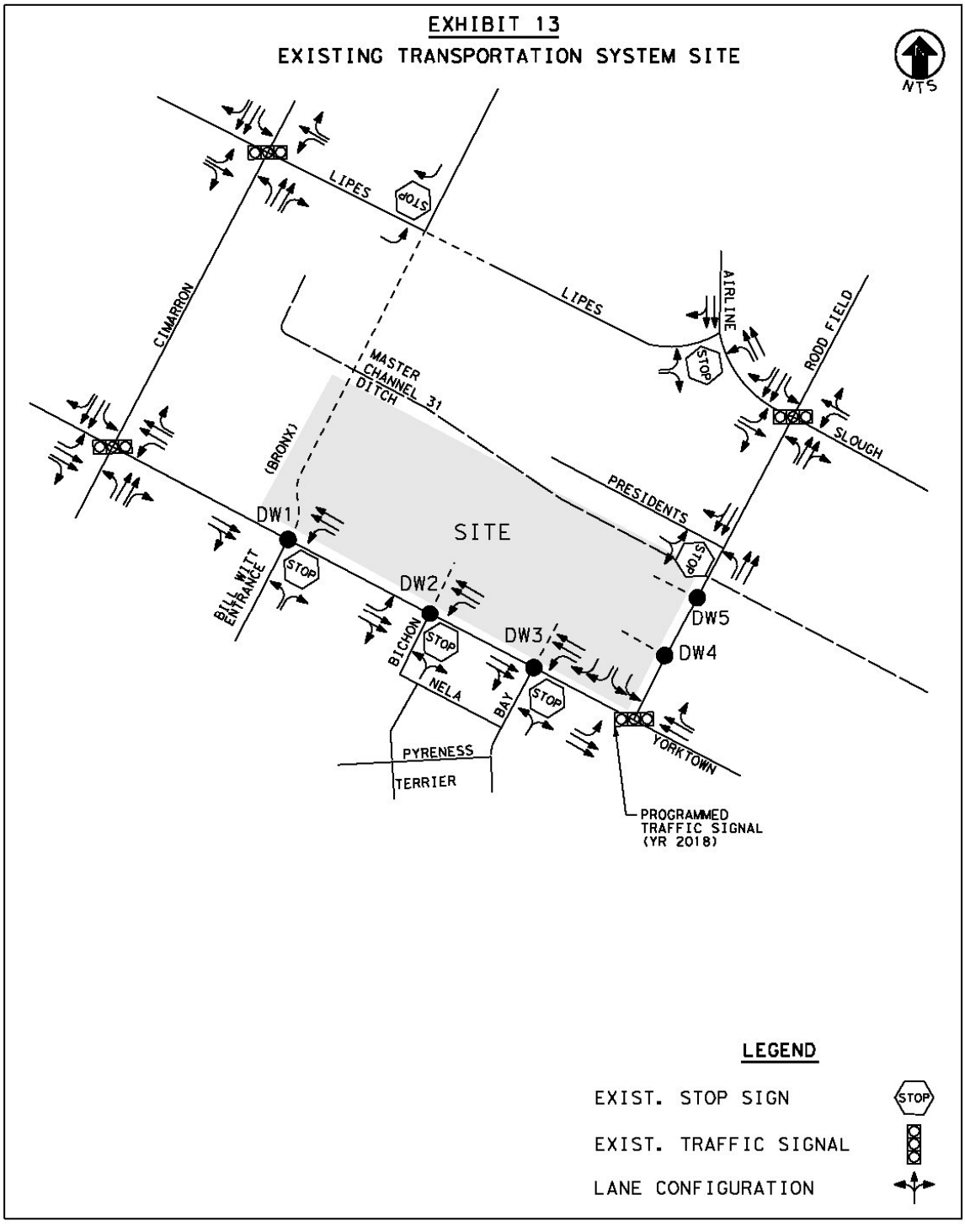


EXHIBIT 13
EXISTING TRANSPORTATION SYSTEM SITE
NTS
LIPES
STOP
LIPES
CIMARRON
AIRLINE
ROD FIELD
STOP
MASTER CHANNEL 31 DITCH
(BRONX)
SLOUGH
PRESIDENTS
DW1
SITE
STOP
STOP
DW2
DW5
BILL WITT ENTRANCE
BICHON
STOP
DW3
DW4
NELA
BAY
STOP
YORKTOWN
PYRENESS
TERRIER
PROGRAMMED TRAFFIC SIGNAL (YR 2018)
LEGEND
EXIST. STOP SIGN
STOP
EXIST. TRAFFIC SIGNAL
LANE CONFIGURATION

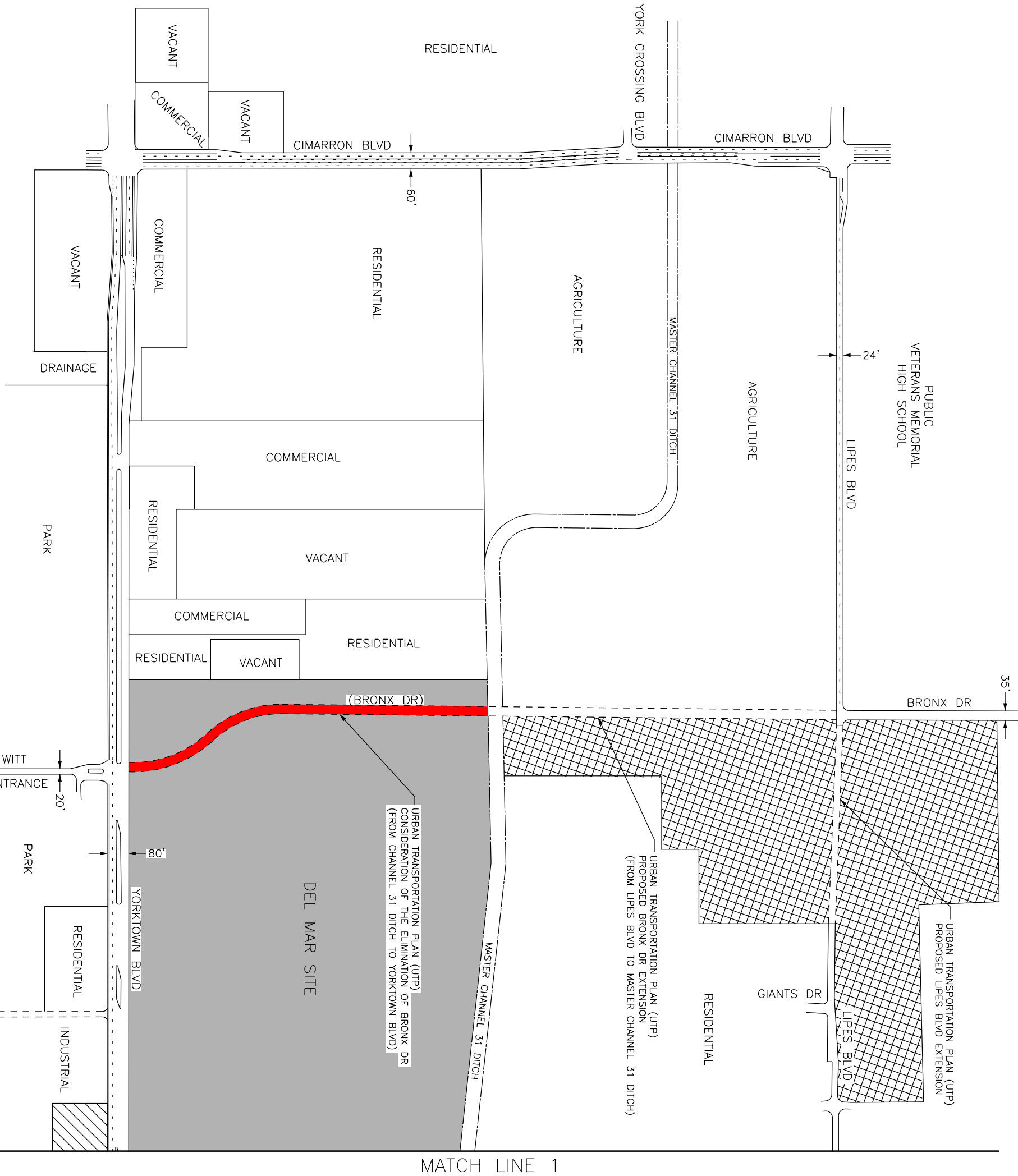


EXHIBIT 14

SHEET 1 OF 2

REVISION NO.	DATE	BY	DESCRIPTION	REVISION NO.	DATE	BY	DESCRIPTION

CITY PROJECT # _____

SHEET ____ of ____
RECORD DRAWING NO.

DEL MAR COLLEGE
SOUTHSIDE CAMPUS

VICINITY LAND USE

CITY of CORPUS CHRISTI
TEXAS
Department of Capital Programs

MALDONADO - BURKETT
INTELLIGENT TRANSPORTATION SYSTEMS, LLP
3833 SOUTH STAPLES STREET SUITE N214
CORPUS CHRIST, TEXAS 78411
PH. (361) 236-4611 www.mbitsgroup.com
TBPE REG. # F-10258

CONSULTANT'S SHEET No.

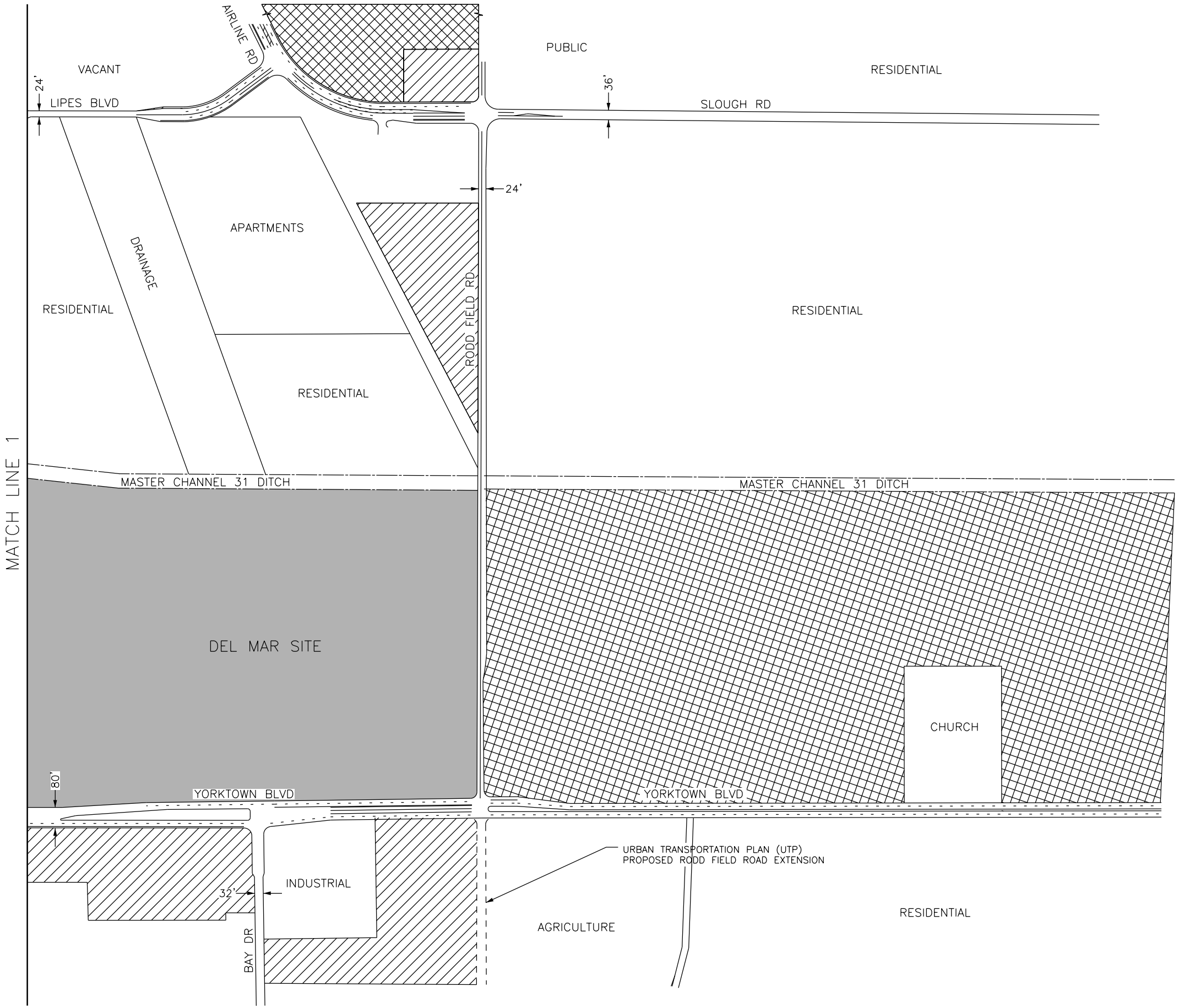


EXHIBIT 14
SHEET 2 OF 2

LEGEND

- UNDEVELOPED PROPERTY (COMMERCIAL)
- UNDEVELOPED PROPERTY (RESIDENTIAL)

CONSULTANT'S SHEET No.

REVISION NO. | DATE | BY | DESCRIPTION

MALDONADO - BURKETT
INTELLIGENT TRANSPORTATION SYSTEMS, LLP
3833 SOUTH STAPLES STREET, SUITE N214
CORPUS CHRISTI, TEXAS 78411
PH. (361) 236-4611 www.mbitsgroup.com
TBPE REG. # F-10258

CITY of CORPUS CHRISTI
TEXAS
Department of Capital Programs

DEL MAR COLLEGE
SOUTHSIDE CAMPUS

VICINITY LAND USE

SHEET ____ of ____
RECORD DRAWING NO.

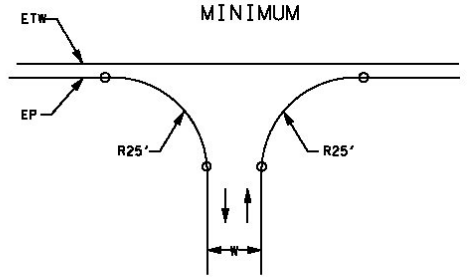
CITY PROJECT # ____

EXHIBIT 15
PROPOSED DRIVEWAY

LEGEND:
ETW-EDGE OF TRAVEL WAY
EP-EDGE OF PAVEMENT

TYPICAL DRIVWAY DESIGNS

RESIDENTIAL MINIMUM

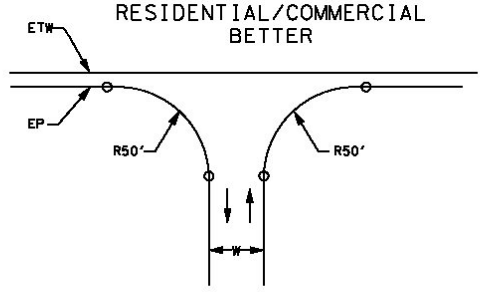


MINIMUM FOR RESIDENTIAL - URBAN

- MOST SUITABLE FOR LOW SPEED URBAN AREAS
- MOST PASSENGER CARS, SUV's AND PICKUPS ARE ABLE TO TURN INTO DRIVEWAY AT VERY LOW SPEEDS

TYPE 1

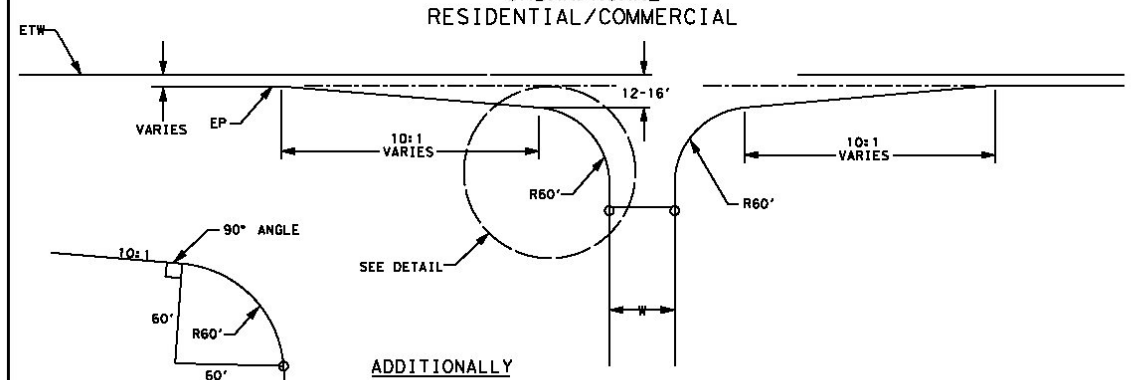
URBAN RESIDENTIAL/COMMERCIAL BETTER



- CAN ACCOMODATE LARGE TRUCKS, PICKUPS WITH TRAILERS
- SLIGHT INCREASE IN VEHICLE SAFETY SINCE TURNS CAN BE MADE AT HIGHER SPEEDS
- CAN REDUCE EDGE DROP-OFFS
- CAN INCREASE LENGTH OF DRIVEWAY CULVERT AND COST OF DRIVEWAY

TYPE 2

URBAN/RURAL RESIDENTIAL/COMMERCIAL



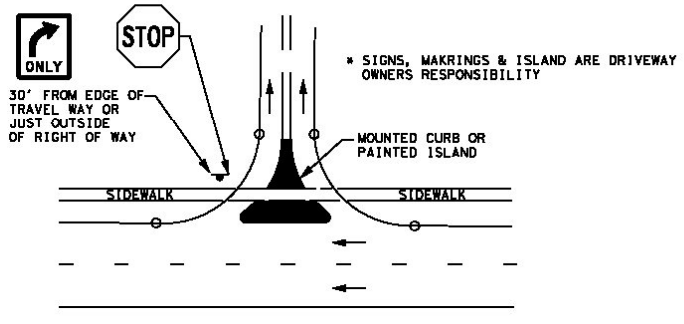
DETAIL

ADDITIONALLY

- REDUCES READ-END TYPE CRASH POTENTIAL BY MOVING THE TURNING PROCESS COMPLETELY OFF THE THRU LANE
- ACCOMADATES LARGE TRUCK TURNS
- PROVIDES PULL-OUT AREA FOR MAIL DELIVERY

TYPE 3

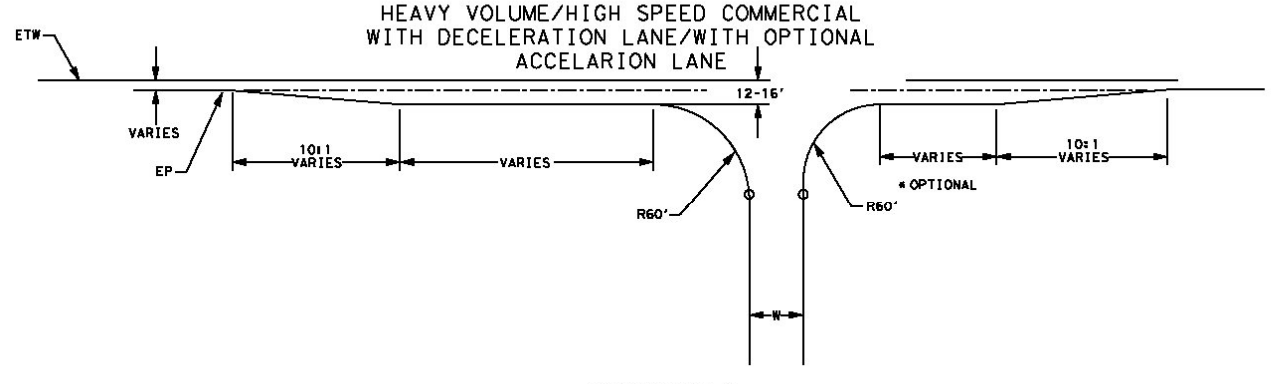
RIGHT IN/RIGHT OUT OF DRIVEWAYS OR DRIVEWAYS ON ONE WAY ROADWAYS (FRONTAGE)



* LESSENS THE POTENTIAL FOR WRONG WAY MOVEMENTS ONTO FRONTAGE ROAD/FREEWAY

TYPE 4

HEAVY VOLUME/HIGH SPEED COMMERCIAL WITH DECELERATION LANE/WITH OPTIONAL ACCELARION LANE

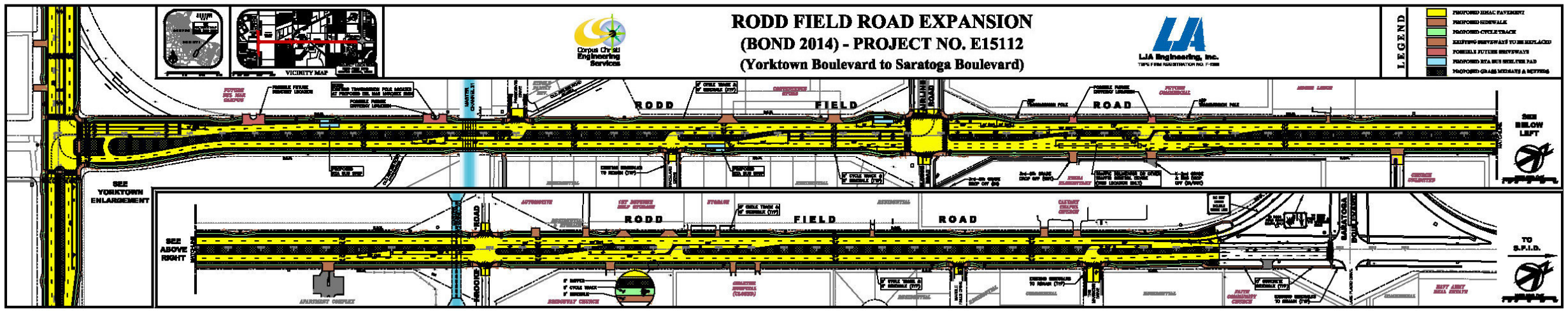


ADDITIONALLY

- PROVIDES DECLERATION/ACCELERATION AREAS TO FURTHER DECREASE POTENTAIL REAR-END TYPE CRASHES

TYPE 5

EXHIBIT 16


RODD FIELD ROAD EXPANSION
(BOND 2014) - PROJECT NO. E15112
(Yorktown Boulevard to Saratoga Boulevard)
Corpus Christi Engineering Services
LJA Engineering, Inc.
LEGEND
VICINITY MAP
RODD
FIELD
ROAD
SEE YORKTOWN ENLARGEMENT
SEE ABOVE RIGHT
SEE BELOW LEFT
TO S.P.I.D.

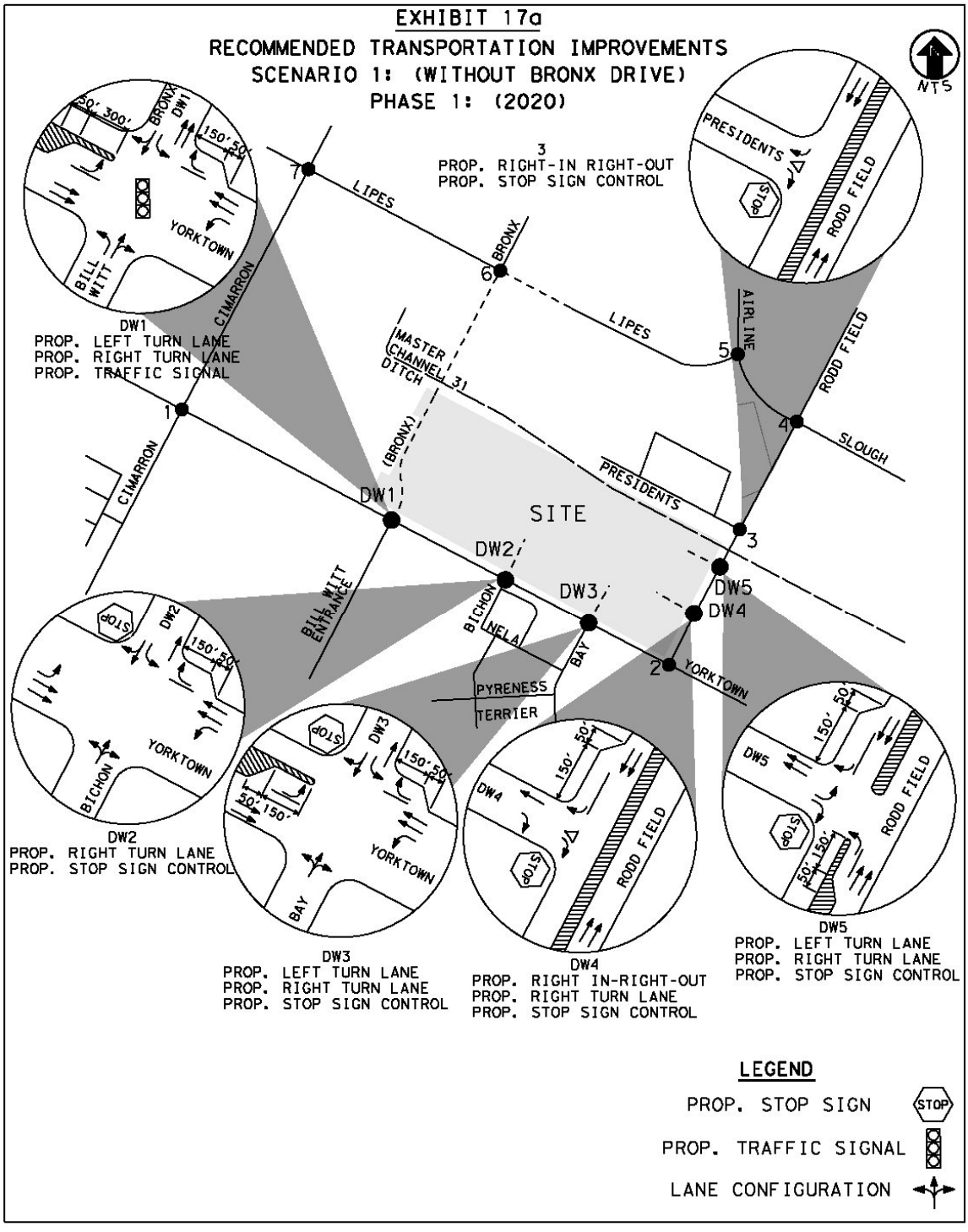


EXHIBIT 17a
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 1: (WITHOUT BRONX DRIVE)
PHASE 1: (2020)
NTS
3
PROP. RIGHT-IN RIGHT-OUT
PROP. STOP SIGN CONTROL
LIPES
BRONX
LIPES
AIRLINE
ROAD FIELD
MASTER CHANNEL DITCH
(BRONX)
CIMARRON
PRESIDENTS
SLOUGH
SITE
DW1
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
PYRENESS
TERRIER
YORKTOWN
DW1
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. TRAFFIC SIGNAL
DW2
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW3
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW4
PROP. RIGHT IN-RIGHT-OUT
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW5
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
LEGEND
PROP. STOP SIGN
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

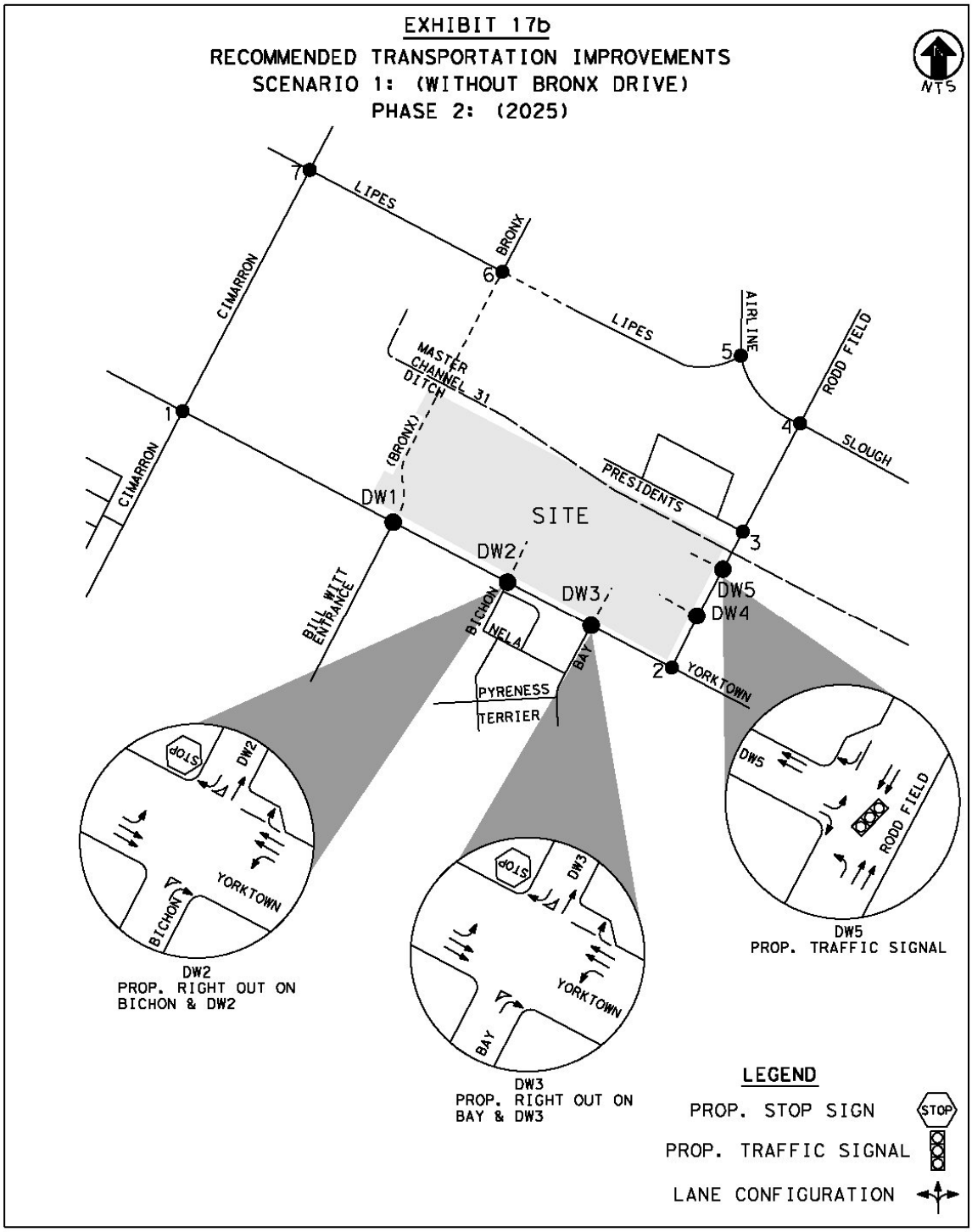


EXHIBIT 17b
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 1: (WITHOUT BRONX DRIVE)
PHASE 2: (2025)
NTS
LIPES
BRONX
CIMARRON
LIPES
AIRLINE
RODD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
SLOUGH
CIMARRON
PRESIDENTS
SITE
DW1
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
YORKTOWN
PYRENESS
TERRIER
1
2
3
4
5
6
7
STOP
DW2
YORKTOWN
BICHON
DW2
PROP. RIGHT OUT ON
BICHON & DW2
STOP
DW3
YORKTOWN
BAY
DW3
PROP. RIGHT OUT ON
BAY & DW3
DW5
RODD FIELD
DW5
PROP. TRAFFIC SIGNAL
LEGEND
PROP. STOP SIGN
STOP
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

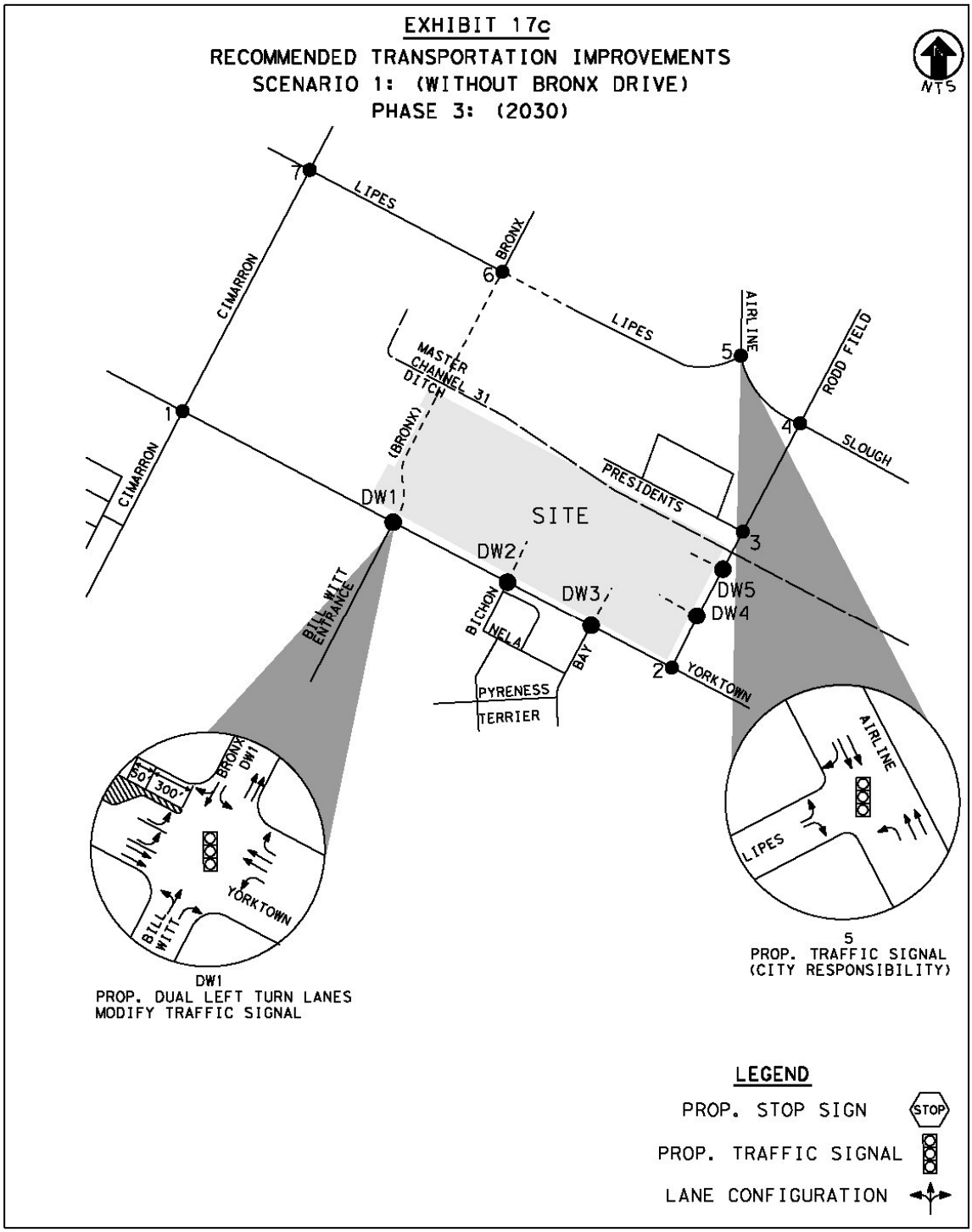


EXHIBIT 17c
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 1: (WITHOUT BRONX DRIVE)
PHASE 3: (2030)
NTS
LIPES
BRONX
CIMARRON
LIPES
AIRLINE
ROOD FIELD
MASTER CHANNEL DITCH 31
(BRONX)
SLOUGH
CIMARRON
PRESIDENTS
DW1
SITE
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
PYRENESS
TERRIER
YORKTOWN
1
2
3
4
5
6
7
300'
BRONX
DW1
YORKTOWN
BILL WITT
DW1
PROP. DUAL LEFT TURN LANES
MODIFY TRAFFIC SIGNAL
AIRLINE
LIPES
5
PROP. TRAFFIC SIGNAL
(CITY RESPONSIBILITY)
LEGEND
PROP. STOP SIGN
STOP
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

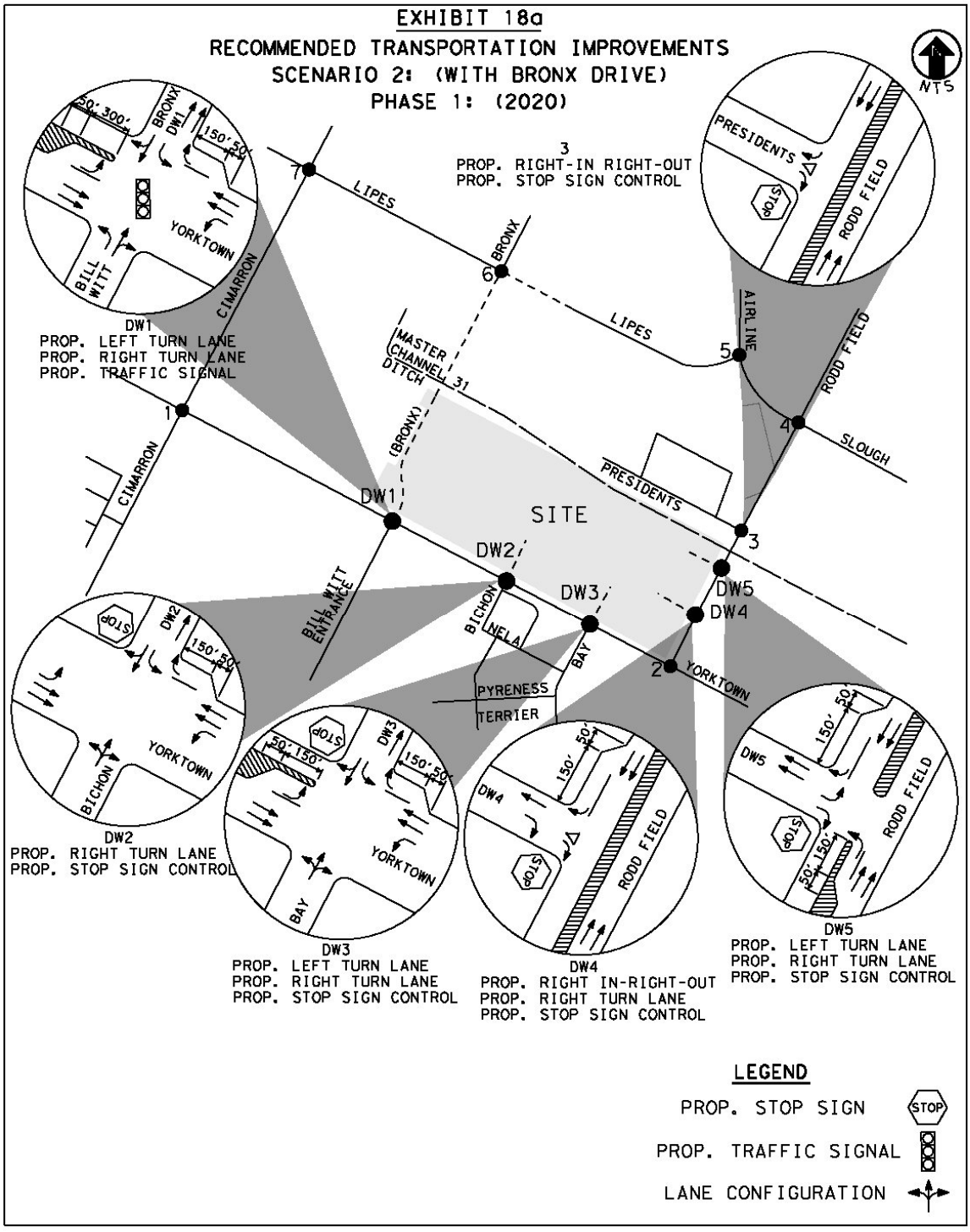


EXHIBIT 18a
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 1: (2020)
NTS
3
PROP. RIGHT-IN RIGHT-OUT
PROP. STOP SIGN CONTROL
LIPES
BRONX
LIPES
AIRLINE
RODD FIELD
MASTER CHANNEL DITCH
(BRONX)
CIMARRON
PRESIDENTS
SLOUGH
SITE
DW1
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
PYRENESS
TERRIER
YORKTOWN
STOP
DW1
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. TRAFFIC SIGNAL
DW2
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW3
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW4
PROP. RIGHT IN-RIGHT-OUT
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
DW5
PROP. LEFT TURN LANE
PROP. RIGHT TURN LANE
PROP. STOP SIGN CONTROL
LEGEND
PROP. STOP SIGN
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

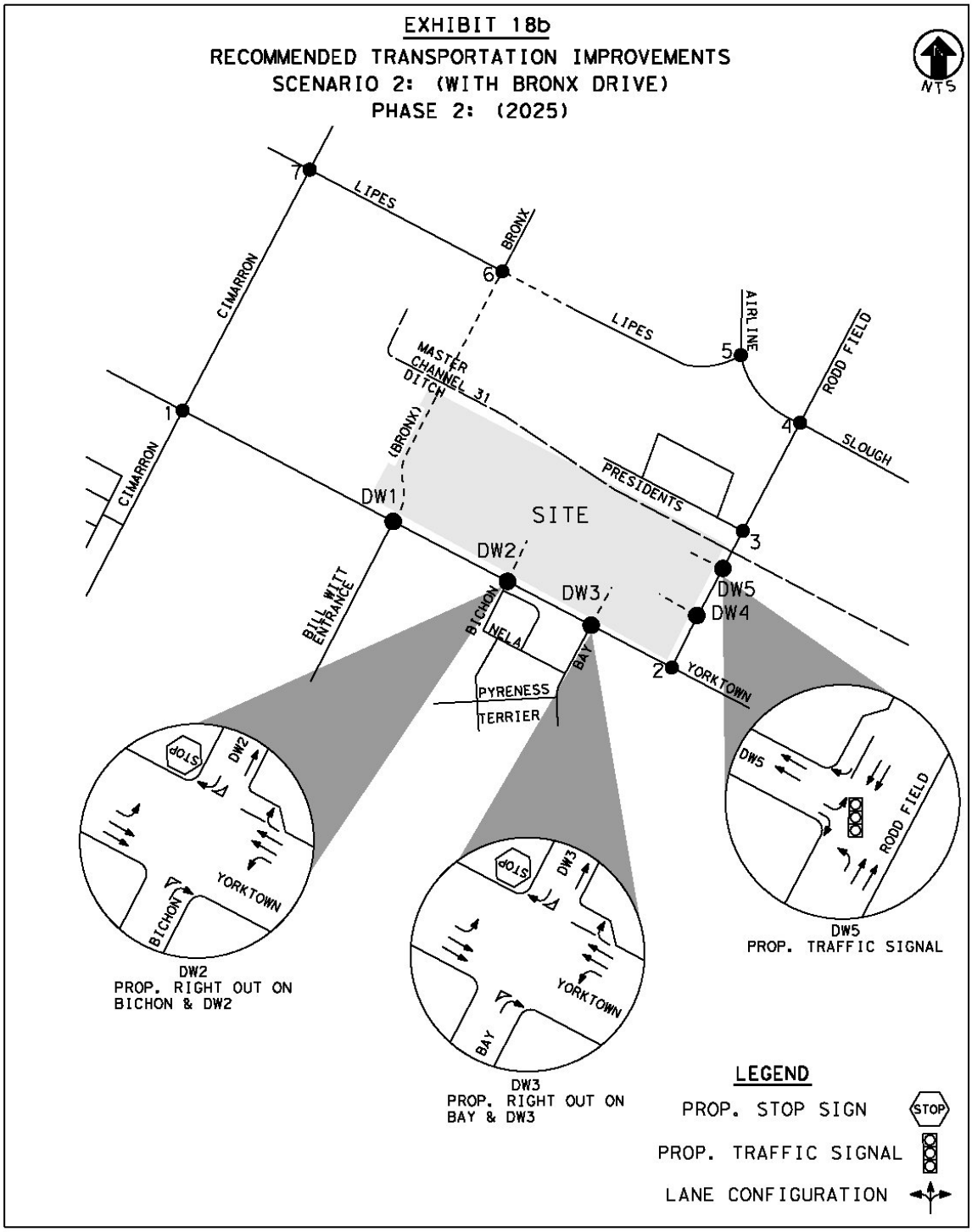


EXHIBIT 18b
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 2: (2025)
NTS
LIPES
BRONX
C.MARRON
LIPES
AIRLINE
RODD FIELD
MASTER CHANNEL DITCH 31
(BRONX)
SLOUGH
PRESIDENTS
C.MARRON
DW1
SITE
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
YORKTOWN
PYRENESS
TERRIER
STOP
DW2
YORKTOWN
BICHON
DW2
PROP. RIGHT OUT ON
BICHON & DW2
STOP
DW3
YORKTOWN
BAY
DW3
PROP. RIGHT OUT ON
BAY & DW3
DW5
RODD FIELD
DW5
PROP. TRAFFIC SIGNAL
LEGEND
PROP. STOP SIGN
STOP
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

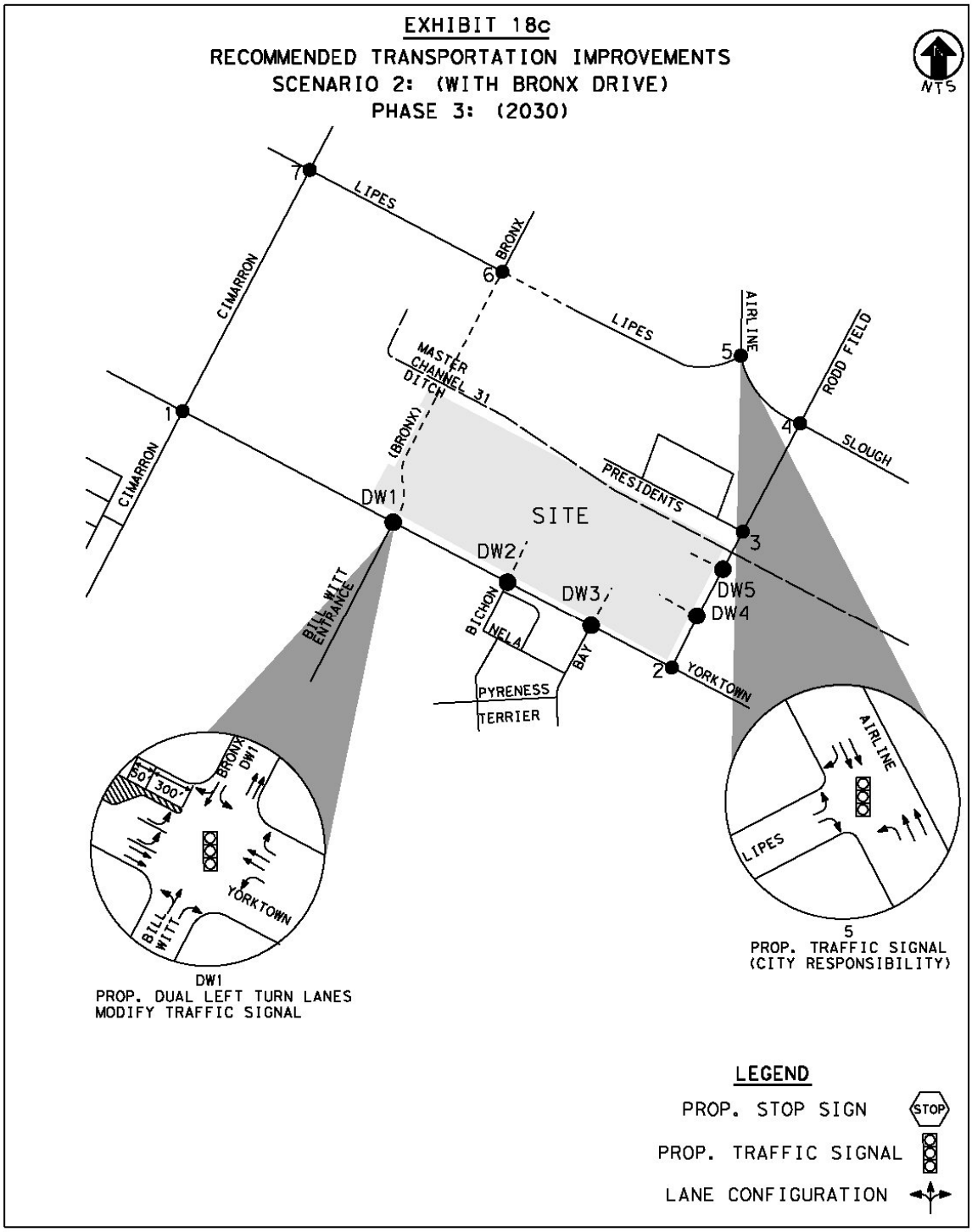


EXHIBIT 18c
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 2: (WITH BRONX DRIVE)
PHASE 3: (2030)
NTS
LIPES
BRONX
CIMARRON
LIPES
AIRLINE
ROOD FIELD
MASTER CHANNEL 31 DITCH
(BRONX)
SLOUGH
PRESIDENTS
SITE
DW1
DW2
DW3
DW4
DW5
BILL WITT ENTRANCE
BICHON
NELA
BAY
YORKTOWN
PYRENESS
TERRIER
DW1
PROP. DUAL LEFT TURN LANES
MODIFY TRAFFIC SIGNAL
5
PROP. TRAFFIC SIGNAL
(CITY RESPONSIBILITY)
LEGEND
PROP. STOP SIGN
STOP
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

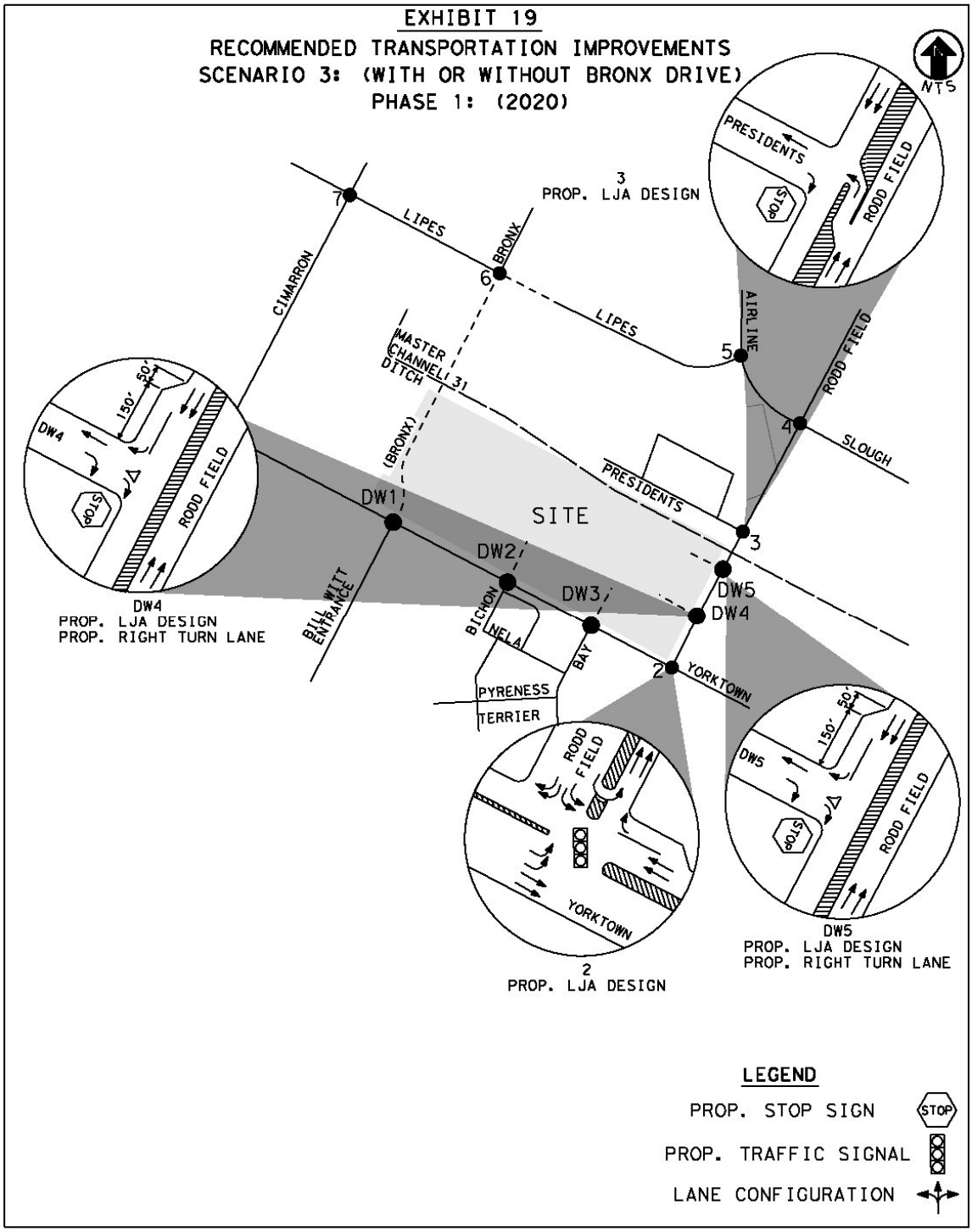


EXHIBIT 19
RECOMMENDED TRANSPORTATION IMPROVEMENTS
SCENARIO 3: (WITH OR WITHOUT BRONX DRIVE)
PHASE 1: (2020)
NTS
PRESIDENTS
STOP
RODD FIELD
3
PROP. LJA DESIGN
7
LIPES
BRONX
6
CIMARRON
LIPES
AIRLINE
5
MASTER CHANNEL DITCH 31
(BRONX)
RODD FIELD
4
SLOUGH
PRESIDENTS
DW1
SITE
DW2
DW3
DW5
DW4
3
BILL WITT ENTRANCE
BICHON
NELA
BAY
2
YORKTOWN
PYRENESS
TERRIER
150'
50'
DW4
STOP
RODD FIELD
DW4
PROP. LJA DESIGN
PROP. RIGHT TURN LANE
RODD FIELD
YORKTOWN
2
PROP. LJA DESIGN
DW5
STOP
RODD FIELD
DW5
PROP. LJA DESIGN
PROP. RIGHT TURN LANE
LEGEND
PROP. STOP SIGN
PROP. TRAFFIC SIGNAL
LANE CONFIGURATION

Tables

TABLE 1
SCENARIO 1 - TRAFFIC DISTRIBUTION (2020)

TRIP DISTRIBUTION % (AM & PM)						
DRIVEWAY	INBOUND			OUTBOUND		
	LEFT (←)	STRAIGHT (↑)	RIGHT (→)	LEFT (←)	STRAIGHT (↑)	RIGHT (→)
Bronx Dr/DW1	75%	0%	25%	25%	0%	75%
DW2	50%	0%	50%	50%	0%	50%
DW3	50%	0%	50%	50%	0%	50%
DW4	30%	-	70%	70%	-	30%
DW5	-	-	100%	-	-	100%

DRIVEWAY DISTRIBUTION % (AM & PM)		
DRIVEWAY	INBOUND	OUTBOUND
Bronx Dr/DW1	40%	40%
DW2	7%	7%
DW3	7%	7%
DW4	30%	30%
DW5	16%	16%
TOTAL	100%	100%

TABLE 2
SCENARIO 2 - TRAFFIC DISTRIBUTION (2020)

TRIP DISTRIBUTION % (AM & PM)						
DRIVEWAY	INBOUND			OUTBOUND		
	LEFT (←)	STRAIGHT (↑)	RIGHT (→)	LEFT (←)	STRAIGHT (↑)	RIGHT (→)
Bronx Dr/DW1	75%	0%	25%	25%	0%	75%
DW2	50%	0%	50%	50%	0%	50%
DW3	50%	0%	50%	50%	0%	50%
DW4	30%	-	70%	70%	-	30%
DW5	-	-	100%	-	-	100%

DRIVEWAY DISTRIBUTION % (AM & PM)		
DRIVEWAY	INBOUND	OUTBOUND
Bronx Dr/DW1	40%	40%
DW2	7%	7%
DW3	7%	7%
DW4	30%	30%
DW5	16%	16%
TOTAL	100%	100%

TABLE 3
SCENARIO 3 - TRAFFIC DISTRIBUTION (2020)

TRIP DISTRIBUTION % (AM & PM)						
DRIVEWAY	INBOUND			OUTBOUND		
	LEFT (←)	STRAIGHT (↑)	RIGHT (→)	LEFT (←)	STRAIGHT (↑)	RIGHT (→)
Bronx Dr/DW1	75%	0%	25%	25%	0%	75%
DW2	50%	0%	50%	50%	0%	50%
DW3	40%	0%	60%	50%	0%	50%
DW4	-	-	100%	-	-	100%
DW5	-	-	100%	-	-	100%

DRIVEWAY DISTRIBUTION % (AM & PM)		
DRIVEWAY	INBOUND	OUTBOUND
Bronx Dr/DW1	40%	40%
DW2	7%	7%
DW3	10%	7%
DW4	28%	28%
DW5	15%	18%
TOTAL	100%	100%

Table 4
Definition of Level of Service for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (sec/veh)	Description
A	≤ 10	LOS A describes operations with a control delay of 10 s/veh or less and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is exceptionally favorable or the cycle length is very short. If it is due to favorable progression, most vehicles arrive during the green indication and travel through the intersections without stopping.
B	> 10 and ≤ 20	LOS B describes operations with control delay between 10 and 20 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is low and either progression is highly favorable or the cycle length is short. More vehicles stop than with LOS A.
C	> 20 and ≤ 35	LOS C describes operations with control delay between 20 and 35 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when progression is favorable or the cycle length is moderate. Individual *cycle failures* (i.e., one or more queued vehicles are not able to depart as a result of insufficient capacity during the cycle) may begin to appear at this level. The number of vehicles stopping is significant, although many vehicles still pass through the intersection without stopping.
D	> 35 and ≤ 55	LOS D describes operations with control delay between 35 and 55 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high and either progression is ineffective or the cycle length is long. Many vehicles stop and individual cycle failures are noticeable.
E	> 55 and ≤ 80	LOS E describes operations with control delay between 55 and 80 s/veh and a volume-to-capacity ratio no greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is high, progression is unfavorable, and the cycle length is long. Individual cycle failures are frequent.
F	> 80	LOS F describes operations with control delay exceeding 80 s/veh or a volume-to-capacity ratio greater than 1.0. This level is typically assigned when the volume-to-capacity ratio is very high, progression is very poor, and the cycle length is long. Most cycle fail to clear the queue.

Source: 2010 Highway Capacity Manual

TABLE 5
LOS FOR SIGNALIZED INTERSECTIONS
EXISTING

Intersection #	Intersection Delay (HCM)	AM		PM	
		Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Intersection 1: Cimarron Blvd & Yorktown Blvd	Overall	25	C	17	B
Intersection 2: Rodd Field Rd & Yorktown Blvd	N/A	N/A	N/A	N/A	N/A
Intersection 4: Rodd Field Rd & Airline Rd/ Slough Rd	Overall	17	B	13	B
Intersection 7: Cimarron Blvd & Lipes Blvd	Overall	10	A	8	A

TABLE 6
LOS FOR SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 1 (2020)

Intersection #	Intersection Delay (HCM) Scenario	AM						PM					
		Delay (sec/veh)			LOS			Delay (sec/veh)			LOS		
		SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
Intersection 1: Cimarron Blvd & Yorktown Blvd	Overall	24	20	24 / 20	C	B	C / B	18	20	18 / 20	B	B	B / B
Intersection 2: Rodd Field Rd & Yorktown Blvd	Overall	9	9	10	A	A	A	9	10	10	A	A	A
Intersection 4: Rodd Field Rd & Airline Rd/ Slough Rd	Overall	17	17	17 / 17	B	B	B / B	14	15	14 / 15	B	B	B / B
Intersection 7: Cimarron Blvd & Lipes Blvd	Overall	11	13	11 / 13	B	B	B / B	9	8	9 / 8	A	A	A / A
Interesection DW1: Yorktown Blvd & Bill Witt Ent/ Bronx Dr/DW1	Overall	14	14	14 / 14	B	B	B / B	14	14	14 / 14	B	B	B / B

TABLE 7
LOS FOR SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 2 (2025)

Intersection #	Intersection Delay (HCM) Scenario	AM Delay (sec/veh) SC1	AM Delay (sec/veh) SC2	AM Delay (sec/veh) SC3	AM LOS SC1	AM LOS SC2	AM LOS SC3	PM Delay (sec/veh) SC1	PM Delay (sec/veh) SC2	PM Delay (sec/veh) SC3	PM LOS SC1	PM LOS SC2	PM LOS SC3
Intersection 1: Cimarron Blvd & Yorktown Blvd	Overall	25	26	25 / 26	C	C	C / C	21	21	21 / 21	C	C	C / C
Intersection 2: Rodd Field Rd & Yorktown Blvd	Overall	10	10	11	A	A	B	12	12	12	B	B	B
Intersection 4: Rodd Field Rd & Airline Rd/ Slough Rd	Overall	17	18	17 / 18	B	B	B / B	16	17	16 / 17	B	B	B / B
Intersection 7: Cimarron Blvd & Lipes Blvd	Overall	13	14	13 / 14	B	B	B / B	10	11	10 / 11	A	B	A / B
Interesection DW1: Yorktown Blvd & Bill Witt Ent/ Bronx Dr/DW1	Overall	21	22	21 / 22	C	C	C / C	17	17	17 / 17	B	B	B / B
Intersection DW5: Rodd Field Rd & DW5	Overall	6	6	N/A	A	A	N/A	10	8	N/A	A	A	N/A

TABLE 8
LOS FOR SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 3 (2030)

	Intersection Delay (HCM)	AM						PM					
		Delay (sec/veh)			LOS			Delay (sec/veh)			LOS		
Intersection #	Scenario	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
Intersection 1: Cimarron Blvd & Yorktown Blvd	Overall	49	51	49 / 51	D	D	D / D	30	32	30 / 32	C	C	C / C
Intersection 2: Rodd Field Rd & Yorktown Blvd	Overall	11	11	11	B	B	B	13	13	12	B	B	B
Intersection 4: Rodd Field Rd & Airline Rd/ Slough Rd	Overall	22	22	22 / 22	C	C	C / C	20	21	20 / 21	C	C	C / C
Intersection 5: Airline Rd & Lipes Blvd	Overall	8	7	7	A	A	A	7	7	7	A	A	A
Intersection 7: Cimarron Blvd & Lipes Blvd	Overall	17	24	17 / 24	B	C	B / C	12	12	12 / 12	B	B	B / B
Interesection DW1: Yorktown Blvd & Bill Witt Ent/ Bronx Dr/DW1	Overall	32	35	32 / 35	C	C	C / C	27	30	27 / 30	C	C	C / C
Intersection DW5: Rodd Field Rd & DW5	Overall	12	13	N/A	B	B	N/A	16	16	N/A	B	B	N/A

Table 9: LOS Criteria for Stop Sign Controlled Intersections

LEVEL OF SERVICE	DELAY RANGE (seconds)
A	≤ 10 SEC.
B	> 10 and ≤ 15 sec.
C	> 15 and ≤ 25 sec.
D	> 25 and ≤ 35 sec.
E	> 35 and ≤ 50 sec.
F	> 50 sec.

Source: 2010 Highway Capacity Manual

TABLE 10
LOS FOR UN-SIGNALIZED INTERSECTIONS
EXISTING

Intersection #	Approach Delay	AM				PM			
		EAST BOUND	WEST BOUND	SOUTH BOUND	NORTH BOUND	EAST BOUND	WEST BOUND	SOUTH BOUND	NORTH BOUND
Intersection 3: Rodd Field Rd & Presidents Dr	LOS	B	N/A	FREE	FREE	B	N/A	FREE	FREE
	(s/veh)	13	N/A	FREE	FREE	12	N/A	FREE	FREE
Intersection 5: Airline Rd & Lipes Blvd	LOS	B	N/A	FREE	FREE	B	N/A	FREE	FREE
	(s/veh)	11	N/A	FREE	FREE	11	N/A	FREE	FREE
Intersection 6: Lipes Blvd & Bronx Dr	LOS	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A
	(s/veh)	FREE	N/A	FREE	N/A	FREE	N/A	FREE	N/A
Intersection DW1: Yorktown Blvd & Bill Witt Ent	LOS	FREE	FREE	N/A	B	FREE	FREE	N/A	B
	(s/veh)	FREE	FREE	N/A	12	FREE	FREE	N/A	14
Intersection DW2: Yorktown Blvd & Bichon Dr	LOS	FREE	FREE	N/A	B	FREE	FREE	N/A	B
	(s/veh)	FREE	FREE	N/A	14	FREE	FREE	N/A	15
Intersection DW3: Yorktown Blvd & Bay Dr	LOS	FREE	FREE	N/A	B	FREE	FREE	N/A	C
	(s/veh)	FREE	FREE	N/A	14	FREE	FREE	N/A	16

TABLE 11
LOS FOR UN-SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 1 (2020)

		AM												PM											
	Approach Delay	EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND			EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND		
Intersection #	SCENARIO	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
Intersection 3: Rodd Field Rd & Presidents Dr	LOS	B	B	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	11	11	11	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	11	11	11	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection 5: Airline Rd & Lipes Blvd	LOS	C	C	B / C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	C	C	B / C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	16	16	14 / 16	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	17	17	14 / 17	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection 6: Lipes Blvd & Bronx Dr	LOS	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	C	C	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	B	B
	(s/veh)	FREE	FREE	FREE	N/A	FREE	FREE	12	13	13	N/A	19	19	FREE	FREE	FREE	N/A	FREE	FREE	11	12	12	N/A	14	14
Intersection DW2: Yorktown Blvd & Bichon Dr/DW2	LOS	FREE	FREE	FREE	FREE	FREE	FREE	C	C	C / C	C	C	C / C	FREE	FREE	FREE	FREE	FREE	FREE	C	C	C / C	C	C	C / C
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	17	18	17 / 18	17	19	17 / 19	FREE	FREE	FREE	FREE	FREE	FREE	19	20	19 / 20	20	21	20 / 21
Intersection DW3: Yorktown Blvd & Bay Dr/DW3	LOS	FREE	FREE	FREE	FREE	FREE	FREE	C	C	C	C	C	C	FREE	FREE	FREE	FREE	FREE	FREE	C	C	C	B	B	B
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	17	18	18	17	18	17	FREE	FREE	FREE	FREE	FREE	FREE	20	20	20	11	11	11
Intersection DW4: Rodd Field Rd & DW4	LOS	A	A	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	10	10	11	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	11	11	12	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection DW5: Rodd Field Rd & DW5	LOS	C	C	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	C	C	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	20	20	11	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	23	23	11	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE

TABLE 12
LOS FOR UN-SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 2 (2025)

		AM												PM										
	Approach Delay	EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND			EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND		
Intersection #	SCENARIO	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
Intersection 3: Rodd Field Rd & Presidents Dr	LOS	B	B	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	12	12	12	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	12	13	12	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection 5: Airline Rd & Lipes Blvd	LOS	C	C	C / C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	D	C	C / C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	22	22	17 / 22	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	26	21	17 / 21	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection 6: Lipes Blvd & Bronx Dr	LOS	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	C	C	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	B	B
	(s/veh)	FREE	FREE	FREE	N/A	FREE	FREE	12	13	13	N/A	21	21	FREE	FREE	FREE	N/A	FREE	FREE	11	13	13	N/A	14	14
Intersection DW2: Yorktown Blvd & Bichon Dr/DW2	LOS	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B / B	B	B	B / B	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B / B	B	B	B / B
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	11	11	11 / 11	11	11	11 / 11	FREE	FREE	FREE	FREE	FREE	FREE	11	11	11 / 11	12	12	12 / 12
Intersection DW3: Yorktown Blvd & Bay Dr/DW3	LOS	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	B	B	B	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	B	B	B
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	11	11	11	11	11	11	FREE	FREE	FREE	FREE	FREE	FREE	11	11	11	12	12	12
Intersection DW4: Rodd Field Rd & DW4	LOS	B	B	B	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE	B	B	C	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE
	(s/veh)	11	11	12	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE	12	12	16	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE
* Intersection DW5: Rodd Field Rd & DW5	LOS	N/A	N/A	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	N/A	N/A	B	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	N/A	N/A	13	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	N/A	N/A	14	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE

* Signal warranted, see **Table 7**.

TABLE 13
LOS FOR UN-SIGNALIZED INTERSECTIONS
SCENARIO 1, 2 AND 3 (SC) OPENING DAY PHASE 3 (2030)

		AM												PM										
	Approach Delay	EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND			EAST BOUND			WEST BOUND			SOUTH BOUND			NORTH BOUND		
Intersection #	SCENARIO	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3	SC1	SC2	SC3
Intersection 3: Rodd Field Rd & Presidents Dr	LOS	C	C	C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	C	C	C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	16	16	16	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	15	15	15	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
Intersection 6: Lipes Blvd & Bronx Dr	LOS	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	C	C	FREE	FREE	FREE	N/A	FREE	FREE	B	B	B	N/A	C	C
	(s/veh)	FREE	FREE	FREE	N/A	FREE	FREE	13	14	14	N/A	23	23	FREE	FREE	FREE	N/A	FREE	FREE	12	13	13	N/A	15	15
Intersection DW2: Yorktown Blvd & Bichon Dr/DW2	LOS	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B / B	B	B	B / B	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B / B	B	B	B / B
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	12	12	12 / 12	12	12	12 / 12	FREE	FREE	FREE	FREE	FREE	FREE	13	13	13 / 13	13	13	13 / 13
Intersection DW3: Yorktown Blvd & Bay Dr/DW3	LOS	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	B	B	B	FREE	FREE	FREE	FREE	FREE	FREE	B	B	B	B	B	B
	(s/veh)	FREE	FREE	FREE	FREE	FREE	FREE	12	12	12	11	12	11	FREE	FREE	FREE	FREE	FREE	FREE	13	13	13	13	13	13
Intersection DW4: Rodd Field Rd & DW4	LOS	B	B	C	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE	C	C	D	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE
	(s/veh)	13	13	16	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE	16	16	35	N/A	N/A	N/A	N/A	N/A	FREE	N/A	N/A	FREE
* Intersection DW5: Rodd Field Rd & DW5	LOS	N/A	N/A	C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	N/A	N/A	C	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE
	(s/veh)	N/A	N/A	17	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE	N/A	N/A	22	N/A	N/A	N/A	FREE	FREE	FREE	FREE	FREE	FREE

* Signal warranted, see **Table 8**.