

Review of Crash Data

Crash data in the vicinity of the proposed project site was provided by the Ipswich Police Department (IPD) for crashes from January 1, 2019 to June 20, 2023. Based on this data, two (2) collisions occurred along Linebrook Road in the vicinity of the project site. One (1) was a rear-end collision due to driver distraction and one (1) was an angled collision due to failure to adhere to a STOP-sign. Neither collision resulted in injuries.

BSC supplemented this data utilizing the MassDOT crash database and included all crashes to October 31, 2023. In addition to the two (2) collisions mentioned by the IPD, there was one (1) collision occurring on July 22, 2023. The crash was a single-vehicle occurring at approximately 1:10am on a wet roadway. BSC calculated the segment crash rate utilizing MassDOT standards and calculated a crash rate of 1.43 crashes per million vehicle miles traveled (c/mvmt), below the Statewide crash rate of 2.98 c/mvmt for minor arterials. The crash rate worksheet is attached in the Appendix.

Review of Sight Distance Analysis

A sight distance analysis was performed by Samiotes Consultants at the proposed location of the driveway for the parking area along Linebrook Road, shown on Sheet C-1.0 of the Design Development Plan Set. The driveway will be located east of the fire apparatus driveway and will be the main driveway for cruisers and employees.

The sight distance analysis was performed in accordance with the American Association of State Highway Transportation Officials (AASHTO), the national standard. The analysis was conducted utilizing both the measured 85th percentile speed of 30mph and the Safety Zone speed limit of 20mph. According to the sight distance analysis, the expected intersection sight distance looking both left and right from the proposed driveway location meets recommended sight distances.

BSC reviewed the calculations for stopping sight distance (SSD) along the roadway, calculated utilizing a 20mph design speed, the speed limit within the Safety Zone. The calculated SSD is approximately 112 feet, which is sufficient based on existing roadway geometry. BSC calculated the SSD utilizing the 85th percentile speed of 30mph, which is approximately 200 feet. BSC recommends Samiotes provide this additional calculation on C-1.0, as well as illustrate it on the roadway graphic. For reference, Sheet C-1.0 produced by Samiotes is attached in the Appendix.

Review of On-Site Circulation

Turning templates were provided by Samiotes Consultants for the fire apparatus, shown on Sheet EX-FT of the Design Development Plan Set. The Ipswich Fire Department utilizes a 42' fire apparatus, which will be utilizing the driveway apron located along Linebrook Road.

The turning maneuvers show that the fire apparatus will be able to make a complete U-turn within the driveway apron on-site and reverse into the parking bays, as well as navigate through the parking area to the southwest, south, and east of the site without overrunning the curb or vehicle parking spaces. BSC recommends Samiotes also provide the turning maneuver template for a fire apparatus making a right-turn from Pineswamp Road to Linebrook Road with the new intersection geometry.

Parking Evaluation

A summary of the Town of Ipswich Traffic Rules and Regulations, as amended through 08/22/22, was provided by CHA with all information pertaining to either Linebrook Road or Pineswamp Road within the vicinity of the proposed site driveways. A graphic showing the location of existing parking prohibitions, as well as the location of recommended parking prohibitions, in the vicinity of the project site is attached in the Appendix.

Current Parking Prohibitions

Currently, parking is prohibited along the following roadways:

- Linebrook Road on the southerly side between Maple Avenue and the driveway to the Our Lady of Hope Parish parking lot

- Pineswamp Road on the easterly side from Linebrook Road to approximately 550 feet south of the intersection.

Recommended Parking Prohibitions

Based on the current design of the project site, including the location of the proposed driveways, BSC recommends parking be prohibited in the following locations:

- Linebrook Road on the northerly side from current end of restriction (approximately 31 Linebrook Road) to intersection of Pineswamp Road.
- Pineswamp Road on the westerly side from the intersection of Linebrook Road for approximately 200 feet south.

Site Design Evaluation

BSC has reviewed the proposed site design, including the new sidewalk along Linebrook Road, curb line along Pineswamp Road to its intersection with Linebrook Road, and crosswalk across Linebrook Road. The proposed sidewalk, which connects the new building westerly to Pineswamp Road, is approximately 5' wide, which is a sufficient width. The proposed crosswalk, which crosses Linebrook Road connecting the proposed sidewalk to the existing sidewalk, is currently designed at 5' wide. BSC recommends the crosswalk meet the minimum requirements set forth by the Manual on Uniform Traffic Control Devices (MUTCD), with a preference for the crosswalk to be approximately 8' to 10' in width. Additionally, the crosswalk should be perpendicular across Linebrook Road, providing the shortest path for pedestrians across the roadway.

In reviewing the proposed curb line along Pineswamp Road at its intersection with Linebrook Road, BSC recommends further analysis of the design, including the turn radius and proposed geometry. As currently designed, the radius is approximately 5 feet. According to the Project Development Design Guide (PDDG) provided by MassDOT, a 15-foot radius is appropriate for right-angle turns.

Conclusion and Recommendations

BSC prepared this memorandum to assess existing and future traffic conditions, as well as safety, parking, and overall site design. As part of the assessment, BSC makes the following recommendations:

1. Calculation of stopping sight distance for 30mph to be included on Sheet C-1.0 and shown on the roadway graphic.
2. Provide turning maneuver template for fire apparatus turning from Pineswamp Road to Linebrook Road eastbound with new intersection geometry.
3. Prohibit parking at the locations noted in the "Parking Evaluation" section.
4. Review of proposed intersection geometry, including curb radius and crosswalk width and orientation.

APPENDICES

APPENDIX A – CRASH RATE WORKSHEET

APPENDIX B – SIGHT DISTANCE

APPENDIX C – PARKING RESTRICTION GRAPHIC

APPENDIX A - CRASH RATE WORKSHEET

SEGMENT CRASH RATE WORKSHEET

CITY/TOWN : Ipswich COUNT DATE : June 2023

DISTRICT : 5

~ SEGMENT DATA ~

ROADWAY NAME: Linebrook Road

START POINT: Washington Street

END POINT: Kimball Avenue

FUNCTIONAL CLASSIFICATION OF ROADWAY: Urban Minor Arterial

ROADWAY DIAGRAM (LABEL ROADWAY AND CROSS STREETS)



AVERAGE DAILY TRAFFIC

SEGMENT LENGTH IN MILES (L): 0.25

AVERAGE DAILY TRAFFIC VOLUME (V): 5,105

TOTAL # OF CRASHES: 3

OF YEARS : 4.5

AVERAGE # OF CRASHES PER YEAR (A): 0.67

CRASH RATE CALCULATION : 1.43

$$\text{RATE} = \frac{(A * 1,000,000)}{(L * V * 365)}$$

Comments : Statewide Crash Rate for Minor Arterials = 2.98

Project Title & Date: _____

APPENDIX B – SIGHT DISTANCE

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LEGEND:

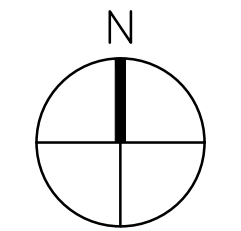
- PROPOSED VERTICAL GRANITE CURB
- PROPOSED FLUSH GRANITE CURB
- PROPOSED CAPE COD BERM
- LIMIT OF WORK
- PROPOSED SIGN
- PROPOSED CONCRETE WALKWAY
- PROPOSED TAPER FLARE
- PROPOSED DETECTABLE WARNING PANEL
- PROPOSED RAMP TYPE B
- PROPOSED RAMP TYPE A
- PROPOSED TRANSITION CURB
- PROPOSED TRANSITION CURB
- PROPOSED PARKING SPACE COUNT
- PROPOSED CHAIN LINK FENCE WITH PRIVACY SLATS
- PROPOSED GRAVEL
- BITUMINOUS CONCRETE PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- PROPOSED CONCRETE PAVERS (DETAILS BY OTHERS)
- PROPOSED LIGHT DUTY CONCRETE PAVING
- PERMEABLE GRASS PAVER
- OFF-SITE WORK BY OTHERS
- PROPOSED PARKING SPACE COUNT

1 inch = 20 feet



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Project Number

Project Title
 Ipswich Public Safety Building

36 Linebrook Rd,
 Ipswich, MA 01938



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 Civil Engineers - Land Surveyors
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 www.samiotes.com

Drawing Title
SIGHT STOPPING DISTANCE PLANS

Date/Issued For
 06.30.23
 DESIGN DEVELOPMENT

Scale
 1"=20'

Drawn By
 DJS

Drawing Number
C-1.0

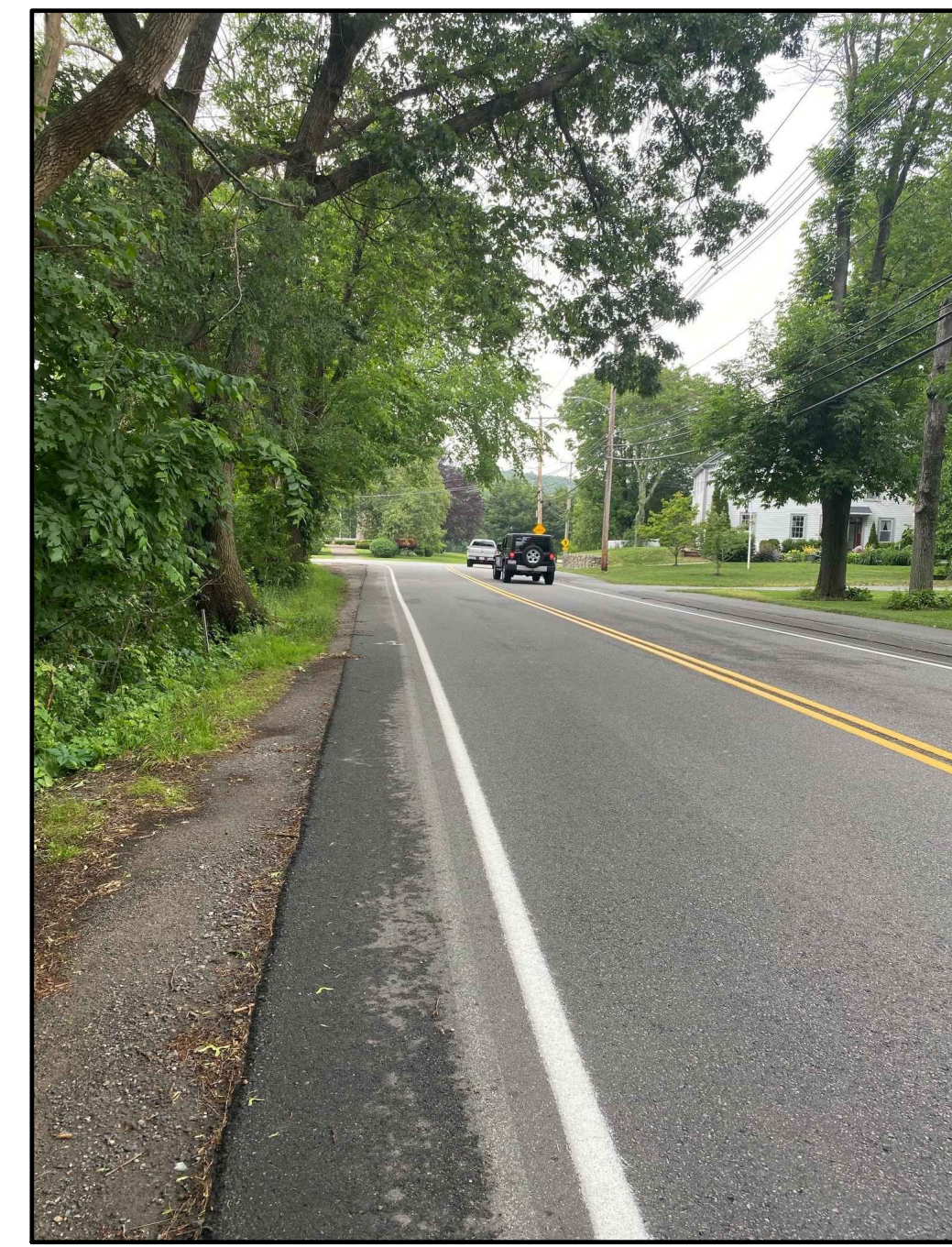
INTERSECTION STOPPING DISTANCE CHARTS

LEFT TURN AFTER STOP				RIGHT TURN AFTER STOP			
U.S. Customary				U.S. Customary			
Design Speed (mph)	Stopping Sight Distance (ft)	Intersection Sight Distance for Passenger Cars		Design Speed (mph)	Stopping Sight Distance (ft)	Intersection Sight Distance for Passenger Cars	
		Calculated (ft)	Design (ft)			Calculated (ft)	Design (ft)
15	80	165.4	170	15	80	143.3	145
20	115	220.5	225	20	115	191.1	195
25	155	275.6	280	25	155	238.9	240
30	200	330.8	335	30	200	286.7	290
35	250	385.9	390	35	250	334.4	335
40	305	441.0	445	40	305	382.2	385
45	360	496.1	500	45	360	430.0	430
50	425	551.3	555	50	425	477.8	480
55	495	606.4	610	55	495	525.5	530
60	570	661.5	665	60	570	573.3	575
65	645	716.6	720	65	645	621.1	625
70	730	771.8	775	70	730	668.9	670
75	820	826.9	830	75	820	716.6	720
80	910	882.0	885	80	910	764.4	765

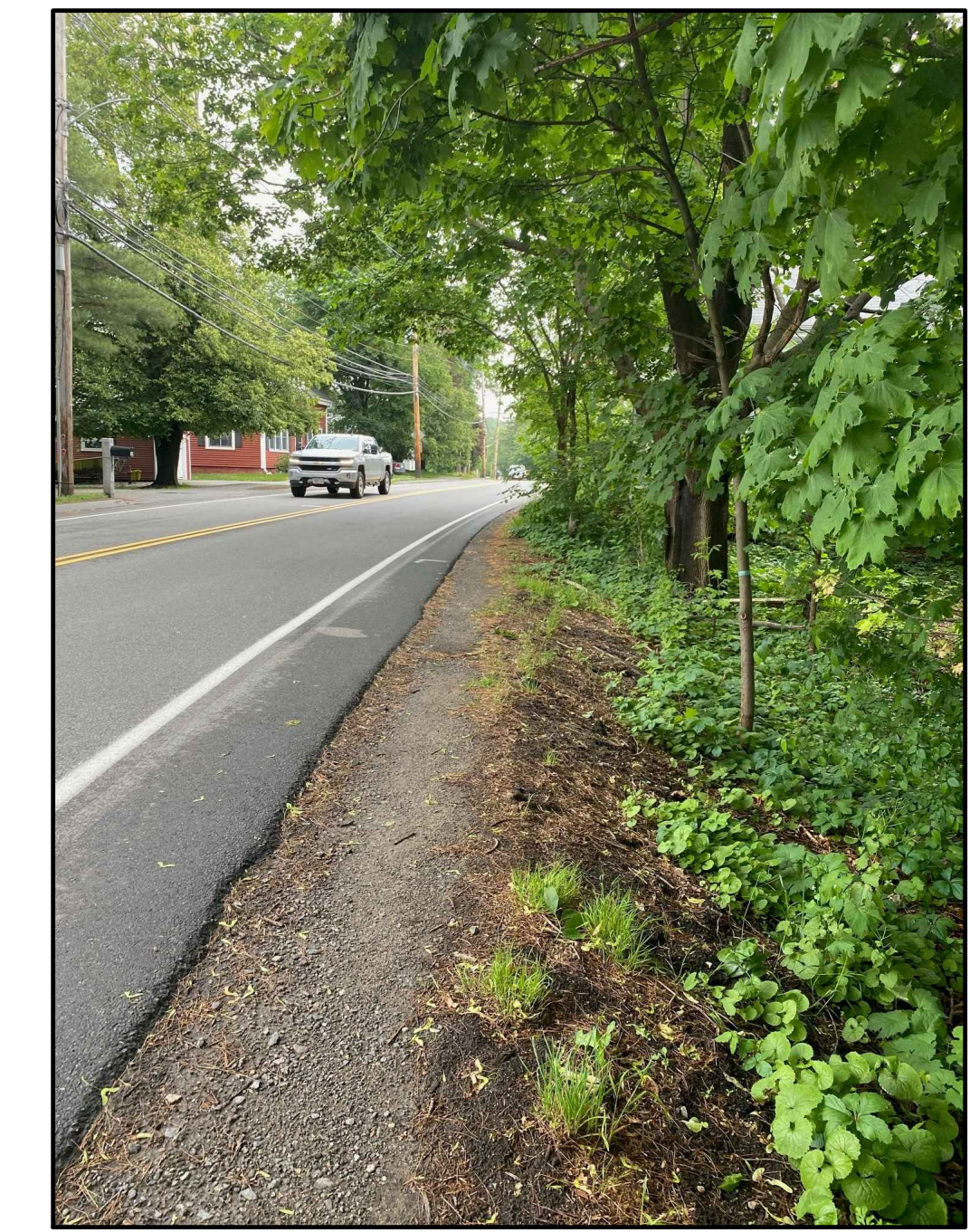
INTERSECTION SIGHT DISTANCE (ISD) FORMULA:
 $ISD = 1.47 \cdot (V) \cdot (T)$
 V = DESIGN SPEED (MPH)
 T = TIME GAP FOR MAJOR ROADS (SECONDS) (SEE TABLE)
 $220.5 = 1.47 (20MPH) (7.5SEC)$

STOPPING SIGHT DISTANCE (SSD) FORMULA:
 $SSD = 1.47(V)(T) + 1.075(V^2/A)$
 V = DESIGN SPEED (MPH)
 T = BREAK REACTION TIME (2.5 SECONDS)
 $111.9 = 1.47(20)(2.5) + 1.075((20^2)/11.2)$

SOURCE: (A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS; 2018, 7TH EDITION)

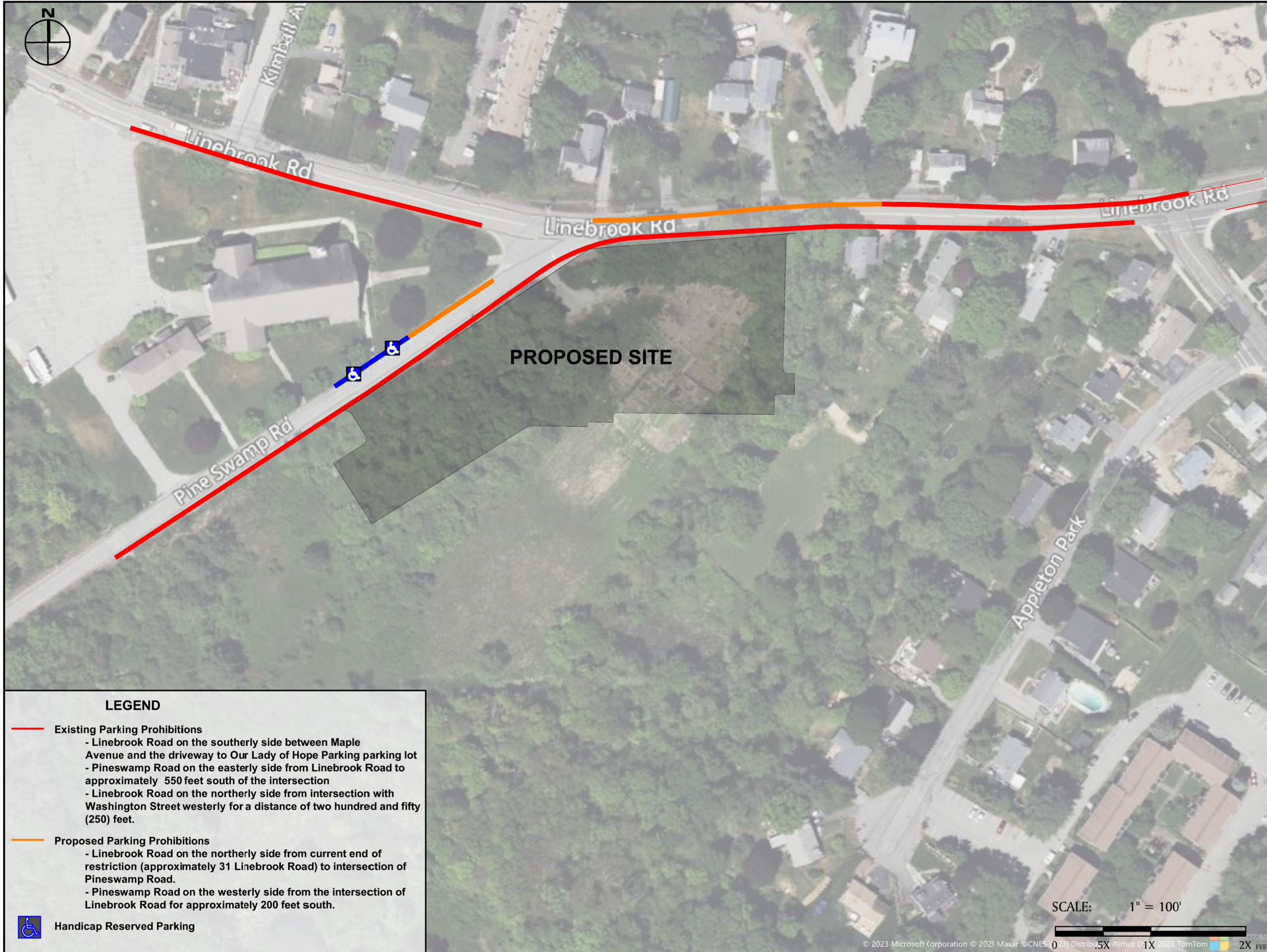


LEFT VIEW FROM DRIVE EXIT



RIGHT VIEW FROM DRIVE EXIT

APPENDIX C – PARKING RESTRICTION GRAPHIC



**IPSWICH PUBLIC
SAFETY BUILDING**

LINEBROOK ROAD

**IPSWICH
MASSACHUSETTS**

**ON-STREET PARKING
PROHIBITIONS**

NOVEMBER 2023

LEGEND

- Existing Parking Prohibitions
 - Linebrook Road on the southerly side between Maple Avenue and the driveway to Our Lady of Hope Parking parking lot
 - Pineswamp Road on the easterly side from Linebrook Road to approximately 550 feet south of the intersection
 - Linebrook Road on the northerly side from intersection with Washington Street westerly for a distance of two hundred and fifty (250) feet.
- Proposed Parking Prohibitions
 - Linebrook Road on the northerly side from current end of restriction (approximately 31 Linebrook Road) to intersection of Pineswamp Road.
 - Pineswamp Road on the westerly side from the intersection of Linebrook Road for approximately 200 feet south.

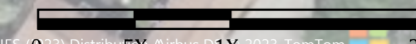
Handicap Reserved Parking

PREPARED FOR:
TOWN OF IPSWICH
 25 GREEN STREET
 IPSWICH, MA 01938



803 Summer Street
 Boston,
 Massachusetts 02127
 617 896 4300

SCALE: 1" = 100'



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Job No.: 010049500.00 Date: NOVEMBER 2023
 Scale: 1" = 100' Revised: _____
 Dwg No: _____
 File: _____