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# Opportunity Site

Traffic and Transportation Analysis – SUMMARY REPORT

City of Brooklyn Center, MN

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**Submitted by:**

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# **Opportunity Site Traffic and Transportation Analysis Summary Report**

## **I. Study Introduction**

The City of Brooklyn Center is in the process of planning for the redevelopment of the Opportunity Site, including establishing a master plan for the area. The Opportunity Site includes approximately 81 acres and is located in the City of Brooklyn Center. See Figure 1 for study area, study roadways, and study intersections.

This summary version of the full report is intended to convey the key elements of the full Traffic and Transportation Analysis Report.

The purpose of this study is to analyze the traffic and transportation impacts associated with the development of the Opportunity Site. For this analysis, the following scenarios were evaluated:

- 2020 Existing Conditions,
- 2022 Opening Year No Build,
- 2042 Future Year No Build,
- 2022 Opening Year Phase 1,
- 2022 Opening Year Full Development, and
- 2042 Future Year Full Development.

## **II. Study Observations**

The following pages and attached exhibits summarize the findings of the analysis. Some general observations were made while performing the analysis and reviewing the results.

### General

The modeling software considers all intersections and adjusts signal timing and signal operations based on the strategy that allows the entire network to operate at the highest level. This can vary from scenario to scenario, which can result in operational characteristics which may not appear to be intuitive.

Based on historic and projected traffic levels in the area, the proposed development activities appear to result in bringing traffic in the area back to pre-recession levels.

The Phase 1 development uses are less intense than previously considered. As a result, Bass Lake Road and the south portion of Shingle Creek Parkway operate efficiently, including the intersection of the two roadways.

### Specific

Summit Drive, immediately east of TH 100, has approximately 700 feet of stacking distance between TH 100 and the stop controlled intersection at Earle Brown Drive. Modeling indicates the longest queue length is 75 feet during the AM peak hour and 100 feet during the PM peak hour.

2020 Existing Conditions to 2022 No Build. Improvements to Brooklyn Boulevard, combined with signal timing adjustments, improve conditions throughout the study area.

2022 No Build to 2042 No Build. By 2042, the intersection at TH 100 and Brooklyn Boulevard will begin to experience stress. Shingle Creek Parkway and Bass Lake Road will continue to operate

efficiently, with some individual movements becoming difficult in the PM peak hour.

2022 Opening Year Phase 1. The Earle Brown Drive and Summit Drive intersection is shown to experience stress during the PM peak hour. This clears up in later scenarios, as better operations occur on the surrounding roadways.

2022 Opening Year Phase 1 to 2022 Opening Year Full Development. Operations adjustments to traffic signals indicate Bass Lake Road has a better coordinated system. The more intense development-related traffic generators have shifted to the north based on the current master plan documents, adding stress to the intersections on the northern portion of the site.

2022 Opening Year Full Development to 2042 Future Year Full Development. The south portion of Shingle Creek Parkway and Bass Lake Road operate efficiently. The background growth, combined with the development on the north portion of the site, will cause delays along the north portion of Shingle Creek Parkway.

2022 Full Development Mitigation 1. Allows the internal and external roadways to operate efficiently.

2042 Full Development Mitigation 1. Adding the background growth begins to stress individual movements throughout the roadway network. All intersections continue to operate at LOS D or better.

### III. Existing Conditions

#### Existing Roadway Capacity

An analysis was performed to review the existing roadway capacities for Shingle Creek Parkway and Bass Lake Road. These are two critical roadways which will provide access to the site. Our findings are as follows:

- The existing traffic capacity along Shingle Creek Parkway is between 26,900 and 32,200 vehicles per day based upon the existing roadway typical section. The volume to capacity ratio is 0.28 to 0.33.
- The existing traffic capacity along Bass Lake Road is between 26,900 and 32,200 vehicles per day based upon the existing roadway typical section. The volume to capacity ratio is 0.50 to 0.60.

A volume to capacity ratio less than 0.85 is considered acceptable. Each of these roadways currently has an acceptable capacity.

#### Traffic Counts

Twenty-four hour turning movement counts were completed in February and March of 2020 at 17 intersections.

During initial meetings with Hennepin County, MnDOT and the City of Brooklyn Center, it was decided that the Brooklyn Boulevard/TH 100 NB ramps and the 57th Ave N/Logan Avenue intersections be added to the study. Due to the atypical traffic patterns associated with COVID-19, traffic count collection ceased, and these intersections were not included in the study.

## Crash Analysis

State crash data for the last three complete years (2017-2019) was reviewed.

- No fatal collisions occurred over the 3-year period at any of the studied intersections.
- There were 5 serious injury collisions.
- Two intersections have an observed crash rate greater than the critical rate:
  - Brooklyn Boulevard & Bass Lake Road, and
  - Humboldt Avenue North & Freeway Boulevard.
- The remaining intersections are operating within the expected range.

Based on the data, this appears to be more of a local road issue. If the total crashes would be reduced by 4 over a three-year period, they would fall back into the normal range. We recommend monitoring the crashes and performing additional analyses if the crash rate remains high. Sight lines, gaps, and lighting should be reviewed.

See Figure 2 for crash related information.

## Existing Traffic Operations Analysis

Operational analysis results are described as a Level of Service (LOS) ranging from A to F. LOS A through D is commonly taken as an acceptable design year LOS. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delay.

The control delay was modeled using Synchro and SimTraffic, a traffic analysis software program designed by Trafficware.

The Existing Conditions traffic operations analysis models the 2020 roadway geometry, including the TH 100 southbound ramp to John Martin Drive with the existing traffic volumes.

All the intersections in the existing conditions operate at an acceptable LOS. Some individual movements reach LOS E and LOS F, however, the intersections only reach LOS C. See Figure 3.

NOTE: The 2020 existing conditions model utilizes the Hennepin County signal timing plans provided. Signal timings are “optimized” in the 2022 and 2042 scenario models for the coordinated systems using Trafficware Synchro methodology to improve overall traffic operations. Individual movements (left turn, right turn, and thru) and overall intersection delays may be shown to increase or decrease as a result of the optimization. Additionally, traffic forecasts developed for the study area are influenced by historical growth rates and planned development. Area growth is distributed within the roadway network based upon trip patterns identified in the study report. This distribution will occur unevenly throughout the study area, further impacting each individual intersection.

## IV. Traffic Forecast

To obtain a historical view of the traffic volumes on Shingle Creek Parkway and Bass Lake Road, the previous years’ traffic count volumes according to the MnDOT were compared.

The daily traffic volumes have decreased on Shingle Creek Parkway from 1997 to 2019. During the same period, the daily traffic volumes on Bass Lake Road initially decreased, but by 2019 there was an overall slight increase. See Figure 4 for traffic volume information.

For the future scenarios (other than existing), the John Martin Drive ramp was assumed to be closed. The John Martin Drive closure included the southbound TH 100 exit, along with the bridge crossing over TH 100. In the model, the southbound TH 100 traffic was routed to Bass Lake Road. The February 2020 Brooklyn Boulevard conditions were used for the existing conditions model. All other scenarios include the Brooklyn Boulevard geometrics as depicted in the Layout found at: <http://www.cityofbrooklyncenter.org/DocumentCenter/View/8038>

There is a proposed low volume right-in/right-out access proposed along Shingle Creek Parkway, approximately 400 feet north of Bass Lake Road. We recommend a right turn lane be added for the right-in/right out, along with modifying the right turn lane for the signalized intersection north of Bass Lake Road. See Figure 5, Phase 1 Recommended Construction.

### **Background Traffic Growth**

The Hennepin County growth factor and historical AADT traffic data provided by MnDOT were used to determine growth rates. The expected growth rates range from 0.50% to 1.16%, with the largest increase anticipated on Brooklyn Boulevard.

### **No Build Traffic Operations Analysis**

The No Build traffic operations models considers only the background traffic growth without any development traffic.

The roadway geometry for the opening year 2022 and design year 2042 no build models assume the southbound TH 100 ramp at John Martin Drive is closed. This places additional stress on Bass Lake Road and Shingle Creek Parkway, as motorists attempt to access the Opportunity site by alternate routes. While the ramp may remain open if no development occurs, the ramp was closed for comparison to the development scenarios.

All intersections in the opening year 2022 No Build analysis operate within an acceptable LOS. See Figure 6 for 2022 No Build information.

All intersections in the future year 2042 No Build analysis operate within an acceptable LOS.

- The Brooklyn Boulevard and TH 100 intersection reaches LOS D in the PM peak hour.
- The Brooklyn Boulevard and TH 100 southbound thru movement reaches LOS F during the PM peak hour.
- Several other movements reach LOS E during the PM peak hour.

See Figure 7 for 2042 No Build information.

### **Opportunity Site Trip Generation**

The Opportunity site is anticipated to have multiple access points to the existing roadway network, much like the current site.

Trip generation estimates for the Opportunity Site were determined using historical traffic data, in conjunction with the provided development strategies, and methods provided by the Institute of Transportation Engineers (ITE), Trip Generation Manual, 10th Edition.

Development trips were distributed based on current traffic patterns in the area along with expected traffic distribution to the site.

## V. Opportunity Site Development Traffic Operations Analysis

The following development models use the forecasted traffic volumes, combined with the estimated trip generation volumes, to analyze future traffic operations. All of the future traffic modeling scenarios assume the southbound TH 100 and John Martin Ramp is closed. The modeling also assumes traffic signal systems are optimized.

### 2022 Opening Year Phase 1

All intersections operate within acceptable LOS, with several individual movements reaching LOS E. The modeling indicates the eastbound movement for internal site intersection of Summit Drive and Earl Brown Drive becomes difficult during the PM peak hour. This will most likely result in vehicles using alternative access locations. See Figure 8.

### 2022 Opening Year Full Development

The Shingle Creek Parkway and Summit Drive North intersection operates at LOS D during the PM peak hour. The PM peak hour northbound thru and westbound right movements reach LOS E.

The Summit Drive North and Earle Brown Drive intersection (east of Shingle Creek Parkway) operates at LOS F during the PM peak hour. The PM peak northbound and southbound left/thru/right movements reach LOS F, as they have difficulty accessing Summit Drive. During the PM peak hour, traffic backs up on Summit Drive N from Shingle Creek Parkway to the Earle Brown Drive/ Target Access. The large westbound right movement from Summit Drive N to Shingle Creek Parkway backs into the large southbound right from Earle Brown Drive/Target Access to Summit Drive N. See Figure 9.

### 2042 Future Year Full Development

The Shingle Creek Parkway and Summit Drive N intersection operates at LOS E during the PM peak hour. The eastbound thru movement and westbound right turn movement operate at LOS E, while the northbound thru and right movements operate at LOS F during the PM peak hour. Traffic on Summit Drive N backs from Shingle Creek Parkway into the adjacent Summit Drive N and Earle Brown Drive intersection, east of Shingle Creek Parkway. Extended queues from the westbound right turn movement at the Summit Drive N and Shingle Creek Parkway intersection back into and perpetuate the southbound right turn delays and queuing at the Summit Drive N and Earle Brown Drive intersection. The Summit Drive N and Earle Brown Drive intersection operates at LOS F during the PM peak hour.

While surrounding intersections operate at LOS D or better, some individual movements reach LOS E and F. See Figure 10.

## VI. Mitigation

Roadway improvement options to mitigate the impacts associated with the proposed development are recommended. The traffic operations analysis identifies intersections that operate outside of the acceptable level of service, primarily during the PM peak hour.

The mitigation strategies will be required at some point between complete Phase 1 development and full build out of the site. See Figure 11 for a depiction of the improvements.

### **Mitigation 1**

Mitigation 1 is recommended once development begins occurring beyond the Phase 1 improvements.

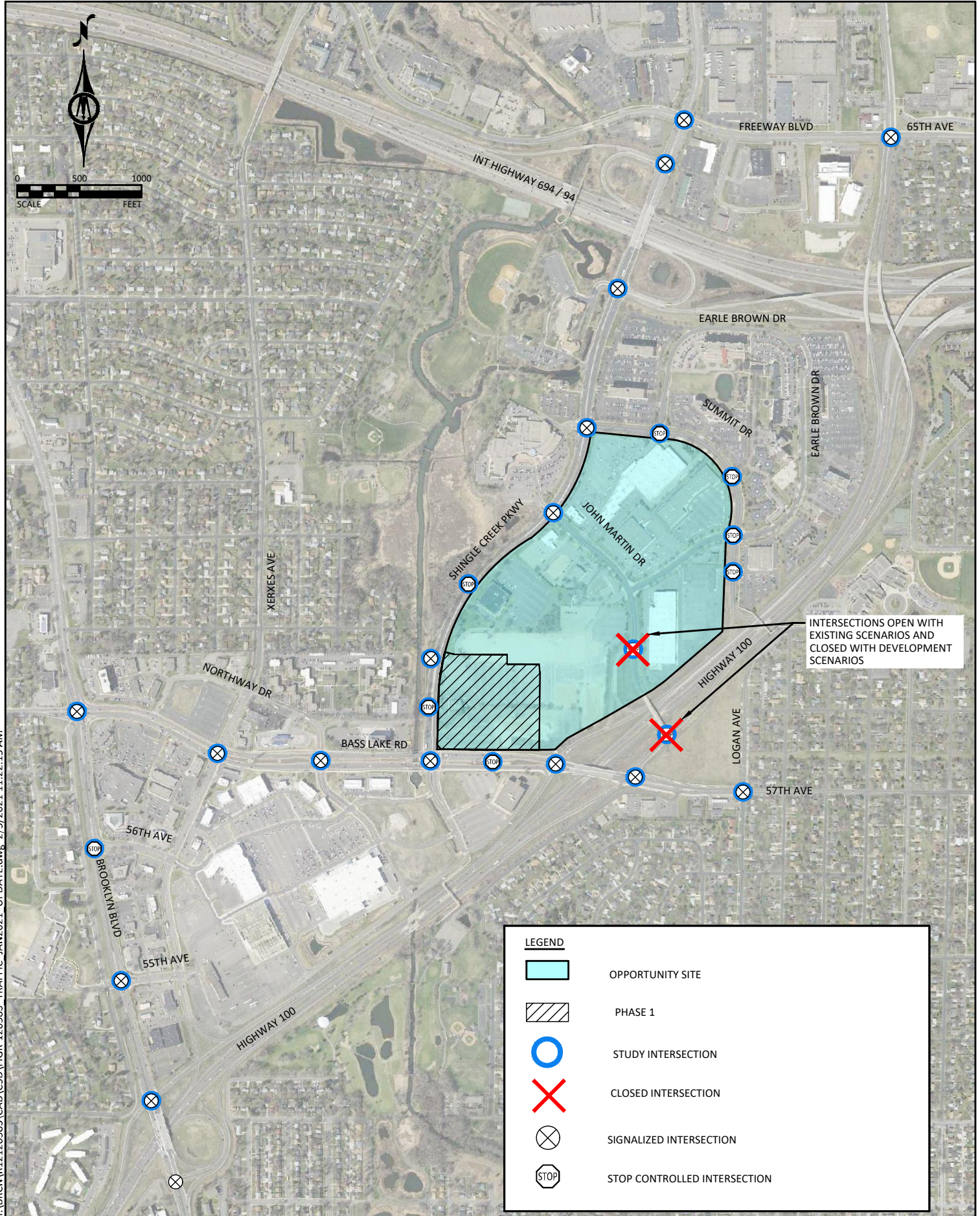
- 1) Construct a westbound channelized right turn lane at the Shingle Creek Parkway and Summit Drive N intersection. Construct an acceleration lane that continues into the existing northbound right turn lane to I94 eastbound ramp.
- 2) Install a traffic control signal at the Summit Drive N and Earle Brown Drive intersection, east of Shingle Creek Parkway.

The construction of a westbound channelized right turn lane on Summit Drive N at Shingle Creek Parkway will decrease the westbound queue and allow more signal time to be given to the northbound and southbound movements at the intersection. The additional acceleration lane will match into the existing northbound right turn lane to the I-94 entrance ramp. The channelized right turn with acceleration lane moves the merging point of northbound thru and westbound right traffic north of the intersection and keeps traffic flowing. Installation of a traffic signal at the Summit Drive N and Earle Brown Drive intersection will allow the side street traffic from Earle Brown Drive and the future development access to enter Summit Drive N.

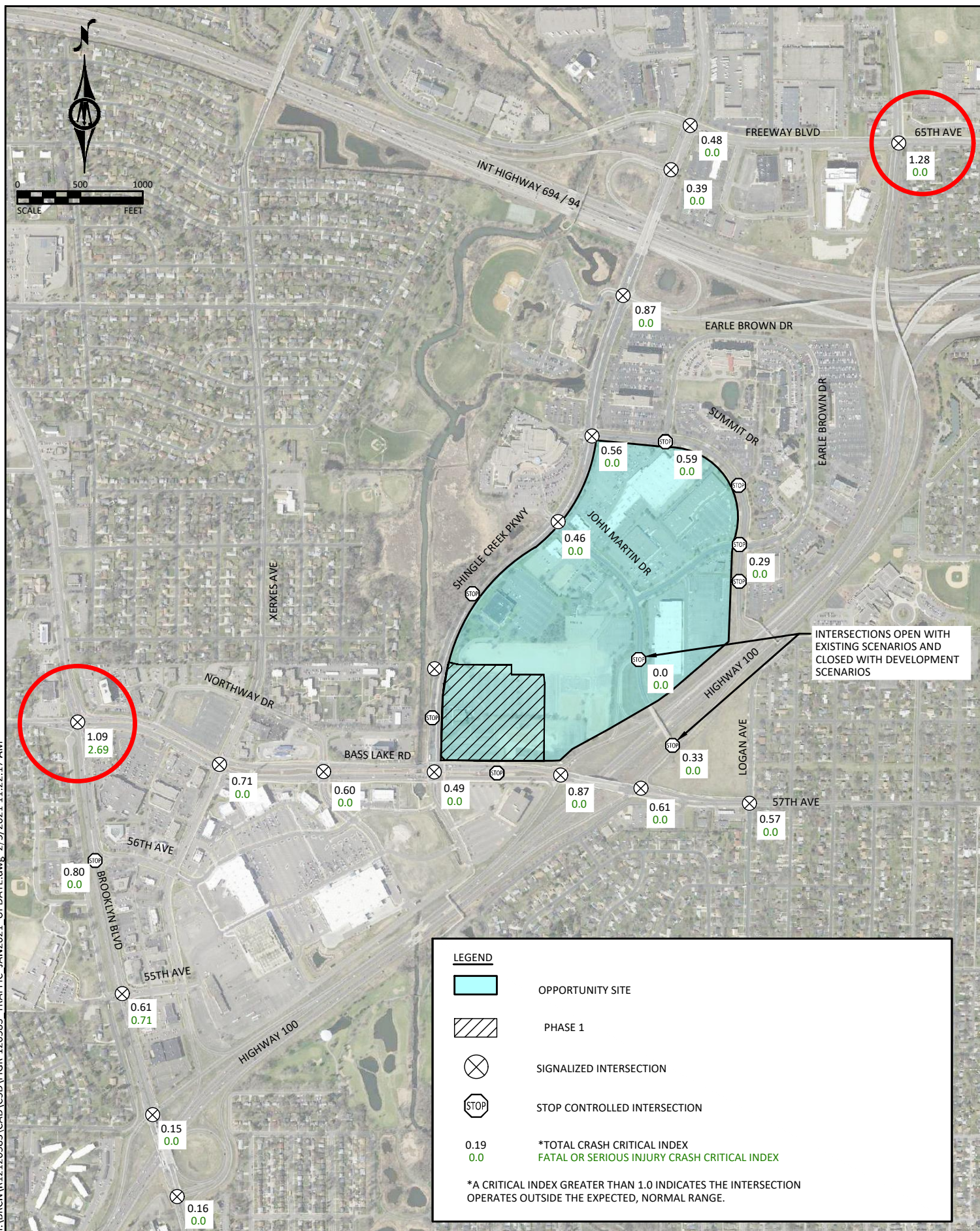
Figures 12 and 13 show the intersection Levels of Service based on implementation of the Mitigation 1 strategies for 2022 and 2042. In 2022, with the improvements constructed, all intersections operate at Level of Service C or better. In 2042, Summit Drive begins to see stress, but all intersections operate at LOS C or better, while the TH 100 and I 94 ramps have LOS D in the PM peak hour.

**Appendix**  
**Opportunity Site – City of Brooklyn Center, MN**  
**Traffic and Transportation Analysis**  
**Summary Report Figures**

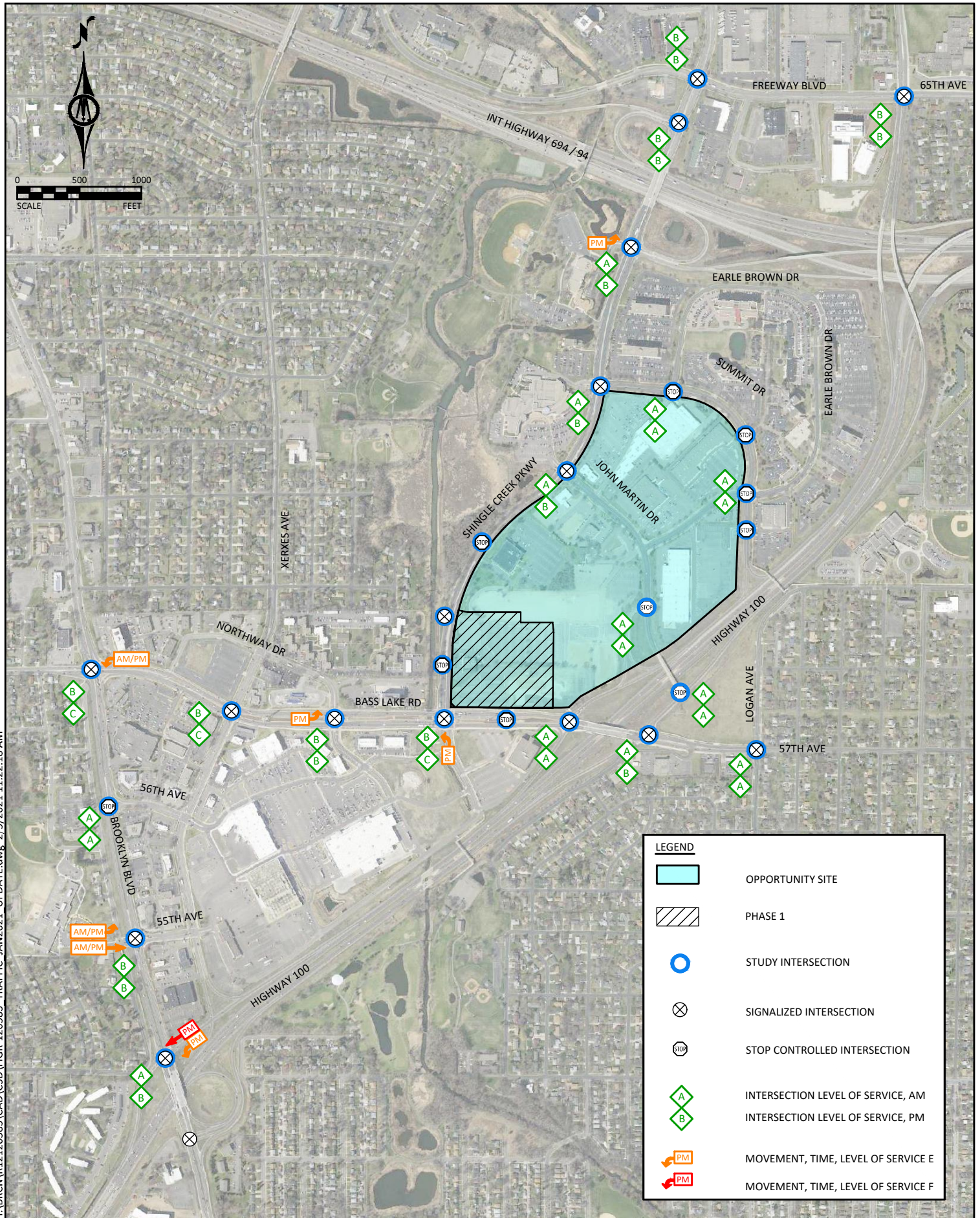














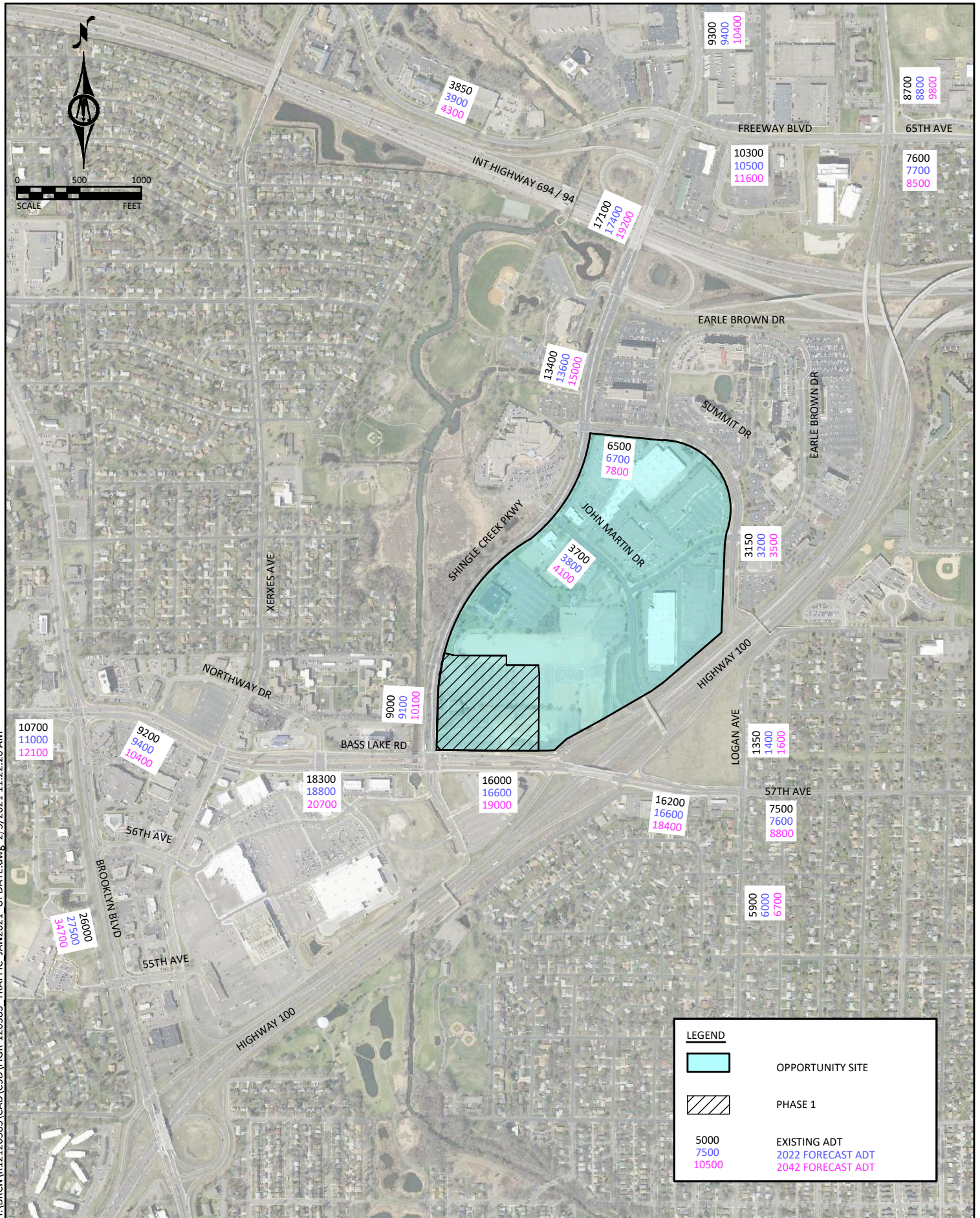
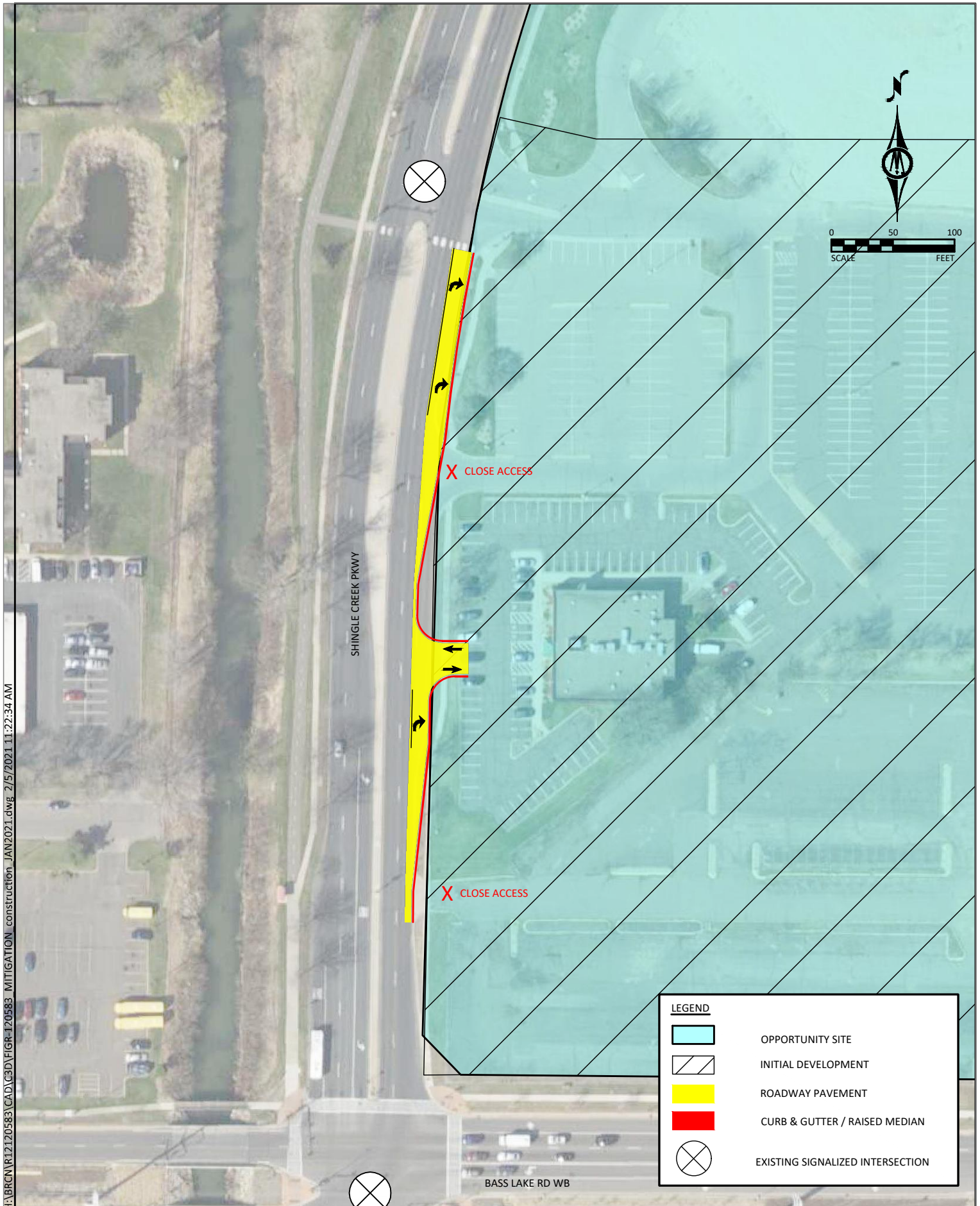
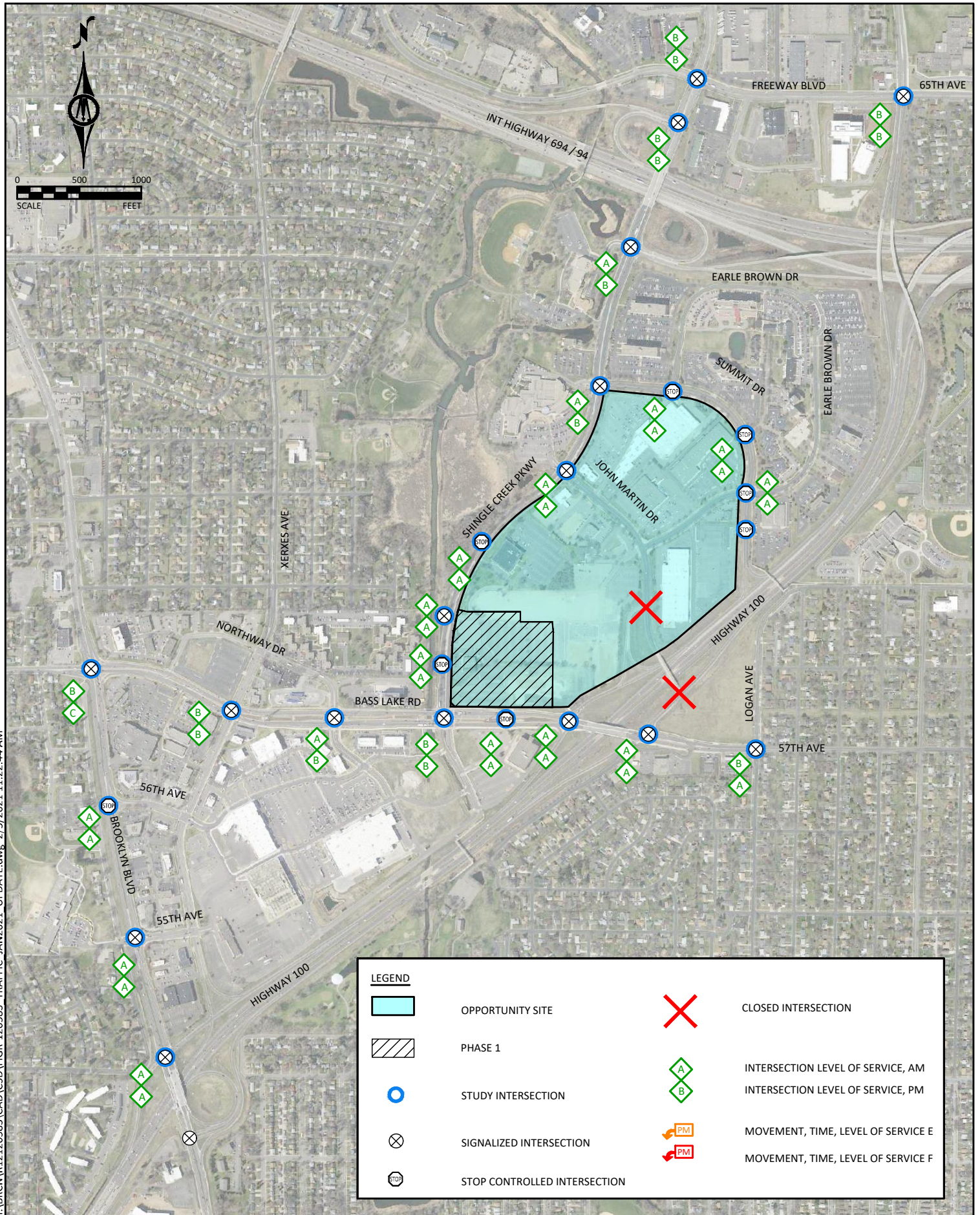




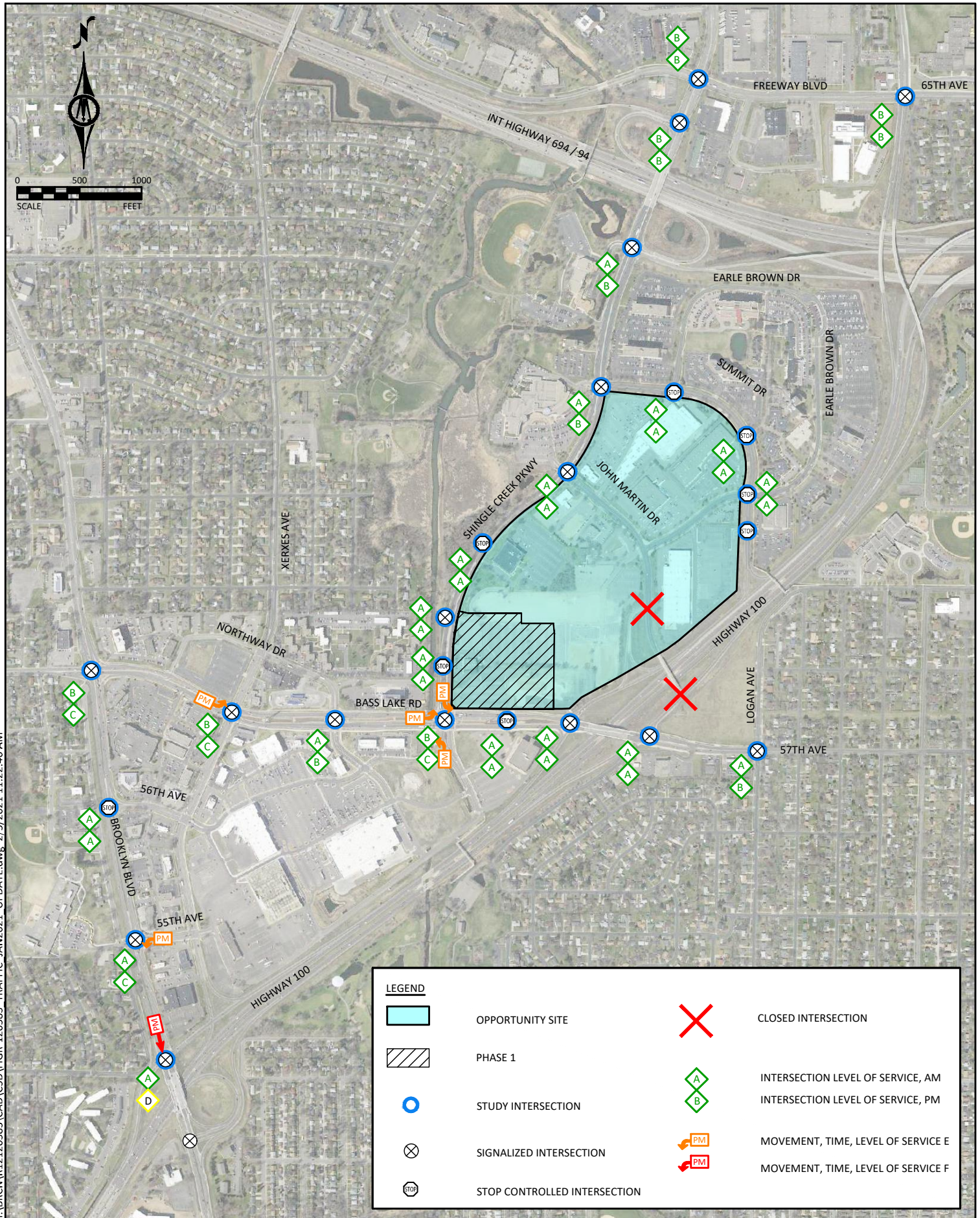
FIGURE 5













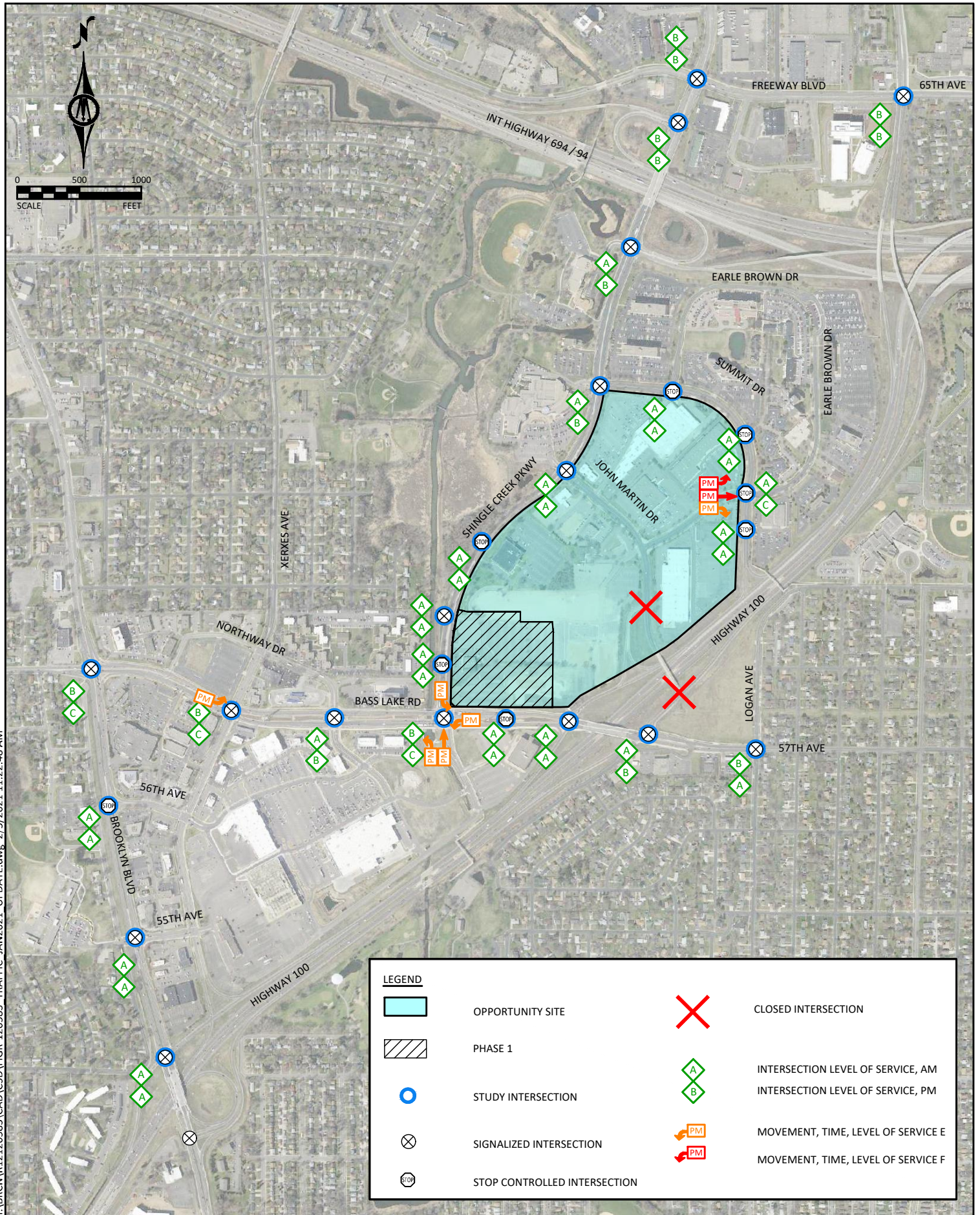




FIGURE 9

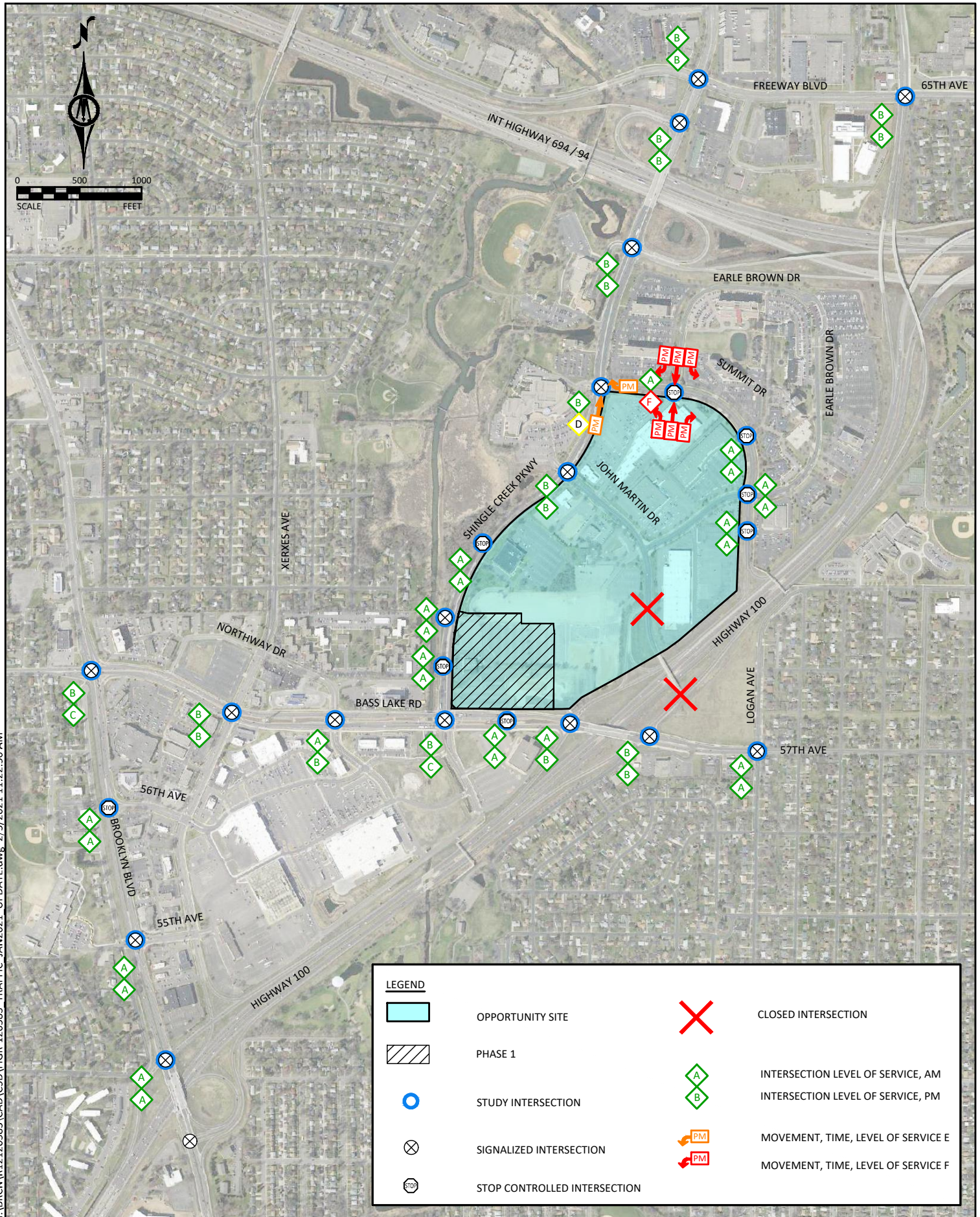
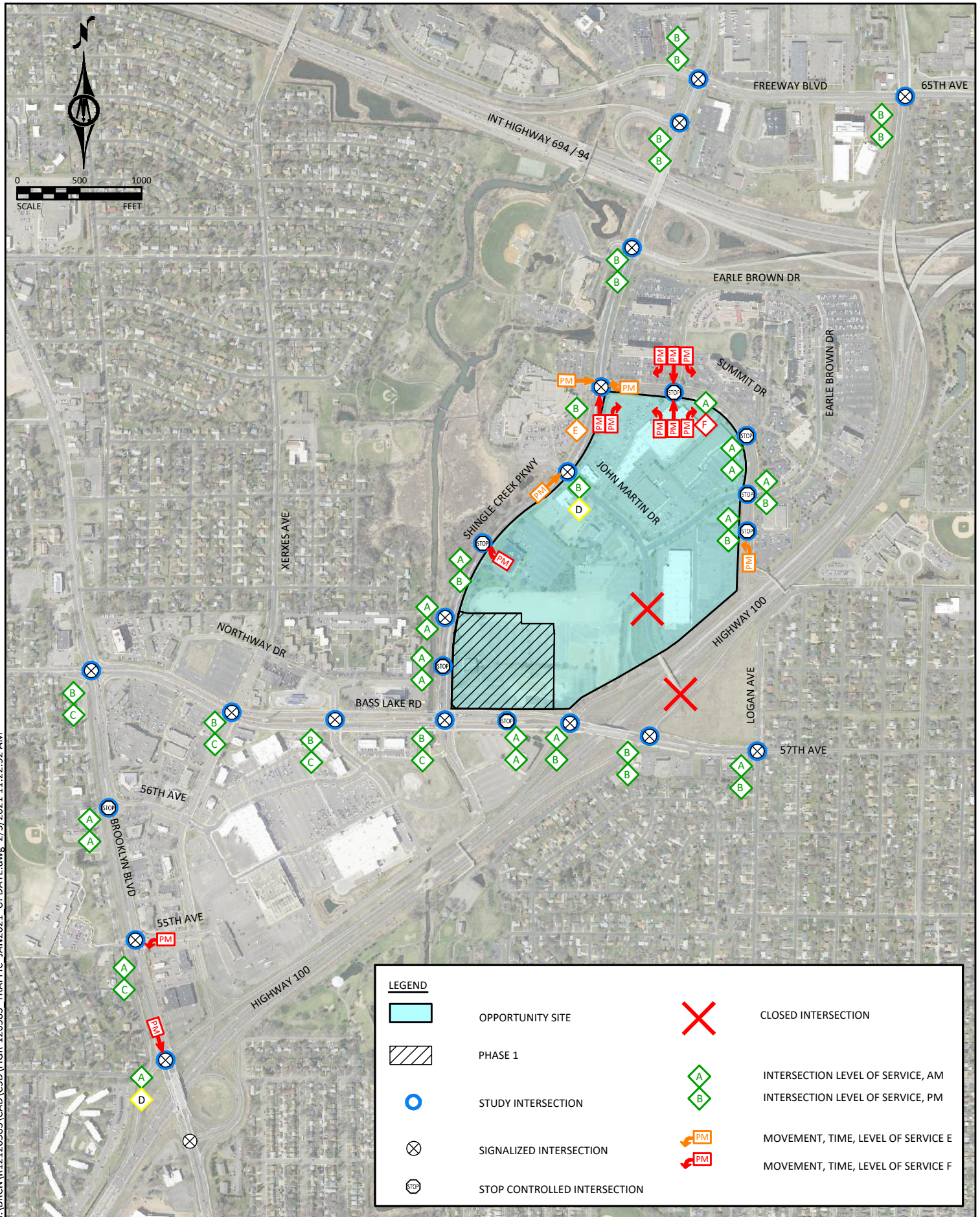




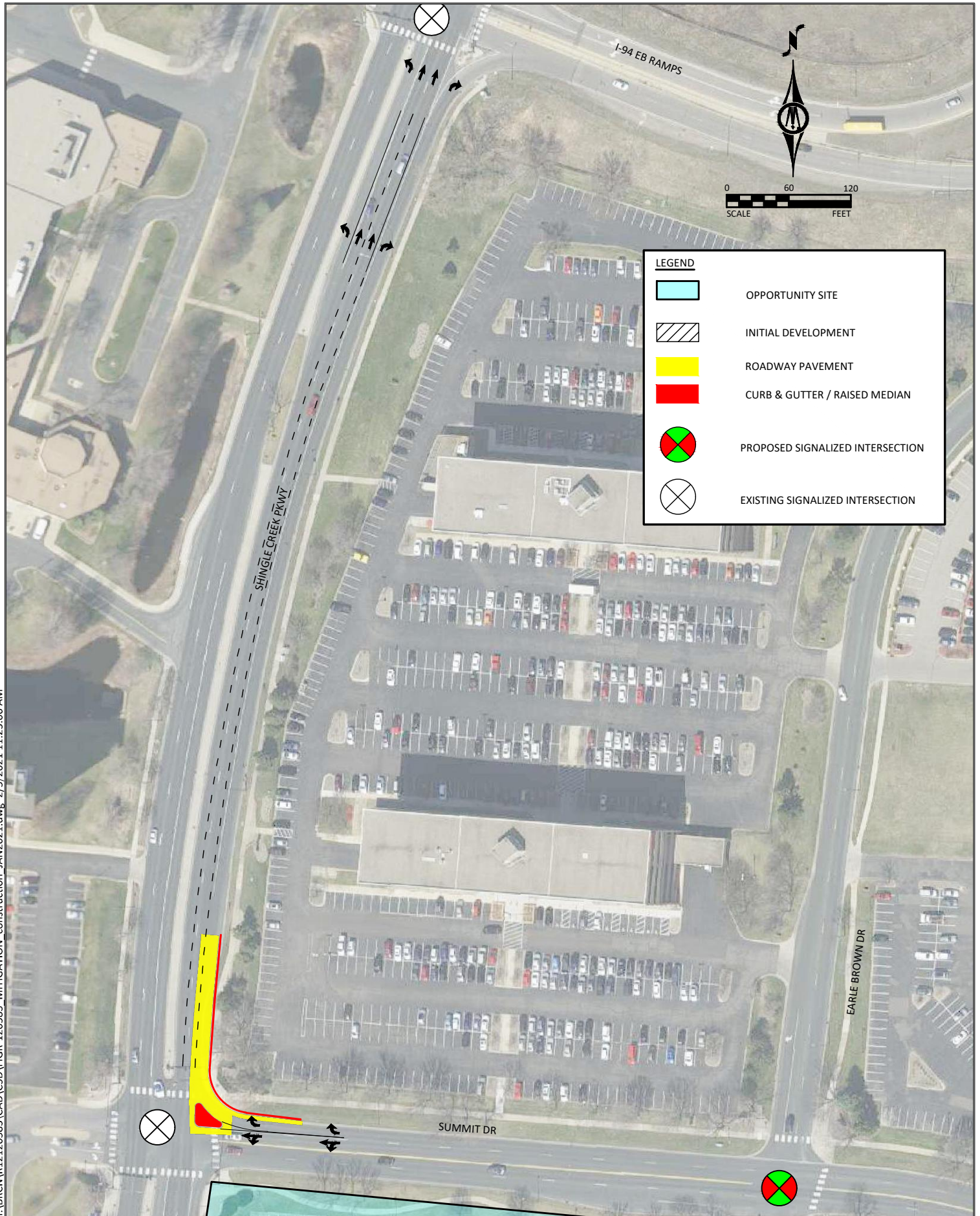
FIGURE 10



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FIGURE 11





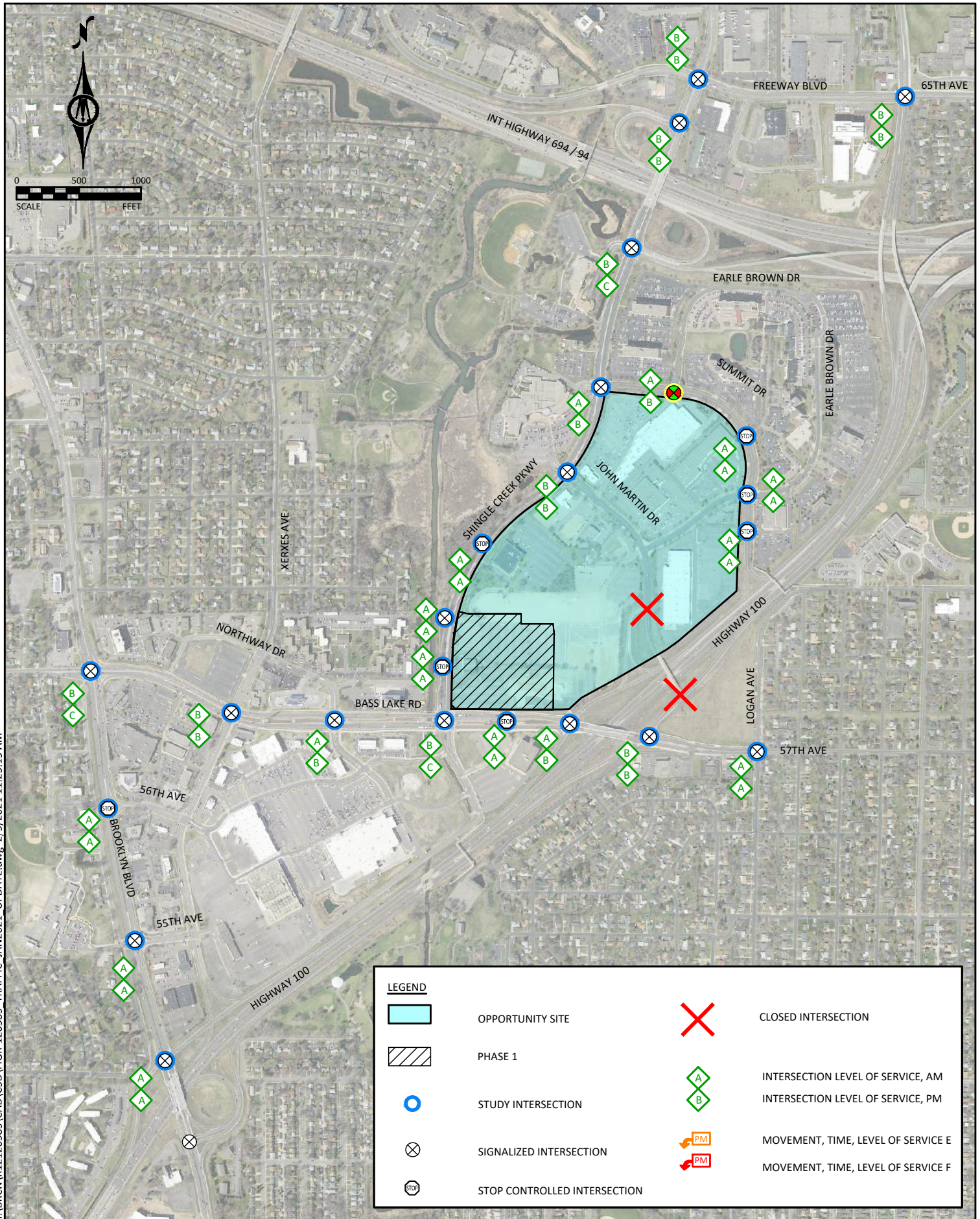
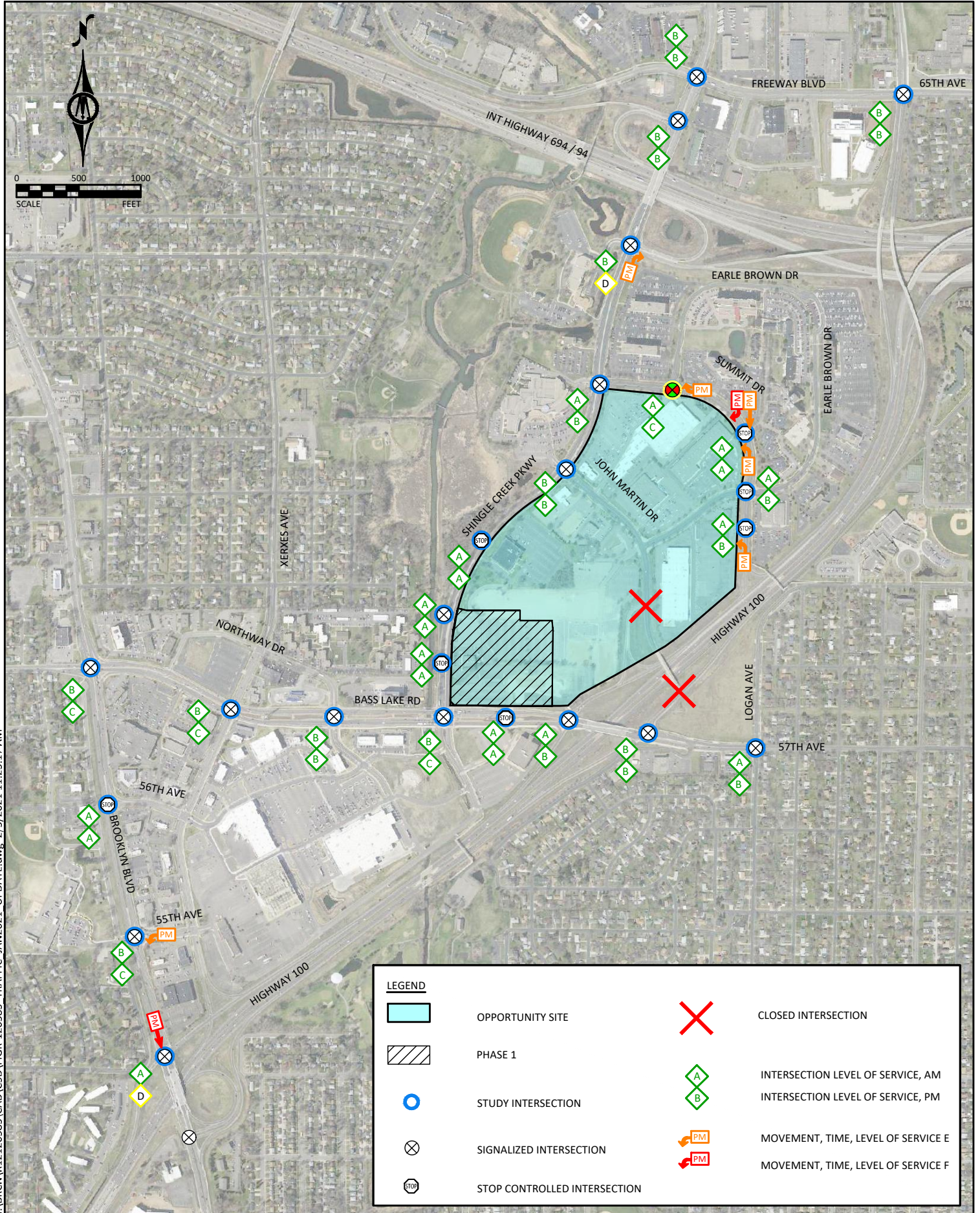




FIGURE 13



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