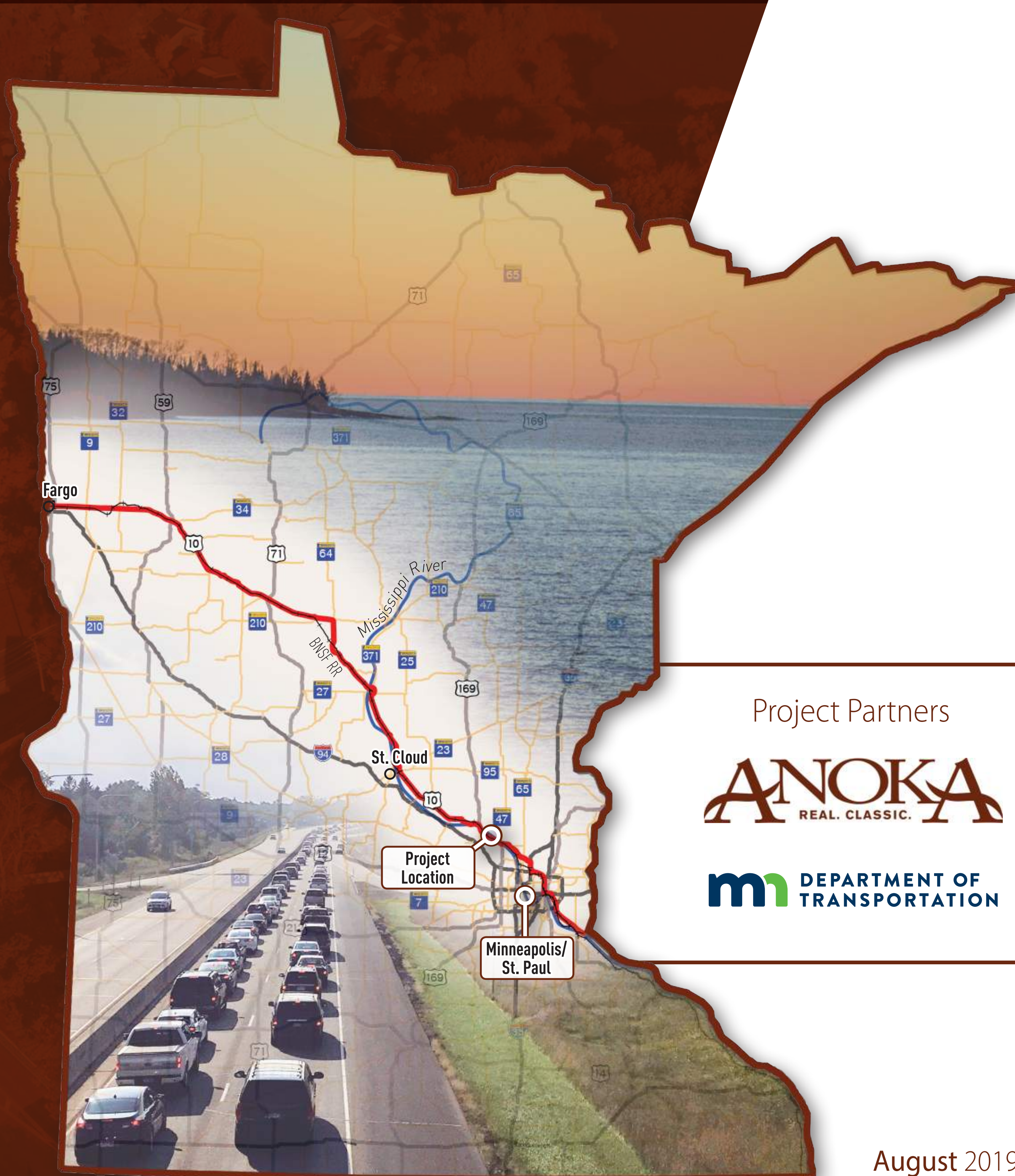
Anoka Highway 10/169 Improvement Project

Environmental Assessment/Environmental Assessment Worksheet (EA/EAW)



Project Partners

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mn DEPARTMENT OF TRANSPORTATION

August 2019

ENVIRONMENTAL ASSESSMENT/ ENVIRONMENTAL ASSESSMENT WORKSHEET

Trunk Highway 10/169
State Project: S.P. 0202-108, 103-010-018
Minnesota Project: Not yet available

From Anoka/Ramsey City Limit to Approx. 0.25 mile east of Main St Interchange in
City(ies): Anoka, in County(ies): Anoka, Minnesota
Section(s), Township(s), Range(s):
Sections 1, 2, T31N, R25W
Section 35, T32N, R25W
Submitted pursuant to 42 U.S.C. 4332 **and M. S.** 116D
By the
U.S. Department of Transportation
Federal Highway Administration and
Minnesota Department of Transportation
for

Reconstruction of an approximately 2.4 kilometer (1.5 mile) segment of an existing four-lane Roadway, replacement of two traffic signals with an interchange and an overpass, and reconstruction of one interchange.

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Recommended for approval by:

July 30, 2019

City of Anoka – Engineering — Date

Recommended for approval by:

Aug 7, 2019

MnDOT – Metro District Director of Program Delivery — Date

Approved by:

8-12-19

MnDOT – Chief Environmental Officer — Date

Approved by:

William R Lohr — Aug 14, 2019

FHWA – Program Development Engineer — Date

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1. Report Purpose

This Environmental Assessment (EA) provides background information for the proposed road construction project on US Trunk Highway 10/169 (Hwy 10/169) in the city of Anoka, Minnesota. This environmental assessment documents:

- Need for the proposed project;
- Alternatives considered and the preferred alternative;
- Environmental impacts and mitigation; and
- Public and agency coordination efforts.

This EA was prepared to comply with the National Environmental Policy Act (NEPA) process and also the state of Minnesota environmental review process. The EA fulfills requirements of 42 USC 4332 and M.S. 116D. From a federal perspective, the EA provides environmental documentation to determine the need for an Environmental Impact Statement (EIS) or whether a Finding of No Significant Impact (FONSI) is appropriate.

This document also incorporates the elements of a state Environmental Assessment Worksheet (EAW) that complies with Minnesota Rules, part 4410.1300. This rule allows the EA to take the place of the EAW form provided that the EA addresses all issues identified in the EAW form.

The City of Anoka is the proposer for this project. The Minnesota Department of Transportation (MnDOT) is the Responsible Governmental Unit (RGU) for the project. EAW preparation is mandatory under Minnesota Rules, part 4410.4300. This EA is made available for public review and comments in compliance with requirements of 23 CFR 771.119 (d) and Minnesota Rules, parts 4410.1500 -4410.1600.

2. Project Purpose and Need

Hwy 10/169 through the City of Anoka is a principal arterial highway that links the Minneapolis-St. Paul area with its northwest suburbs, St. Cloud, and regional destinations beyond, including the lakes/recreation region in northwestern Minnesota (see project location in **Figure 2-1** in **Appendix A**). The project area includes a roughly 1.5 mile portion of Hwy 10/169 extending from the west limit of the city to approximately 0.25 mile east of the Main St. Hwy 10/169 carries both regional traffic and local trips to businesses and residences in the city. This portion of highway currently carries 60,600 vehicles per day (2017 AADT).

The highway carries 3,600 heavy vehicles per day (2017) through the project area. It is classified as Tier 2 in the Metropolitan Council's *Highway Truck Corridor Study* (June 2017) and is designated as part of the National Truck Network as a High Priority Interregional Corridor connecting the Minneapolis/St. Paul to St. Cloud metropolitan areas.

This portion of the highway in the project area is now a four-lane expressway that includes one grade-separated interchange, two signalized intersections, three unsignalized local street connections, and six private driveways. Hwy 10/169 directly east of the project area is a limited access freeway that abruptly transitions to an expressway at the signalized Fairoak Ave intersection. Transportation issues along the project corridor include mobility, closely spaced access points, and safety. This section documents primary and secondary needs.

2.1 Primary Needs

The primary needs are the transportation problems this project intends to address. These needs are described below.

2.1.1 Mobility – Motorized Vehicular

Hwy 10/169 in the project area lacks highway capacity to handle existing and forecasted traffic volumes. This results in considerable peak travel time traffic queues and delays, including traffic back-ups of more than 1 mile on Hwy 10/169 during peak travel times and average peak hour speed of 20 miles per hour (compared to the posted 60 miles per hour speed limit).

Peak hour traffic at Hwy 10/169 intersections at Thurston Ave and Fairoak Ave both operate at a failing level of service during peak hours. Traffic queues exceed acceptable lengths at these intersections, as well as at intersections on either side of the project area.

Currently, access points onto Hwy 10/169, including intersections and driveways, do not fit with its function as a principal arterial. This negatively affects the mobility and safety on the highway.

Hwy 10/169 acts as a barrier to north-south local trips, combined with an incomplete service road system on both sides of Hwy 10/169 negatively affects the connectivity of the local road network. This results in an over-reliance on Hwy 10/169 to serve local trips, rather than local trips being served by local roadways.

2.1.1.1 Highway Capacity

Hwy 10/169 transitions abruptly from a limited access freeway to an expressway at the signalized Fairoak Ave intersection. This transition is not accompanied by a corresponding decrease in adjacent land use intensity or traffic volumes.

Current daily volume on Hwy 10/169 is 60,600 vehicles per day (near Verndale Ave). Volumes in this same location are forecasted to be 89,700 vehicles per day by 2041 (see **Figure 2-2**). The standard traffic engineering measure of traffic congestion is Level of Service (LOS). LOS ranges from A (free flowing) to F (excessive congestion and delay). Compared with the current daily volumes, this segment of Hwy 10/169 operates at or over capacity (the LOS D/E boundary) during peak periods, resulting in traffic backups and increased travel times (see **Table 2-1** in the following section for existing LOS, delay, and queuing information). See **Figure 2-2** for a depiction of existing PM peak hour queueing throughout the project area.

Forecasted increases in traffic are anticipated to cause additional delay and queueing throughout the area. The intersection of Hwy 10/169 at Thurston Ave is expected to operate at an overall LOS F in both AM and PM peak periods. The intersection of Hwy 10/169 at Fairoak Ave is expected to operate at an overall LOS F in the PM peak period. See **Table 2-2** for additional 2041 LOS, delay, and queuing information.

2.1.1.2 Existing Traffic Operations

It currently takes vehicles 4.3 times longer to travel westbound along Hwy 10/169 from Hwy 47 to Thurston Ave during peak versus off-peak traffic, largely due to extreme westbound queuing at Fairoak Ave. This queuing information pertains to typical workdays. In the event of a crash, queueing is worse. Additionally, because Hwy 10/169 is a major route for those travelling to/from the lakes region of northwestern Minnesota, the highway experiences extensive delays on Fridays and Sundays during summer months.

Traffic analysis completed for this project documents existing traffic conditions and operations in and adjacent to the project area [see TH 10 Improvements: Existing Conditions and Traffic Forecasts Technical Memo (September 2017) in **Appendix B**]. **Table 2-1** summarizes the analysis results for existing traffic. The table shows that traffic at Hwy 10/169 intersections with Thurston Ave and Fairoak Ave operate at a failing level of service during peak hours. The table also shows maximum traffic queues. Some of the existing peak hour queues extend back into other intersections and require vehicles to wait through more than one signal cycle before clearing the intersection. These problematic queues along with queues that block turn lanes are highlighted pink in **Table 2-1**.

Existing traffic operation conditions for the Hwy 10/169 intersections at Thurston Ave and Fairoak Ave are summarized below and are shown on **Figure 2-2**.

Hwy 10/169 at Thurston Ave:

- Operates at LOS E during PM peak hour
- Maximum eastbound, northbound, and southbound queues block turn lanes during the AM peak hour
- Maximum queues block turn lanes on all approaches during the PM peak hour
- Average queue length of 1,175 feet for the southbound left turn movement during the PM peak hour, maximum queue length of 2,175 feet

Hwy 10/169 at Fairoak Ave:

- Operates at failing LOS F during PM peak hour
- Maximum eastbound and westbound through queues and southbound movement queues block turn lanes during the AM peak hour; westbound queue extends to Main St
- Maximum westbound through, eastbound through, and southbound queues block turn lanes during the PM peak hour; westbound queue extends past Hwy 47

Table 2-1: Existing (2017) Peak-Hour Intersection Traffic Operations

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd *Signalized Intersection*	AM	31	C	96	F	NBL	EBT	175	1400
	PM	38	D	126	F	SBL	WBT	300	2225
TH 10 at Thurston Ave *Signalized Intersection*	AM	31	C	212	F	SBL	EBT	150	1625
	PM	62	E	379	F	SBL	SBL	1175	2175
TH 10 at Cutters Lane *Stop Controlled*	AM	4	A	189	F	NBR	NBR	25	150
	PM	4	A	69	E	NBR	NBR	25	75
TH 10 at SuperAmerica-Culvers *Stop Controlled*	AM	2	A	257	F	NBR	NBR	25	50
	PM	2	A	122	F	NBR	NBR	25	50
TH 10 at Verndale Ave *Stop Controlled*	AM	1	A	11	B	SBR	SBR	25	50
	PM	2	A	15	B	SBR	SBR	25	75
TH 10 at Fairoak Ave *Signalized Intersection*	AM	15	B	225	F	SBL	WBT	150	1775
	PM	93	F	419	F	WBL	WBT	1925	5350
Main St at Church St/EB TH 10 Ramps *Stop Controlled*	AM	4	A	56	F	EBL	SBL (Ramp)	25	150
	PM	5	A	341	F	EBL	SBT (Ramp)	50	550
Main St at WB TH 10 Ramps *Stop Controlled*	AM	7	A	24	C	WBT	WBL/T/R	50	225
	PM	12	B	69	F	WBL	WBL/T/R	275	1025
EB TH 10 Ramps at Ferry St *Signalized Intersection*	AM	15	B	64	E	WBL	NBT/R	100	425
	PM	19	B	65	E	WBR	NBT/R	225	850
WB TH 10 Ramps at Ferry St *Signalized Intersection*	AM	28	C	47	D	WBL/R	WBL/T	250	2275
	PM	26	C	57	E	WBT	WBL/T	250	1850
EB TH 10 Ramps at 7th Ave *Signalized Intersection*	AM	8	A	51	D	EBL	SBL	125	475
	PM	11	B	49	D	EBL	NBT/R	100	500
WB TH 10 Ramps at 7th Ave *Signalized Intersection*	AM	15	B	65	E	WBL	WBL/T	675	3450
	PM	7	A	52	D	WBT	NBL	50	350

*Delay in seconds per vehicle
**Maximum delay and LOS on any approach and/or movement
***Limiting Movement is the highest delay approach.
Source: TH 10 Improvements: Existing Conditions and Traffic Forecasts, Bolton & Menk Memorandum, September 19, 2017.

2.1.1.3 Forecast Traffic Operations

Table 2-2 shows operations would likely deteriorate substantially with 2041 future volumes on the existing roadway geometry. Peak hour queues that extend into other intersections or extend past turn lanes are highlighted pink in **Table 2-2**. When demand volumes exceed area capacity, LOS, delay and queueing would worsen. Issues related to the future traffic in the project area are discussed below.

With forecasted volumes it is anticipated to take 9.5 times longer to travel westbound along Hwy 10/169 from Hwy 47 to Thurston Ave during peak verses off-peak traffic, largely due to extreme westbound queuing at Fairoak Ave.

Hwy 10/169 at Thurston Ave:

- Would operate at LOS F during AM and PM peak hours
- Maximum eastbound, westbound, and southbound queues would block turn lanes during the AM peak hour
- Maximum queues would block turn lanes on all approaches during the PM peak hour
- Average and maximum queue length would exceed 5,000 feet for the southbound left turn

movement during the PM peak hour (2.4 times as long as existing queue)

Hwy 10/169 at Fairoak Ave:

- Would operate at failing LOS F during PM peak hour
- Maximum queues would block turn lanes on all approaches during the AM peak hour; eastbound queue extends to Thurston Ave while westbound queue would extend to Main St
- Maximum queues would block turn lanes on all approaches during the PM peak hour; eastbound queue would extend to Thurston Ave while westbound queue would extend to Round Lake Blvd (2.3 times as long as existing queue)

Table 2-2: Future No Build (2041) Peak-Hour Intersection Traffic Operations

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd	AM	129	F	203	F	EBL	EBT	5275	5725
Signalized Intersection	PM	41	D	302	F	EBL	EBT	3225	5700
TH 10 at Thurston Ave	AM	136	F	410	F	SBL	EBT	10375	10850
Signalized Intersection	PM	186	F	1258	F	SBL	EBT	6875	10000
TH 10 at Fairoak Ave	AM	33	C	350	F	NBL	EBT	975	2625
Signalized Intersection	PM	339	F	540	F	WBL	WBT	11950	12550
TH 10 at Cutters Lane	AM	12	B	726	F	NBR	NBR	200	475
Stop Controlled	PM	18	C	90	F	NBR	NBR	225	475
TH 10 at SuperAmerica-Culvers	AM	4	A	817	F	NBR	NBR	100	275
Stop Controlled	PM	13	B	1253	F	NBR	NBR	250	325
TH 10 at Verndale Ave	AM	2	A	19	C	SBR	SBR	25	50
Stop Controlled	PM	21	C	132	F	SBR	SBR	75	225
Main St at Church St/EB TH 10 Ramps	AM	7	A	99	F	EBL	SBL (Ramp)	25	175
Stop Controlled	PM	14	B	1556	F	SBL (Ramp)	EBT	675	900
Main St at WB TH 10 Ramps	AM	9	A	41	E	WBL	WBL/T/R	50	275
Stop Controlled	PM	35	D	265	F	WBL	WBL/T/R	950	2475
EB TH 10 Ramps at TH 47	AM	45	D	143	F	EBL	NBT/R	375	1575
Signalized Intersection	PM	119	F	218	F	NBR	NBT/R	1825	2075
WB TH 10 Ramps at TH 47	AM	119	F	261	F	WBL	WBL/T	2625	3050
Signalized Intersection	PM	102	F	355	F	WB	WBR	2600	3050
EB TH 10 Ramps at 7th Ave	AM	11	B	57	E	EBL	SBL	50	475
Signalized Intersection	PM	19	B	58	E	EBL	NBT/R	300	1175
WB TH 10 Ramps at 7th Ave	AM	168	F	212	F	WBL	SBT/R	975	2100
Signalized Intersection	PM	215	F	319	F	SBR	SBT	725	1425

*Delay in seconds per vehicle

**Maximum delay and LOS on any approach and/or movement

***Limiting Movement is the highest delay approach.

Source: TH 10 Improvements: Existing Conditions and Traffic Forecasts, Bolton & Menk Memorandum, September 19, 2017.

2.1.1.4 Access Points

Access management is used to maintain appropriate mobility and safety characteristics of a given roadway. Guidelines included in MnDOT's *Access Management Manual* classify Hwy 10/169 in the project area as a non-interstate freeway principal arterial on a high-priority interregional corridor (1-AF). MnDOT's guidelines note that this highway type is generally transitioning to a freeway and that at-grade intersections should be considered interim. Existing access points, shown on **Figure 2-2**, demonstrate that Hwy 10/169 in the study area does not meet MnDOT's guidelines. Access deficiencies are provided in **Table 2-3**.

Table 2-3: MnDOT Access Guidelines and Existing Hwy 10/169 Access Deficiencies

MnDOT Guideline	Existing deficiency
Minimum 1.0 mile spacing between at-grade, full-movement intersections	Thurston Ave and Fairoak Ave intersections are approximately 0.5 mile apart
Minimum 0.5 mile spacing between an at-grade intersection and merge point of closest ramp	Fairoak Ave intersection is approximately 1,600 feet (0.3 mile) from westbound on-ramp at Main St

In addition to the at-grade intersections and ramps, Hwy 10/169 includes three public street access points (right-in/right-outs onto Hwy 10/169 at: Cutters Lane, near Super America and Culvers, and Verndale Ave) and six private, direct driveway accesses onto Hwy 10/169. Northbound movements onto the highway at Cutters Lane and the unnamed frontage road access near the businesses south of Hwy 10/169 and west of Fairoak Ave have excessive delays and failing LOS (see **Tables 2-1** and **2-2**). The presence of these access points is also inconsistent with the highway's designation as a principal arterial road.

2.1.1.5 Connectivity

Current local road system conditions in the project corridor affect the ability of travelers making local trips to stay on the local road network. Hwy 10/169 acts as a barrier for local travel. A variety of factors including rivers - the Mississippi to the south and the Rum to the east - and general historic development patterns have resulted in a limited arterial and collector roadway network to serve the city west of the Rum River. Hwy 47 just west of the Rum and Main St are the only A minor arterials serving this area. Cutters Grove Ave and Park St are the only major collector roadways in this portion of the City. There are no county roadways in this area (Bunker Lake Boulevard/CSAH 116 skirts the northern City limit).

A discontinuous service road system on both sides of Hwy 10/169 provides limited access for commercial, residential, industrial, and institutional land uses. An incomplete service road system results in an over-reliance on Hwy 10/169 to serve local trips, rather than making local trips on local roadways. This yields inefficient local travel patterns that are burdensome to residents and contribute unnecessary local traffic onto a regional principal arterial highway.

2.1.2 Safety – Vehicular

There is a need to address historically high crash rates. As determined by safety analysis, Hwy 10/169 in the project area experiences much higher crash rates than would be expected on this type of corridor [see TH 10 Improvements: Safety Analysis (August 2018), **Appendix C**]. Multiple factors contribute to the traffic safety deficiencies experienced on Hwy 10/169. Two factors that negatively impact vehicle safety are:

- Traffic volumes exceeding roadway and intersection capacity during peak travel times, leading to excess queueing and congestion and
- An excess of public and private access points leads to uncontrolled mainline exit/entry movements and associated vehicle conflict points

Vehicle travel speeds also negatively impact traffic safety. Westbound motorists coming from the freeway portion of Hwy 10 travel at speeds in excess of 70 miles per hour on average;[1] 60 miles per hour is the posted speed limit. These vehicles frequently encounter stopped traffic in

[1] Speed data from MnDOT freeway loop detector data for the period from January 2017 to June 2017.

queues at the signalized intersection at Hwy 10/169 and Fairoak Ave. **Table 2-4** summarizes historic crash information, for 2006-2015, for both the project area (from the west city limit to the Main St interchange) and the area affected by Hwy 10/169 congestion (from the west city limit to the Hwy 10 Rum River bridge).

Table 2-4: Hwy 10/169 Crash Data and Comparison to Comparable Highways (2006-2015)

	Project Area (West City Limit to Main St)	Area of Effect (From West City Limit to Rum River Bridge; Approximately 2 Miles)
Total Crashes (2006-2015)	578	928
Crash Rate*	1.74	2.08
Statewide Average Crash Rate (for Similar Roadways)	1.09	1.09
Critical Index**	1.40	1.70
Total Fatal and Serious Injury Crashes (2006-2015)	5	7
Fatal and Serious Injury Crash Rate (West City Limit to Main St)	1.51	1.57
Statewide Average Fatal and Serious Injury Crash Rate (for Similar Roadways)	0.69	0.69
Critical Fatal and Serious Injury Index**	1.06	1.2

*Crash rate for a corridor is standard traffic engineering metric calculated as number of crashes per million miles traveled.
**A critical index greater than one shows that the segment is operating outside the normal range when compared to similar roadway segments statewide.
Source: Minnesota Crash Mapping Analysis Tool (MnCMAT)

The fatal and serious injury crash rate for the Hwy 10/169 project area segment for the 2006-2015 timeframe is 1.51, whereas the statewide average is 0.69. The fatal and serious injury critical index is 1.06, which demonstrates that this project area segment operates outside the normal range. (A critical index greater than one shows that the segment is operating outside the normal range when compared to similar roadway segments statewide). The crash rate for the Hwy 10/169 affected area segment for the 2006-2015 timeframe is 2.08, whereas the statewide average is 1.09. The fatal and serious injury critical index was found to be 1.70, which demonstrates that this project area segment operates outside the normal range.

Overall, Hwy 10/169 in Anoka experiences a higher number of overall crashes, including fatal and serious injury crashes, than would be expected on comparable roadways. More than half (57 percent) of all crashes were rear-end crashes, indicating high levels of congestion and queueing.

Table 2-5 summarizes crash information for Hwy 10/169 intersections with Thurston Ave and Fairoak Ave and the Main St at Hwy 10 Ramps. The most recent (2006-2015) ten-year crash rate for the Hwy 10/169/Fairoak Ave intersection is 2.37, which is over 5 times higher than the statewide average for this category of intersection (with a rate of 0.46). The critical index for this intersection is 4.09, which is well outside the normal range.

For the intersection at Hwy 10/169 and Thurston Ave, the ten-year crash rate is 0.94, or over 2 times the statewide average for a similar intersection (0.46). The critical index for the Hwy

10/169 and Thurston Ave intersection is1.62, which is outside the normal range.

The ten-year crash rate at Main St and the EB Hwy 10 Ramps was found to be 0.58, which is over 2 times the statewide average for a similar intersection (0.19). The critical index was found to be 1.76 which shows that the intersection is operating outside the normal range.

The ten-year crash rate at Main St and the WB Hwy 10 Ramps was found to be 0.46, which is over 2 times the statewide average for a similar intersection (0.19). The critical index was found to be 1.25 which shows that the intersection is operating outside the normal range.

Table 2-5: Hwy 10/169 Intersection Crash Data and Comparison to Comparable Highways (2006-2015)

	Intersection			
	Hwy 10 at Thurston Ave	Hwy 10 at Fairoak Ave	Main St at EB Hwy 10 Ramps	Main St at WB Hwy 10 Ramps
Total Crashes (2006-2015)	225	561	42	20
Crash Rate*	0.94	2.37	0.58	0.46
Statewide Average Crash Rate (for Similar Intersections)	0.46	0.46	0.19	0.19
Critical Index	1.62	4.09	1.76	1.24
*Crash rates for individual intersections are calculated as number of crashes per million vehicles entering the intersection.				
**A critical index greater than one shows that the segment is operating outside the normal range when compared to similar roadway segments statewide.				

2.1.3 Mobility – Non-Motorized

Hwy 10/169 through Anoka is a barrier to those traveling by non-motorized means due to these factors:

- Wide cross section which results in long crossing distances for those traveling by non-motorized means.
- Long wait times for walk signal at signalized crossing locations due to prioritization for the heavy traffic movements.
- High vehicle speeds (freeway-to-expressway transition).
- Limited designated/protected crossing locations at Thurston Ave, Fairoak Ave, and Main St (see **Figure 2-3**).
- Inadequate non-motorized accommodations on roadways parallel to Hwy 10/169.
- A discontinuous non-motorized transportation network, including Hwy 10/169 frontage roads, results in poor connectivity for pedestrians and bicyclists.

These factors are exacerbated by land uses on either side of Hwy 10/169 that are conducive to non-motorized trips. The numerous commercial properties and restaurants directly adjacent to the highway (shown on **Figure 2-3)** are destinations for people walking and biking from throughout the community, including high-density residences on either side of the highway.

Pedestrians cross Hwy 10/169 between the intersections and the interchange at Main St (supported by pedestrian counts taken for the *TH 10 Access Management Study*).

In addition, the lack of continuous sidewalk or trail paralleling Hwy 10/169, pedestrians frequently walk along the service roads that parallel the highway; this is especially prevalent along the south side of Hwy 10/169 between Cutters Lane and Fairoak Ave.

2.1.4 Safety – Non-Motorized

Currently, the project area lacks continuous, dedicated, non-motorized transportation facilities. Pedestrians and bicyclists frequently walk alongside roadways, including along the south frontage road and along the shoulders of the highway. Non-motorized travelers cross Hwy 10/169 at the traffic signals at Thurston Ave and Fairoak Ave, as well as at un-signalized and unmarked locations, shown in **Figure 2-3**.

High traffic volumes and high motor vehicle speeds also create safety issues for pedestrians and bicyclists within the project corridor. The posted speed limit along Hwy 10/169 in the project area is 60 miles per hour. This portion of highway carries 60,600 vehicles per day (2017 AADT).

As previously stated Hwy 10/169 transitions abruptly from a limited access freeway to an expressway at the signalized Fairoak Ave intersection. This transition is not accompanied by a corresponding decrease in adjacent land use intensity or traffic volumes so drivers may not expect pedestrians or bicyclists that could cause a crash issue.

Based on MnDOT data, there were four crashes involving pedestrians, and four involving bicyclists in the project corridor between 2006 and 2015. One of these, along Hwy 10/169 at Verndale Ave, resulted in a pedestrian fatality (see **Figure 2-3**). Two of the crashes were non-incapacitating injury crashes. There were possible injuries in the other five crashes. The intersections of Thurston Ave and Fairoak Ave with Hwy 10/169 were found to have crash rates two to five times higher than the statewide average crash rate for similar intersections.

2.2 Secondary Needs

Secondary Project Needs are other transportation problems discovered during project planning and development that the project may be able to address, while addressing the primary needs.

2.2.1 Geometric Deficiencies

Geometric deficiencies at two locations in the project area result in traffic issues. This includes the Hwy 10/169 interchange at Main St/Greenhaven Rd, where entrance/exit ramps are sub-standard in design resulting in issues for traffic accelerating onto and decelerating from Hwy 10/169. The Thurston Ave and North Hwy 10/169 Service Rd intersection is too closely spaced to the Thurston Ave intersection with Hwy 10/169, resulting in traffic queuing issues.

2.2.1.1 Hwy 10/169 and Main St/Greenhaven Rd Interchange

Existing design deficiencies at the Hwy 10/169 and Main St/Greenhaven Rd interchange have resulted in numerous traffic issues. The westbound Hwy 10/169 entrance ramp at Main St/ Greenhaven Rd is a sub-standard design. The westbound entrance ramp's acceleration lane is 300 feet long. MnDOT standards call for an 1,100-foot long acceleration lane (per Table 6-2.04B in the MnDOT Road Design Manual). This short ramp only allows vehicles to reach speeds of approximately 30 mph prior to merging; heavy commercial vehicles travel even slower. The discrepancy in travel speed between vehicles on Hwy 10/169 (posted 60 mph) and vehicles entering the highway contributes to the queuing experienced by westbound drivers during peak periods (see **Table 2-1**). These large discrepancies in vehicle speeds between those entering and those on the mainline increases the potential for crashes.

The existing eastbound exit ramp has a straight, flat alignment. This contributes to vehicles often entering town at speeds that exceed the 35 mph posted speed. Traffic control at the ramp terminal allows exiting vehicles to proceed through the intersection without slowing, as does the alignment of the ramp compared to Main St.

A median with plantings was added to the north leg of this intersection in 2013 (along with development of the HealthPartners Riverway Clinic facility). Sight distances were calculated to determine if the median hinders the sight of drivers along the westbound ramp. Sight distances are met for the posted speed limit. However, it just meets the minimum sight distance threshold.

It is perceived that vehicles along southbound Greenhaven Rd, north of the westbound ramp terminal, tend to travel above the speed limit and sight distances are not met for speeds above 35 mph. Additionally, depending on the planting in the median, sight distance may be an issue. Existing traffic conditions, including traffic volumes by intersection leg, are provided in **Figure 2-2**.

2.2.1.2 Thurston Ave and North Hwy 10/169 Service Rd Intersection Deficiencies

Thurston Ave provides the only grade-separated crossing of the BNSF tracks between 7th Ave in Anoka and Armstrong Blvd in Ramsey - a distance of over five miles. Thurston Ave also provides the primary access to Hwy 10/169 for traffic to and from the Anoka Enterprise Park, a 260-acre industrial/manufacturing development area with over 70 businesses. The intersection of Thurston Ave and North Hwy 10/169 Service Rd currently has all-way stop sign control. This intersection is 525 feet from the Thurston Ave intersection at Hwy 10/169. This close proximity of intersections, along with the high traffic volumes on Thurston Ave, results in extensive queuing. During the PM peak hour, the southbound queue at the intersection of Hwy 10 at Thurston Ave is 1175 feet long which extends well past the North Hwy 10/169 Service Rd (see **Table 2-1**). These issues have created a need to improve intersection spacing and to consider changes to intersection traffic control.

2.3 Additional Considerations

In 2016, a project intended to encourage pedestrians to use the current signal at Fairoak Ave to cross Hwy 10/169 was completed. Non-motorized enhancements included in the 2016 project are depicted on **Figure 2-3** and described below:

- Shared use path linking Verndale Ave and Fairoak Ave on the north side of Hwy 10/169.
- 32 inch high removable concrete median barrier from 500 feet southeast of the Hwy 10/169/Thurston Ave intersection to Fairoak Ave (length of approximately 0.5 miles) to discourage pedestrian crossing at median locations.
- Sidewalk linking Fairoak Ave and existing sidewalk at Church St and Main St along the south side of Hwy 10/169 and its eastbound off-ramp to Main St.

2.4 Project Purpose

The purpose of the Hwy 10/169 Safety and Mobility Improvement Project is to reduce crashes and improve traffic operations. This will result in improved mobility and reliability for all users of the project corridor.

3. Alternatives

This section summarizes project termini and alternatives developed and evaluated for the project.

3.1 Project Termini & Construction Limits

The project limits on Hwy 10/169 extend from Anoka's border with Ramsey (approximately 0.5 mile west of the Thurston Ave/Cutters Grove Ave intersection to approximately 0.25 mile east of the Main St interchange, a distance of approximately 1.5 miles.

Hwy 10/169 operates as a freeway to the east of Fairoak Ave. MnDOT is leading a project - Highway 10 Rum River Bridge Replacement and Corridor Improvements located directly to the east of this study area. This bridge replacement and corridor study is considering reconstruction of Hwy 10 through this study area. Therefore, for traffic staging purposes and keeping the projects separate, the center area between the two interchanges of Main St and TH 47/Ferry St were selected.

3.2 Alternative Development and Screening Process

This section describes the process used to develop and screen concepts, that led to recommendation of a preferred alternative. The concept development process for the proposed project began with the 2014 *Highway 10 Access Planning Study (Hwy 10 Access Planning Study)*. Hwy 10/169 studies before this point focused on converting the highway to a freeway through the Cities of Anoka and Ramsey. By the early 2010s, it became clear that funding for freeway conversion would not be available in the foreseeable future. The following sections describe the *Hwy 10 Access Planning Study* process and recommendations, as well as additional concept refinement and evaluation work.

3.2.1 *Hwy 10 Access Planning Study* – Concept Evaluation and Identification

The *Hwy 10 Access Planning Study* focused on concepts that would provide many of the same benefits of a full freeway design, but at incremental steps and with achievable cost. MnDOT led the study in partnership with Anoka County, the City of Anoka, the City of Ramsey, and the Metropolitan Council. Overall study's limits extended from the Rum River to the Anoka County/Sherburne County border.[2] Recommendations from the *Hwy 10 Access Planning Study* that are pertinent to this project are shown on **Figure 2-4** and summarized below; additional detail is also provided in **Appendix D-1**, which includes graphics from the study that apply to this project area:

- Remove traffic signal at Thurston Ave/Cutters Grove Ave; construct a grade-separated access control to ultimately allow for construction of an interchange.
- Remove the traffic signal at Fairoak Ave;
  - Construct an interim reduced-conflict, reduced-access intersection
  - Close all access points on south side of the highway (in conjunction with an improved/extended service road south of Hwy 10/169, described below)

[2] The portion of that study area that included the Hwy 10/169 Safety and Mobility Improvement Project area was referred to as "Subarea 5" in the planning study.

- Construct a roundabout at Main St/Greenhaven Rd ramp terminal
- Close mainline access points along Hwy 10/169 at:
  - Better Value Liquor Store
  - Calvary Cemetery (north side of Hwy 10/169)
  - South frontage road at Culvers/Super America
  - Fairoak Ave
  - Wright Tire (south side of Hwy 10/169)
- Local Connections:
  - Construct a continuous service road on the south side of Hwy 10/169 between Cutters Grove Ave and Main St
  - Construct a new road on the north side of Hwy 10/169 (locally referred to as Green Haven Parkway) to link Thurston Ave with Main St
- Non-motorized Accommodations:
  - Construct a pedestrian overpass at Verndale Ave
  - Construct continuous pedestrian facilities within the study corridor

These recommendations were developed through a process that included technical evaluations and agency/public coordination. The recommendations were broadly supported by study partner agencies. The Metropolitan Council provided letters supporting the study while the Cities of Anoka and Ramsey and Anoka County passed resolutions of endorsement.

3.2.2 Anoka Solution Process – Concepts Refinement and Evaluation

While the City of Anoka supported the overall recommendations in the MnDOT led *Hwy 10 Access Planning Study*, Anoka's adopted resolution documented some concerns, including that closure of Fairoak Ave across Hwy 10/169 would sever the north/south connections across the highway (see the City's Resolution accepting the *Hwy 10 Access Planning Study* in **Appendix D-7**). In 2015, the City of Anoka led further efforts to refine the concepts recommended in MnDOT's study. These efforts, referred to as the Anoka Solution, culminated in July 2015, when the City adopted the Anoka Solution plan (see **Appendix D-2**). This plan, which was generally consistent with the vision identified in MnDOT's study, broke improvements into projects that could be constructed as standalone projects or together. Relevant agencies, including MnDOT and Anoka County reviewed and supported the refinements.

The City has continued to refine the Anoka Solution plan since 2015. Overall refinements, evaluations, and recommendations that have occurred since beginning the Anoka Solution plan process are described in the sections below.

3.2.2.1 Hwy 10/169 at Thurston Ave/Cutters Grove Ave

The City has considered multiple interchange concepts at the Hwy 10/169 and Thurston Ave/Cutters Grove Ave Since completion of the *Hwy 10 Access Planning Study*. Interchange types considered and evaluated are described below. Planning level layouts for the tight diamond, single point urban interchange, bowtie, and grade-separated roundabout concepts, along with summary evaluation matrices are provided in **Appendix D-4**.

Folded and Diverging Diamond Interchanges Concepts

Folded diamond and diverging diamond concepts were eliminated early on. The folded diamond design (ramps and loops on the west side of the interchange) were determined to be incompatible with the proposed Green Haven Parkway. This interchange type would also have resulted in extensive local impacts, most notably west of Thurston Ave and north of the current Hwy 10/169 service road.

The diverging diamond design would result in signal warrants not being met on Thurston Ave/Cutters Grove Ave intersections which would result in the need for stop signs. These stop signs would result in traffic queuing which would negate safety and operational benefits of the interchange.

Tight Diamond Interchange

A diamond interchange design with ramp terminals on either side of the mainline roadway, is a standard design that is common to settings similar to the Hwy 10/169 and Thurston Ave/Cutters Grove Ave intersection. This interchange type oftentimes requires less right-of-way than other interchange types.

Two tight diamond concepts were evaluated, one where the mainline is bridged over Thurston Ave/Cutters Grove Ave, and the other with Thurston Ave/Cutters Grove Ave bridged over the mainline (see Concepts A and B in **Appendix D-4**). These concepts were eliminated because:

- Intersections at ramp terminals would not meet signal warrants. This would mean that stop signs would be used which would result in traffic queuing and delays.
- Intersections at ramp terminals would be approximately 290' apart. This would likely result in operational and safety issues because traffic at one intersection could impact the operations at the other.
- These concepts would not remove the skew on Thurston Ave/Cutters Grove. Skewed intersections can pose problems for drivers, especially drivers who have impairment in neck movement.

Single Point Urban Interchange (SPUI)

This design is characterized by one intersection at the center of the interchange (rather than two intersections, as with diamond interchanges) (see Concept C in **Appendix D-4**). Left turning movements on the secondary roads operate simultaneously which allows for increased capacity. This interchange type also usually requires less right-of-way than diamond interchanges.

Traffic analysis done as part of the Anoka Solution process showed that a SPUI at Fairoak Ave/Cutters Grove Ave would operate better than a tight diamond design. However, the SPUI concept was removed from further consideration primarily due to high costs, primarily associated with structural elements.

"Bowtie" Interchange

This concept is similar to the tight diamond, but traffic control at the ramp terminals would be accomplished with two roundabouts, thus eliminating the need for stop signs (which do not meet signal warrants, as noted above). The mainline would be bridged over Thurston Ave/Cutters

Grove Ave (see Concept D in **Appendix D-4**). The bowtie concept is preferred over a tight diamond concept from an operational perspective. It also costs less than the tight diamond and requires less right-of-way than the bridged mainline version. The roundabout-style design mitigates for the intersection skew at this location.

Grade-Separated Roundabout Interchange

The grade-separated roundabout, shown in **Appendix D-4** as Concept E, provides additional operational benefits compared to the bowtie roundabout, including a smaller footprint and lower costs than other interchange types. The grade-separated roundabout scored best compared to other intersection concepts considered at this location, including:

- Best operational characteristics,
- Least right-of-way requirements,
- Lowest cost, and
- Most effective mitigation of skewed intersection.

The evaluation process assumed that for the grade-separated roundabout concept, Hwy 10/169 would be bridged over the local streets. Subsequently, it had been determined that local streets would go over the highway, as depicted in Concept F. Concept F depicts a grade-separated roundabout with Thurston Ave over Hwy 10/169. This change would not alter the findings of the earlier evaluation process for this location.

3.2.2.2 Hwy 10/169 at Fairoak Ave

Thirteen grade-separated alternatives were considered at Hwy 10/169 and Fairoak Ave as part of the Anoka Solution analysis. All alternatives included removing the traffic signal and are shown in **Appendix D-5** as Alternatives A-M. The alternatives are categorized as follows:

- Underpass of Hwy 10/169 on existing alignment (Alternatives A and B).
- Overpass of Hwy 10/169 on existing alignment (Alternatives C and D).
- Overpass of Hwy 10/169 on eastern alignment overpass of Hwy 10/169 (Alternatives E through I).
- Overpass of Hwy 10/169 on Western Alignment (Alternatives J through M).

As part of the Anoka Solution process, the City identified an underpass of Hwy 10/169 on the existing alignment, as preferred (see the Alternative B drawing in **Appendix D-5**). The Fairoak Ave underpass would:

- Use the existing Fairoak Ave alignment.
- Maintain the existing location of Fairoak Ave/south service road intersection.
- Achieve grade-separation by depressing Fairoak Ave and elevating Hwy 10/169.

This intersection concept was recommended by the City because it would:

- Maximize use of the existing Fairoak Ave alignment, thus minimizing the need for road on new alignment. This would have potential to reduce property impacts and possibly costs. It would also limit disruptions to existing local travel patterns.

- Result in desirable intersection spacing on Hwy 10/169 within the City by maintaining the existing, central Fairoak Ave alignment between Thurston Ave and Main St. Though Fairoak Ave will pass under Hwy 10/169, it will still maintain access across the highway for both motorized and non-motorized traffic. It is notable that the City has designated Fairoak Ave as a future trail route.

3.2.2.3 Main St Interchange

Intersection at Main St South Ramp Terminal

The *Highway 10 Access Planning Study* identified a roundabout to replace the current intersection at the Main St south ramp terminal (see **Appendix D-1**). The roundabout accommodates the proposed service road extension on the south side of Hwy 10/169 (see Section 3.2.2.4 Local Connections and Circulation for additional detail). Accommodating this new, fifth leg at the Main St intersection would be difficult to achieve without a roundabout. It would also be difficult to accommodate the fifth leg with the intersection's existing skew.

Intersection at North Ramp Terminal

Since completing the *Highway 10 Access Planning Study*, the Anoka Solution process yielded a recommendation to replace the existing intersection on the north side of Hwy 10/169 at Greenhaven Rd with a roundabout (see **Appendix D-2**). The roundabout addresses traffic operational issues associated with a 4-way stop control. (A stop sign on northbound Greenhaven Rd would lead to unacceptable queueing backing into the proposed roundabout to the south at peak times). Additionally, a roundabout would enhance pedestrian safety by reducing the crossing distances on Greenhaven Rd.

Westbound Entrance Ramp

The Anoka Solution process led to a recommendation to extend the Main St interchange westbound entrance/acceleration lane to meet MnDOT design standards.

3.2.2.4 Local Connections and Circulation

The evolution of local roadway connections since the *Highway 10 Access Planning Study* was completed and through the Anoka Solution process is described below.

Local Roads North of Hwy 10/169 – Green Haven Parkway

The City of Anoka is planning for a continuous local road on the north side of Hwy 10/169 - between Thurston Ave and Greenhaven Rd. Locally, this roadway is referred to as Green Haven Parkway. Two portions of the parkway - 1) west of Thurston Ave and 2) from just west of Fairoak Ave to Greenhaven Rd - were recommended in both the *Hwy 10 Access Planning Study* and the Anoka Solution plan (see **Appendices D-1** and **D-2**, Projects E and D).

Green Haven Parkway - from Thurston Ave to Garfield St - was recommended in the *Hwy 10 Access Planning Study* (see **Appendix D-1** and **Appendix D-2**, Anoka Solution Project A). This portion parkway was constructed in 2017 and is currently open traffic.

The City is continuing to study potential parkway alignments from just east of Garfield St to Fairoak Ave. A 2012 parkway concept (an excerpt from the Greens of Anoka Redevelopment Master Plan) that would link Thurston Ave to the City's Northstar Station is shown in **Appendix D-3**. Another alignment was included in the Anoka Solution Plan (see **Appendix D-2**, Project B). Three other parkway options between Garfield St and Fairoak Ave were shared with the public in 2017 (see **Appendix D-3**). The City continues to consider alignment options, separate from the Hwy 10/169 Safety and Mobility Improvement Project. The ultimate parkway location will be decided by the City in conjunction with decisions regarding future (re)development near the Green Haven Golf Course.

Local Frontage Road South of Hwy 10/169

The local frontage road on the south side of Hwy 10/169 included in the Anoka Solution plan (see projects C and D in **Appendix D-2**) is similar to the vision identified in the *Highway 10 Access Planning Study* (see **Appendix D-1**). Since the *Hwy 10 Access Planning Study*, south frontage road has been refined to close highway access at Cutters Lane. This access would no longer be needed with the proposed interchange at Thurston Ave/Cutters Grove. The access point would also be too close to the interchange and thus would be inconsistent with recommendations in *MnDOT's Access Management Manual* and could present operational and safety issues.

3.2.2.5 Non-Motorized Connections

The *Hwy 10 Access Planning Study* recommended a pedestrian overpass of Hwy 10/169 between Verndale Ave and the service road on the south-side of the highway (see **Appendix D-1**). Further study during the Anoka Solution process identified space constraints on both sides of the highway that would require a switchback and/or helix design to achieve sufficient grade change over a short horizontal distance.

Given these constraints, and the addition of the Fairoak Ave underpass of Hwy 10/169, the focus of a grade-separated, non-motorized traveler connection moved from the Verndale Ave area to Fairoak Ave. This option will accommodate non-motorized traffic on both sides of the highway. This option is economically preferred because it utilizes infrastructure that will be put in place for the underpass at Fairoak Ave. This option will also provide a more direct crossing for non-motorized traffic than a crossing that would require a switchback or helix ramps. The City of Anoka has also identified Fairoak Ave as a route for a future city trail.

3.2.3 Value Engineering Study

MnDOT led a value engineering (VE) study on Hwy 10 from Thurston Ave to Main St in June 2018. This study was conducted according to FHWA and MnDOT regulations. The VE study resulted in design changes aimed at identifying potential improvements to the preliminary design concept and decreasing project costs. Major changes to the project design that were a direct result of the VE study are listed below and are reflected on **Figure 3-1**:

- Shifting the Hwy 10 alignment north to improve the highway alignment and reduce retaining walls.
- Reconstructing Hwy 10 over Thurston Ave (previously, the design had Thurston Ave going over Hwy 10).

3.3 Preferred Alternative

The development and evaluation of concepts described in Section 3.2– including the *Hwy 10 Access Management Study* and the Anoka Solution Process - led to recommendation of a preferred alternative. A layout or plan view depiction of the preferred alternative is shown in **Figure 3-1** and is summarized below.

3.3.1 Hwy 10/169/Mainline Reconstruction

Elements of reconstructing the highway include:

- Maintaining 12' travel lanes.
- Converting approximately 70 percent of the highway from a rural cross section (with ditches) to an urban cross section (with curb and gutter); see the Drainage heading below for further information.
- Removing the center median, which ranges in width from 10-30'.
- Increasing outside shoulder width from 8-10' existing to 10-13' proposed. Increasing inside shoulder width from 2-4' existing to 4-5' proposed.
- Correcting an existing compound curve east of and through the Main St interchange area.

3.3.2 Thurston Ave/Cutters Grove Ave Interchange

This signalized intersection will be replaced with a full-access grade-separated roundabout. The roundabout is a unique peanut shape that adapts the roundabout to the existing geometric skew of the intersection while limiting additional right-of-way needs of the interchange design (see **Figure 3-1**). Hwy 10/169 will be bridged over Thurston Ave/Cutters Grove Ave. The roundabout single-lane will be expandable to two lanes for the southbound to eastbound movement. A trail will be constructed on the west side of the road, ranging from 10-12' wide.

3.3.3 Fairoak Ave Underpass

The existing Hwy 10/169 intersection at Fairoak Ave will be eliminated and replaced with an underpass. The highway will be raised by approximately 17' while Fairoak Ave will be lowered by 2'. The width of Fairoak Ave will be reduced from 36' to 27'. This will allow for two 13.5' travel lanes, a 10' trail on the west side, and a 5' sidewalk on the east side. The sidewalk will have a 5' boulevard, the trail will have a 6-10' boulevard.

3.3.4 Main St/Greenhaven Rd Interchange

Reconstruct/upgrade of this interchange will include:

- Replacing the Hwy 10/169 bridge over Main St/Greenhaven Rd (MnDOT Bridge ID No. 02010) which will correct an existing compound curve on the highway, described above. The new bridge will include shoulders that meet engineering standards. Clearance under the bridge will be 16' (compared to the current 16'8").
- Constructing a new single-lane roundabout at the Hwy 10/169 westbound ramp terminal.
- Constructing a roundabout at the Hwy 10/169 eastbound ramp terminal, which will accommodate the extended service road from the west.
- Constructing a 5' wide sidewalk on the west side of Main St.

3.3.5 Access Removal

The project will remove three public St access points (right-in/right-outs onto Hwy 10/169 at: Cutters Lane, near Super America and Culvers, and Verndale Ave) and six private, direct driveway accesses onto Hwy 10/169. The only remaining access points to Hwy 10/169 within the project area will be the Thurston Ave interchange and the Main St interchange.

3.3.6 Local Roads Parallel to Hwy 10/169

- Two portions of Green Haven Parkway North of Hwy 10/169 – 1) west of Thurston Ave and 2) between just east of Fairoak Ave to Greenhaven Rd – are included in the preferred alternative. Sidewalks will be included along both portions of the parkway, on the north and south sides of the roadway, respectively.
- Local Frontage Road South of Hwy 10/169 – This route will use the existing intersection at Cutters Grove Ave and existing alignment east to Fairoak Ave. The portion which is currently the north perimeter of the Eagle Brook Church parking lot will be constructed as a separate roadway. The existing service road from Fairoak Ave to Main St will be extended. This south frontage road will have an urban design, with curb and gutter that will adhere to MnDOT State Aid standards for collector roadways. Sidewalks will be included along the south side of the frontage road.

3.3.7 Non-Motorized Connections

Non-motorized elements of the project include:

- Underpass at Fairoak Ave including a 10' trail with boulevard on the west side and 5' sidewalk with boulevard on the east side; the trail will be part of the City's designated trail system.
- New 5' sidewalk with boulevard the entire length of the south side of the local frontage road south of Hwy 10/169, from Cutters Grove Ave east to Main St.
- Replacement of existing 5' sidewalk on the west side of Thurston Ave (currently directly at back of curb) with a 12' trail north of the new service road intersection, and a 10' trail south of this intersection. The entire trail will have a boulevard except on the bridge over railroad tracks north of Hwy 10/169.
- New 5' sidewalk with boulevard along the north side of Green Haven Parkway, west of Thurston Ave.
- New 5' sidewalk with boulevard along the south side of Green Haven Parkway/Jacob Ln.
- Replacement of existing 3' – 4' sidewalk at back of curb along the west side of Greenhaven Rd/Main St between Jacob Ln and eastbound Hwy 10/169 exit ramp with 5' sidewalk with boulevard; this sidewalk will connect through proposed roundabout to existing sidewalk along the south side of Main St heading into the downtown area.

3.3.8 Drainage

Hwy 10/169 in the project area currently has a rural section design, using ditching for stormwater conveyance. The proposed project will convert approximately 70 percent of the mainline to urban section design with curb and gutter. The areas that will remain ditched are: a) the right shoulder of the eastbound lanes from the west project limit to approximately ¼ mile east of this point, b) the right shoulder of the westbound lanes between Thurston Ave and Main St, and c) the right shoulder of the eastbound lanes from Main St to the east project limit.

Existing drainage patterns will be maintained. Additional stormwater control will be provided through ponds meeting applicable Lower Rum River Watershed Management Organization (LRRWMO) and National Pollutant Discharge Elimination (NPDES) standards. Based on preliminary evaluation, approximate pond locations are depicted on **Figure 3-1**. Drainage on local streets that are part of the proposed project will also follow existing patterns and will be treated through ponding in accordance with applicable LRRWMO and NPDES requirements. The predominance of sandy soils in the project area is conducive to volume control for stormwater runoff.

3.4 Project Cost, Funding, Schedule and Benefit/Cost Analysis

3.4.1 Project Cost

The estimated total project cost (in 2022 dollars) is approximately $92.9 million. This includes inflation and contingencies. A summary of these costs is provided below:

Table 3-1: Project Costs in 2022 Dollars

Project Cost	2022 Dollars
Construction Cost	$71,000,000
ROW Cost	$11,000,000
Project Development and Delivery Fee	
Preliminary Design (2% Construction Cost)	$1,400,000
ROW Acquisition (3% ROW Cost)	$300,000
Final Design (5% Construction Cost)	$3,500,000
Construction Engineering (8% Construction Cost)	$5,700,000
Total Cost	**$92,900,000.00**

3.4.2 Funding

The project will be funded and paid for through a combination of federal funding and state/county/local funds. Funding sources acquired to date include:

Table 3-2: Project Funding

Sources (Award Date)	Award Amt.
MnDOT Highway Freight Program (November 2017)	$20,000,000
MnDOT Commitment (May 2018)	$14,000,000
Metropolitan Council Regional Solicitation (Fairoak Ave & Main St, January 2017 & Thurston Ave, January 2019)	$14,000,000
MnDOT TED (December 2017)	$5,000,000
Anoka County	$4,000,000
MnDOT Construction Services	$3,960,000
City of Anoka - Local Funds	$2,000,000
MnDOT Bridge Design; (Final)	$300,000
Minnesota Legislature Bonding Bill (May 2018)	$15,000,000
subtotal of firm commitments	***$78,260,000.00***

The remaining funding will be paid for through a combination of federal funds and state/county/local funding.

3.4.3 Schedule

The anticipated schedule for the proposed project is shown in **Table 3-3**, below.

Table 3-3: Proposed Schedule of Project Activities

Activity	Anticipate Completion Date
Preliminary Design and Construction Limits	2/2019
EA/EAW Distribution	9/2019
Open House/Public Hearing	9/2019
EIS Need Determination/Finding of No Significant Impact	10/2019
Final Design and Right-of-Way Acquisition	1/2021
Planned Letting Date	6/2021
Begin Construction (tree clearing/grading)	Winter 2021/2022
Begin Major Construction	Spring 2022
Complete Construction	2024

3.4.4 Benefit/Cost Analysis

A Benefit-Cost Analysis is included in **Appendix E**. A summary of the Benefit-Cost Analysis results is provided in **Table 3-4**. The analysis shows considerable benefit to vehicle operators in the Project Area in both travel time benefits and operating and maintenance cost benefits that far outweigh the cost of constructing the Project. Using a discount rate of 3% yields a benefit-cost ratio of 3.959 while a discount rate of 7% yields a ratio of 2.312.

Table 3-4: Benefit-Cost Summary

Item	Build	
	PV (3% Discount Rate)	PV (7% Discount Rate)
Travel Time Benefit	$ 199,875,000.00	$ 109,481,000.00
Collision Reduction Benefit	$ 62,717,000.00	$ 34,990,000.00
Operation and Maintenance Benefit	$ 794,000.00	$ 515,000.00
Emissions Benefit	$ (688,000.00)	$ (362,000.00)
Vehicle Operating Benefit	$ (4,769,000.00)	$ (2,503,000.00)
PV Total Benefit	**$ 257,929,000.00**	**$ 142,121,000.00**
Major Structures	$ 29,045,000.00	$ 23,611,000.00
Surfacing	$ 11,537,000.00	$ 9,526,000.00
Grading and Drainage/Sewer	$ 11,413,000.00	$ 9,417,000.00
Lighting/Signals	$ 1,865,000.00	$ 1,522,000.00
Subbase/Base	$ 1,053,000.00	$ 877,000.00
Engineering	$ 13,463,000.00	$ 11,449,000.00
Right-of-Way	$ 4,660,000.00	$ 4,102,000.00
Other Costs	$ 8,564,000.00	$ 7,085,000.00
PV Total Cost	**$ 81,600,000.00**	**$ 67,589,000.00**
PV Salvage Value	$ 16,447,000.00	$ 6,108,000.00
(PV Total Cost - Salvage Value)	**$ 65,153,000.00**	**$ 61,481,000.00**
Benefit-Cost Ratio	**3.959**	**2.312**

4. Environmental Assessment Worksheet

This environmental assessment of the preferred alternative is based on the State of Minnesota's Environmental Assessment Worksheet (EAW). This section replicates the July 2013 version of the standard form used in Minnesota for environmental review of projects that meet specific thresholds per Minnesota Rule 4410.4300. Federal environmental regulations not addressed in the EAW form are addressed in Section 5.0, Additional Federal Social, Economic, and Environmental Issues.

4.1 Project Title

Anoka Highway 10/169 Safety and Mobility Improvement Project

4.2 Proposer

City of Anoka

Contact person: Ben Nelson

Title: Engineering Technician

Address: 2015 First Ave North

City, State, ZIP: Anoka, MN 55303

Phone: 763-576-2785

Fax: N/A

Email: bnelson@ci.anoka.mn.us

4.3 RGU

Contact person: Brigid Gombold

Title: Environmental Coordinator

Address: 1500 West Cty Rd. B2

City, State, ZIP: Roseville, MN 55113

Phone: 651-234-7674

Fax: N/A

Email: brigid.gombold@state.mn.us

4.4 Reason for EAW Preparation

(check one)

Required:

☐ EIS Scoping

☒ Mandatory EAW

Discretionary:

☐ Citizen petition

☐ RGU discretion

☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

4410.4300 subp 22 Highway Projects, (B). For construction of additional travel lanes on an existing road for a length of one or more miles.

4.5 Project Location

County: Anoka

City/Township: Anoka

PLS Location (¼, ¼, Section, Township, Range):

NESE of Section 35-32-25
NWSE of Section 35-32-25
NESW of Section 35-32-25
SESE of Section 35-32-25
SWSE of Section 35-32-25
NENE of Section 2-31-25
NWNW of Section 1-31-25
NWNE of Section 2-31-25
SWNW of Section 1-31-25
SENW of Section 1-31-25
SWNE of Section 1-31-25
NESW of Section 1-31-25
NWSE of Section 1-31-25

Watershed (81 major watershed scale): Rum River

GPS Coordinates: N/A

Tax Parcel Number: N/A

At a minimum attach each of the following to the EAW:

- **County map showing the general location of the project;**

See **Figure 2-1** in **Appendix A**

- **U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and**

  See **Figure 4-1** in **Appendix A**

- **Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.**

  - **Figure 4-2**, Existing Land Use
  - **Figure 4-4**, Soils
  - **Figure 4-5**, Water Resources
  - **Figure 3-1**, Project Layout
  - **Figure 5-**1, Right-of-Way Needs

4.6 Project Description:

a. **Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).**

This Hwy 10/169 project includes replacing the traffic signal at Thurston Ave with an interchange, the signal at Fairoak Ave with an underpass, and reconstructing the interchange at Main St. At-grade highway access points within the project area will be eliminated. Local connections for motorized and non-motorized travels will be improved.

b. **Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.**

The preferred alternative is described in Section 3.3, and shown in **Figure 3-1**, Project Layout. Construction elements are summarized below:

- Demolish targeted buildings including service removal
- Remove existing roadway material and topsoil
- Excavate and place material for storm ponds
- Excavate material from under the proposed new roadway areas
- Lay storm sewer/watermain/sanitary sewer
- Move overhead power lines underground
- Construct retaining walls
- Place/compact material for new roadbed and embankments

- Construct roadway and non-motorized pavements
- Construct center concrete barrier with overhead signing
- Construct bridges, which will include:
    - Place approach roadway embankments
    - Drive pile
    - Construct abutments and piers
    - Install bridge girders
    - Construct concrete decking
- Install lighting of the corridor and the roundabouts

Excavated materials will be re-used for overlay, aggregate or embankment purposes where appropriate, and in accordance with best management practices established in MnDOT's Standard Specifications for Construction.

Demolition will be performed in accordance with Minnesota Rules 7035.0805 (the "Pre-Renovation and Demolition Rule"). Hazardous materials within the structures will be identified, removed prior to demolition per Minnesota Pollution Control requirements, and disposed in accordance with applicable federal, state, and local regulatory requirements.

The project will require two full construction seasons to complete. The anticipated starting date is in 2022 and the anticipated approximate completion date in 2024. A construction sequencing/phasing plan will be completed as part of final design.

c. **Project magnitude:**

Table 4-1: Project Magnitude

Total Project Acreage	88.0 acres
Linear project length	1.5 miles
Number and type of residential units	N/A
Commercial building area (in square feet)	N/A
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	N/A

d. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

The purpose of the Hwy 10/169 Safety and Mobility Improvement Project is to reduce crashes and improve traffic operations. This will result in improved mobility and reliability for all users of the project corridor (see Section 2.4 for details). Project needs are described in detail in Section 2.1 and 2.2 of this document.

e. **Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes ✓ No**
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

Highway improvements are anticipated to occur on Hwy 10/169 to both the east and west of the project area. To the east, MnDOT is planning to replace the Hwy 10 Rum River Bridge in the early 2020s. MnDOT is also studying potential improvements to the Hwy 10/MN 47/Ferry St interchange. To the west of the project area, the City of Ramsey is currently studying potential improvements to the highway within the city's limits. MnDOT and the City has and will continue to coordinate closely regarding the interplay of the Hwy 10/169 Safety and Mobility Improvement Project and other Hwy 10/169 projects.

Future land (re)development could occur within the project area, however, specific plans are not in place. The type and density of development will depend on market forces and the City of Anoka's land use regulations. Future environmental reviews will be considered on a project by project basis and will be based on specific development plans.

f. **Is this project a subsequent stage of an earlier project? ✓Yes ☐ No**
If yes, briefly describe the past development, timeline and any past environmental review.

MnDOT and the City of Anoka, along with other partners, have been pursuing safety and mobility improvements along Hwy 10/169 for several years. Details regarding these efforts are provided in the Alternative Development and Screening Process included in Section 3.2 of this

Environmental Assessment. Appropriate environmental reviews and permits were completed as part of past projects, including construction of the Hwy 10/169 interchange at Armstrong Blvd in the City of Ramsey.

4.7 Cover Types

Estimate the acreage of the site with each of the following cover types before and after development:

Table 4-2: Project Cover Types

	Before	After		Before	After
Wetlands	0.0	0.0	Lawn/landscaping	35.41	32.48
Deep water/streams	n/a	n/a	Impervious surface	49.13	52.59
Wooded/forest	3.29	0	Stormwater Pond	0.21	2.97
Brush/Grassland	0	0	Other (describe)	0	0
Cropland	0	0			
			TOTAL	**88.04**	**88.04**

4.8 Permits and Approvals Required

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. ***All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.***

Table 4-3: Required Permits and Approvals

Unit of government	Type of application	Status
Federal		
FHWA	Environmental Assessment	In process
MnDOT CRU on behalf of FHWA	Section 106 (Historic/Archaeological Determination)	Complete
MnDOT OES on behalf of FHWA	Endangered Species Act Section 7 Determination	Complete
US Corps of Engineers	Section 404 Clean Waters Act permit, Section 401 Rivers and Harbors Act permit	To be requested
State		
MnDOT	Environmental Assessment Worksheet	In process
MnDNR	Public Waters Work Permit	To be requested
MPCA	National Pollutant Discharge Elimination System (NPDES)	To be requested
Local		
Metropolitan Council	Controlled Access approval	To be requested
Anoka	Municipal Consent	To be requested
Anoka/Lower Rum River Watershed Management Organization (WMO)	Drainage permit	To be requested
Lower Rum River WMO (as Local Government Unit [LGU])	Wetland Conservation Act permit	To be requested

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19.

If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

4.9 Land Use

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

The existing land uses along the Hwy 10/169 project area consist of residential, retail, commercial, office, educational, churches, cemeteries, and parks. These uses are shown on **Figure 4-2**.

The retail and commercial areas mainly consist of restaurants, gas stations, and auto shops.
Educational facilities include Anoka Technical Collage and Secondary Technical Education Program (STEP). Three churches including the Church of Jesus Christ of Latter-day Saints, Grace Life Church, and Eagle Ridge Church are located along the Hwy 10 service road. Three cemeteries - Oakwood Cemetery, Forest Hill Cemetery, and Calvary Cemetery - are located adjacent to the highway.

John Ward Park is located to the south and west of the Hwy 10 and Main St interchange. The Mississippi River Community Park & Kings Island are located south and west of the Highway 10 and Thurston Ave intersection. The Green Haven Country Club is located north of the project area and a regionally significant ecological area exist on the western most edge of the project area. No farmlands are located within the project area.

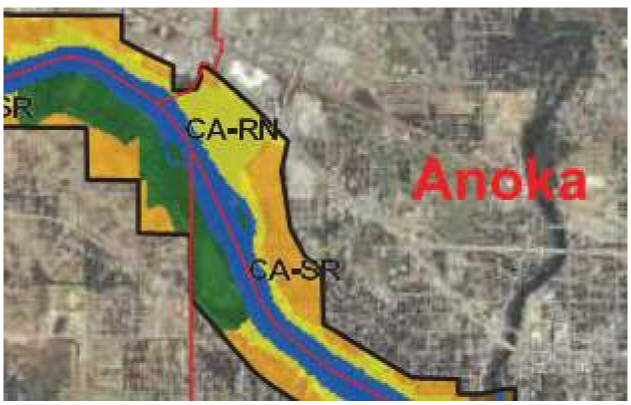
ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

Planned land uses identified in the City of Anoka's 2040 Comprehensive Plan are shown on **Figure 4-3**. The land uses along the project corridor consist of commercial, industrial, institutional, and open space. Land uses in the area must comply with the allowed permitted and conditional uses for the designated zoning district (see EAW Item 9.a.iii below).

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The project area is encompassed by the Highway Commercial (C-4) zoning district, as identified in the City of Anoka's 2040 Comprehensive Plan. There are no overlay districts in the project area.

The Mississippi River traverses the southern and western edges of the City of Anoka.
The Mississippi River Corridor Critical Area Program (MRCCA) is a joint state, regional and local program that provides coordinated planning and management for the 72 mile stretch of the Mississippi River through the seven-county metropolitan area and 54,000 acres of surrounding land across 30 local jurisdictions. The MRCCA shares a boundary with the Mississippi National River and Recreation Area (MNRRA), a unit of the National Park Service. The boundaries of the MRCCA and the MNRRA are depicted in the existing land use **Figure 4-2**. The MRCCA is divided into six districts: Rural & Open Space District (CA-RAS), River Neighborhood District (CA-RN), River Towns & Crossings District (CA-RTC), Separated from River District (CA-SR), Urban Mixed District (CA-UM), and Urban Core District (CA-UC). The project area falls partially within the CA-RN district of the MRCCA, as shown in the image below.



Source: MRCCA District Map – Anoka to Brooklyn Park (https://files.dnr.state.mn.us/waters/watermgmt_section/critical_area/map_anoka-brooklynpark.pdf)

Within the CA-RN district are setbacks including a Shoreland Impact Zone (SIZ) and Bluff Impact Zone (BIZ). Development is limited in the setback areas, including transportation and vegetation removal activities. Maintaining a vegetated buffer to both physically and visually separate the River from the highway should be a high priority for this project. The figure below provides the dimensional standards published by the MnDNR.

This project area is in close proximity to a steep slope leading to a side channel of the Mississippi River that separates Kings Island from the mainland.

	CA-ROS	CA-RN	CA-RTC	CA-SR	CA-UM	CA-UC
Height	35'	35'	48'*	Underlying zoning	65'*	Underlying zoning
River Setback	200'	100'	75'	NA	50'	Underlying zoning
Bluff Setback	100'	40'	40'	40'	40'	40'

*Greater height may be allowed with a local Conditional Use Permit.

Source: MnDNR Summary of Mississippi River Corridor Critical Area Rules https://files.dnr.state.mn.us/waters/watermgmt_section/critical_area/summary_rules.pdf)

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 4-9a above, concentrating on implications for **environmental effects.**

The proposed project is compatible with existing and planned nearby land uses. It is also consistent with the goals and objectives of the Comprehensive and Transportation Plan for the City of Anoka. See Item 6.2 of this EAW form for a description of anticipated right of way impacts, which includes some city owned property along the highway. Anticipated permanent and temporary easement acquisitions will not preclude any future planned land uses on affected properties.

The proposed transportation improvements associated with the preferred alternative will not result in substantial land use changes. No existing parkland/open space will be converted to a transportation use.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

The proposed project is compatible with existing or planned land uses, no land use mitigations are required. As strongly recommended by the National Park Service, the project will maintain a vegetated buffer to both physically and visually separate the Mississippi River from the reconstructed Hwy 10/169 and the exit ramp in in the southwest quadrant of the interchange with Thurston Ave/Cutters Grove Ave. During construction, no staging will occur within and no equipment or materials will be placed within the boundary of the Mississippi River and Recreation Area (NRAA). See the letter from the National Park Service in **Appendix I** and the List of Commitments in **Appendix N** for additional information.

4.10 Geology, Soils and Topography/Land Forms

a. **Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.**

According to the *Bedrock Geology of the Anoka Quadrangle, Anoka and Hennepin Counties, Minnesota*, the uppermost bedrock units underlying the project area are the St. Lawrence and Franconia formations which consist of interbedded dolomite, sandstone, siltstone, and shale. Depth to bedrock is generally greater than 90 feet below ground surface. There are no known susceptible geologic features such as karst conditions in the project area. The proposed project does not pose a threat to impact groundwater resources.

b. **Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.**

Anoka is situated along the northern bank of the Mississippi River on the eastern edge of an area known as the Anoka Sand Plain. This area consists of glacio-fluvial deposits formed by meltwater streams associated with the realignment of the Mississippi River following the drainage of glacial Lake Grantsburg. According to the Surficial Geology of the Anoka 30 x 60 Minute Quadrangle, Minnesota Geological Survey, 1999, soils in the Anoka area consist mainly of silty, fine to medium-grained sand with gravel.

The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture classifies soils into hydrologic soil groups A – D:

- Group A – Soils with a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands.
- Group B – Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately course texture.
- Group C – Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.
- Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.

Soils within the project area are shown on **Figure 4-4**. Soils within the project area are Group A soils. Other than the highly permeable nature of the soils, the project area does not have steep slopes or other surficial features which would lead to elevated potential for erosion losses. Construction limits encompass a total area of approximately 88.0 acres. An approximate 44,100 cubic yards will be excavated; the estimated volume of fill is approximately 334,100 cubic yards.

The project will require a National Pollution Discharge Elimination System (NDPES) construction Permit as administered by the Minnesota Pollution Control Agency. This permit will identify best management practices (BMPs) that will be used during construction activities to limit the potential for erosion and sedimentation losses. The permanent stormwater control measures will comply with NPDES and Lower Rum River Watershed Management Organization (LRRWMO) standards as adopted and administered by the City of Anoka. Further information is provided in Item 11.b.ii.

4.11 Water Resources

a. **Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.**

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Public Waters

Surface water features in the project area are depicted on **Figure 4-5**. This includes two Minnesota Department of Natural Resources (DNR) Public Waters Waterways and two DNR Public Waters Wetland Basins:

- Mississippi River – Public Waters Waterway
- Rum River – Public Waters Waterway
- Unnamed Basin 107W – Public Waters Wetland Basin
- Unnamed Basin 108W – Public Waters Wetland Basin

The Mississippi River from the northwest Anoka city limit to the Rum River had been listed as impaired for fecal coliform but was delisted in 2012. The Rum River, located to the east of the project area, is on the Minnesota Pollution Control Agency's (MPCA) Impaired Stream list due to mercury in fish. There are no other Impaired Waters within a mile of the project area.

Wetlands

The project area is characterized by the extensive presence of sandy soils. Correspondingly, there are few wetlands in the area. Field review/delineations have been performed for the project area on the following dates:

- June 9, 2015
- June 19, 2015

- August 22, 2017
- June 1, 2018

The June 9, 2015 delineation work identified one wetland on the north side of Hwy 10/169 approximately 200 feet west-northwest of Fairoak Ave ("I1", **Figure 4-5**). The delineation and no loss determination for this wetland was approved under the Minnesota Wetlands Conservation Act (WCA) in November of 2015 and under Section 404 of the US Clean Water Act in September of 2016. The no loss determination was based on characterization of the wetland as incidental and constructed in an upland area. Per WCA and Section 404 regulations, this wetland can be impacted without mitigation.

A delineation report covering all delineation work done within the Hwy 10/169 project limits is provided in **Appendix F**. None of the fieldwork subsequent to June 9, 2015 discovered the presence of regulated wetlands in the project area.

The Department of the Army Corps of Engineers (Corps of Engineers) has provided the City of Anoka with an approved jurisdictional determination for the project area. This letter, in **Appendix F**, indicates the project area contains no waters of the United States subject to the Corps of Engineers jurisdiction. Therefore, no authorization is required to discharge dredged or fill material within the project area.

ii. Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Based on the Minnesota Department of Health data, known wells in the project area are presented in **Figure 4-5**. Well logs that include these wells are provided in **Appendix G**. Based on information from these well logs, depth to groundwater in the project corridor is generally in the range of 20 to 50 feet. As identified previously, the proposed project is not anticipated to represent a threat to groundwater resources.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. **Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.**

The project will not generate wastewater.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Not applicable.

2) **If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.**

Not applicable.

3) **If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.**

Not applicable.

ii. **Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.**

Existing Drainage System

The existing surface drainage patterns and receiving waters for the project area are depicted in **Figure 4-5**. From west to east, the drainage system currently serving the project area is described below.

<u>Hwy 10/169 from West City Limit to Thurston Ave/Cutters Grove Ave</u> – Highway drainage flows west overland via ditching to a drainage channel directly south of the westerly Anoka Technical College parking lot. This channel flows south and outlets to the Kings Island oxbow channel. This channel flows to the Mississippi River.

<u>Thurston Ave north of Hwy 10/169</u> – From the railroad tracks south to the Hwy 10/169 service road, stormwater drains to storm sewer intakes at the service road intersection. This storm sewer runs west and south, passing under the highway and discharging to the Kings Island oxbow channel at a point approximately 1,000 feet west-northwest of the Hwy 10/169 intersection at Thurston Ave/Cutters Grove Ave. From the service road south to Hwy 10/169, Thurston Ave stormwater drains south to the Hwy 10/169 ditch system which then flows west and discharges to the Kings Island oxbow channel as described under the previous heading.

Hwy 10/169 from Thurston Ave/Cutters Grove Ave to 500 feet east of Thurston Ave/Cutters Grove Ave – The north side of the highway drains west into the highway ditch system described under the first drainage description heading, above. The south side of the highway drains west and enters the City storm sewer system at Cutters Grove Ave south of Hwy 10/169, which discharges to a stormwater basin near Rivlyn Ave NW and eventually to the Kings Island oxbow channel. This channel flows directly to the Mississippi River. The storm sewer system south of the highway also serves the service road section between Cutters Grove Ave and Cutters Lane.

Hwy 10/169 from 500 Feet East of Thurston Ave/Cutters Grove Ave to East Project Limit – Stormwater on both sides of the highway and in the median drains east via ditch to the MnDOT storm sewer system at Fairoak Ave. This system serves the Fairoak Ave intersection and Main St interchange area in Hwy 10/169. This system is routed east along the north side of the highway to a 6-acre pond (Public Water 108W, see **Figure 4-5**) directly east-northeast of the Main St. interchange. Drainage is conveyed east from this pond, via MnDOT storm sewer along Hwy 10/169 to the Rum River approximately ½ mile to the east. MnDOT's stormwater system picks up substantial municipal drainage from both sides of the highway through this segment.

Stormwater Control for Proposed Action

The project will increase impervious surfaces from 49.13 acres to 52.59 acres, an increase of 3.46 acres, or 7.0 percent. This will result in corresponding increased runoff volumes, rates, and pollutant loading relative to existing conditions.

The project is located entirely within the boundaries of the Lower Rum River Watershed Management Organization's (LRRWMO). The LRRWMO's stormwater control requirements have been adopted by the City of Anoka, which is the permitting agency. The project will comply with all applicable LRRWMO requirements, which are summarized in **Table 4-4**.

Table 4-4: Summary Lower Rum River WMO Drainage Control Standards

Volume Control	A volume equal to one inch of run-off from impervious surfaces per LRRWMO standards
Rate Control	2-year, 10-year, and 100-year 24-hour duration events
Water Quality	Meeting the identified volume and rate control requirements through infiltration measures will provide the required water quality control performance

The project will also require a National Pollutant Discharge Elimination System (NPDES) permit as administered by the MPCA. Because the project will add more than one acre of new impervious surface, permanent engineered controls will be required for the new impervious areas. Meeting LRRWMO standards as addressed above is anticipated to satisfy NPDES permanent stormwater management requirements.

Hwy 10/169 in the project area now has a rural section design, using ditching for stormwater conveyance. The proposed project will convert approximately 70 percent of the mainline to urban section design with curb and gutter. The areas that will remain ditched are: a) the right shoulder of the eastbound lanes from the west project limit to approximately ¼ mile east of this point, b) the right shoulder of the westbound lanes between Thurston Ave and Main St, and c) the right shoulder of the eastbound lanes from Main St to the east project limit.

Existing overall drainage patterns will be maintained, and additional stormwater control will be provided through ponds meeting applicable LRRWMO and NPDES standards. Based on preliminary evaluation, approximate pond locations are depicted on **Figure 3-1**. Drainage on local streets that are part of the proposed project will also follow existing patterns and will be treated through ponding in accordance with applicable LRRWMO and NPDES requirements. The predominance of sandy soils in the project area is conducive to volume control for stormwater runoff.

iii. **Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation**.

It is not anticipated that dewatering activities will be required during construction. However, if it is determined during final design that dewatering is necessary, a DNR appropriations permit would be obtained. Coordination with the Lower Rum River Watershed Management Organization would also take place as appropriate. Once completed, the project will not require groundwater appropriation.

iv. **Surface Waters**

a) **Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland**

mitigation for unavoidable wetland impacts will occur in the same minor or major watershed, and identify those probable locations.

Information on existing wetlands on the project area was provided in EAW Response 11.a.i, above. Based on preliminary design, the project will not have wetland impacts.

b) **Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.**

No anticipated physical effects or alterations to other surface water features are anticipated to result from this project.

4.12 Contamination/Hazardous Materials/Wastes:

a. **Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.**

Risk Factors

The presence of contaminated properties (including properties with soil and/or groundwater that are negatively affected by pollutants, contaminants, or hazardous wastes) is a concern in the development of highway projects because of the liabilities associated with ownership of such properties, the cleanup costs, and the safety concerns for construction personnel. Contaminated materials encountered during highway construction projects must be properly handled and treated in accordance with state and federal regulations. Improper handling of contaminated materials can exacerbate their impact on the environment. Contaminated materials also cause adverse impacts to highway projects by increasing construction costs and causing construction delays.

Phase I Environmental Site Assessment (ESA)

As part of the Early Notification Memo (ENM) process, MnDOT's Contaminated Materials Management Team (CMMT) reviewed the project area on a preliminary basis (see CMMT response provided in **Appendix I**). The CMMT concluded that multiple petroleum and non-petroleum contaminated sites are located within approximately 500 feet of the project area and concluded that the project has a medium to high risk of impacting potentially contaminated sites. Therefore, additional evaluation of the project area was deemed necessary. This evaluation has been performed as summarized below.

A Limited Phase I ESA was performed to identify potentially contaminated sites (American Engineering Testing, January 2018). This review was based on the following methods:

- Review of areas within 500 feet of the project construction limits
- Review of environmental databases, historical records, and records available from the Minnesota Pollution Control Agency (MPCA)
- Interviews with local and state government staff familiar with the project corridor
- Field reconnaissance of the project corridor

Using criteria established by MnDOT, the Phase I ESA ranked/classified all identified properties within the project corridor has having high, medium, low, or de minimis potential for contamination. A total of 29 properties (referred to as "sites") of with either Low, Medium, or High potential for contamination. The rest of the sites were classified as de minimis (very low potential for contamination). A map summarizing these findings is provided in **Appendix H**. The medium potential sites are summarized in **Table 4-5**; potential high risk sites are identified in **Table 4-6**.

Table 4-5: Phase I ESA Medium Potential Risk Sites

SITE NO.	SITE NAME	DESCRIPTION/RANKING RATIONALE
1	Diamond Auto Inc.	Closed LUST* site
4	Continental Post Services	Closed LUST site
5	Former Total Petroleum	Former bulk facility, former gas station, closed LUST site
6	Anoka Technical College	CESQG*, tank site, multiple closed LUST sites
12	Kwik Trip	Tank site, closed LUST site
15	Office Building	Former auto repair, CESQG
16	Liquor Store/Fraser	Former boat repair, CESQG
18	Honest 1 Auto Care	Former gas station, removed tank site, closed LUST site
19	Clark Station	Auto repair and gas station, tank site, CESQG, spill site
20	Great Plains Gas Co Spill	Spill site, 500 gallons spilled into road ditch
21	Pawn America	Closed in-place tank site
22	J and J Automotive Service	Auto Repair
23	Anoka Park and Golf Maintenance	Vehicle repair and maintenance
25	Tire Zoo	Auto repair
26	Sign Station Inc.	Former gas station, closed LUST site
28	Anoka Meat & Sausage	Former gas station, two closed LUST sites
29	Military Memorial Site (moved in 2018)	Undocumented fill with ashes, cinders

*LUST = Leaking Underground Storage Tank; CESQG = Conditionally Exempt Small Quantity Generator (hazardous waste)

Table 4-6: Phase I ESA High Potential Risk Sites

SITE NO.	SITE NAME	DESCRIPTION/RANKING RATIONALE
2	Former Dump	Mississippi Trail dump site
11	Vista/Federal Premium	Former IMI Cornelius, Inc., multiple VIC* listings, RCRA CORRACTS*, closed LUST* site17
17	SuperAmerica	Closed and open LUST sites, active gas station
24	Ward Park	Old Anoka dump site
27	Anoka Shopping Center	Dry cleaner, CESQG*, former gas station and laundromats

*VIC = Voluntary Investigation and Cleanup Program (Minnesota Pollution Control Agency); RCRA CORRACTS = Resource Conservation and Recovery Act Corrective Action Site (US Environmental Protection Agency; CESQG = Conditionally Exempt Small Quantity Generator

Since the Phase I ESA study was completed, project construction limits were extended approximately 1,000 feet to the east. A search of the MPCA's What's In My Neighborhood database did not identify any contamination sites of concern within 500 feet of the extended project limits.

The Phase I ESA recommended preparing a Phase II drilling plan to describe the soil boring locations within the project's planned excavation areas that should be evaluated for potential of encountering impacted soil and/or groundwater. This plan will be prepared and reviewed by MnDOT's Contaminated Materials Management Team (CMMT) prior to finalization. Phase II work will be performed in accordance CMMT guidance. If contaminated materials are encountered during construction, materials will be managed in accordance with all applicable local, state, and federal regulatory requirements.

If guardrail posts have treated wood, this material will be separated and taken to an MPCA-permitted sanitary or industrial waste landfill. Documentation that the waste was handled properly will be kept in the project file for future reference.

b. **Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.**

Solid wastes generated will be typical of roadway construction projects of similar type and scale. All solid wastes generated by project construction will be disposed of properly in an MPCA-permitted solid waste landfill. Demolition of concrete, asphalt, and other potentially recyclable construction materials will follow MnDOT specifications and special provisions. Additional concrete guidance can be found at: https://www.dot.state.mn.us/environment/regulatedmaterials/guidance.html

c. **Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.**

Chemicals/hazardous materials anticipated to be on-site during the construction include petroleum products such as gasoline, diesel fuel, and other engine fluids for maintaining construction equipment. No above or below ground storage tanks are planned for use during the construction project. Any hazardous materials used during construction will be stored in leak-proof containers and locked away while not in use. The field engineer/inspector will be responsible for ensuring safe handling of any hazardous materials during the proposed construction. All unused materials will be removed, and if needed, disposed of consistent with applicable environmental regulations.

If a spill of chemical/hazardous materials should occur during or after the construction process, the Minnesota Duty Officer will be notified. Any contaminated spills or leaks that occur during construction are the responsibility of the contractor, who will be required to respond to according the MPCA containment and remedial action procedures.

Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Building demolition will be performed in accordance with Minnesota Rules 7035.0805 (the "Pre-Renovation and Demolition Rule"). This will entail identifying hazardous materials within structures, removal prior to demolition per MPCA requirements, and disposal in accordance with applicable federal, state, and local regulatory requirements.

4.13 Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features)

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The majority of the project area is largely composed of developed land uses and roadways. A small number of urban trees and woodlands exist in the project limits.

The west end of the project area is in close proximity to a steep slope leading to a side channel of the Mississippi River that separates Kings Island from the mainland. Mississippi River floodplain, Kinds Island, and an oxbow of the Mississippi River are also located near the far west end of the study area, south of Hwy 10/169 project area.

Wildlife in the area is primarily limited to species that have adapted to live in urbanized areas, including those commonly occurring in Minnesota, such as raccoons, squirrels, rabbits, and various birds. The City of Anoka has established a waterfowl hunting zone along Kings Island. The City retains guidelines to the hunting zone including number of hunters, hunting periods and coordination with other public uses of Kings Island.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB _20080689_) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

The Minnesota Department of Natural Resources (MNDNR) Natural Heritage letter is provided in **Appendix I**. This letter includes the findings from review of the National Heritage Information System (NHIS) database which includes information about reported occurrences of rare, threatened, and endangered species or critical habitats. The NHIS identified two resources within an approximate one-mile radius of the Highway 10 project limits (S.P. 0202-90). These include Blanding's Turtles (Emydoidea blandingii) and a Regionally Significant Ecological Area (RSEA).

Blanding's turtle habitat includes wetlands (marshes and ponds) and upland habitats that are both developed and undeveloped. Blanding's turtle, identified in the NHIS database, is an endangered species and has a threatened status in Minnesota. T32N R25W Section 35 and T31N R25W Section 2 contain a Regionally Significant Ecological Area (RSEA). In 2003, the DNR Central Region, in partnership with the Metropolitan Council, conducted a landscape-scale assessment of the seven-county metro area that identified ecologically significant terrestrial and wetland areas. The mapping of RSEAs was done using two primary data sources. The first data source was native plant communities mapped by the Minnesota County Biological Survey. The remaining areas were derived using a modeling process that predicts the likelihood that high quality native animal habitats exist in a contiguous area.

The NHIS was also reviewed by DNR-MnDOT Liaison staff, Peter Leete, who responded with new records for rare native mussels reported in the Mississippi River. Caution would need to be taken with the project not adding adverse conditions during construction or from permanent stormwater treatment facilities. The email from Peter Leete is provided in **Appendix I**.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

No substantial impacts to fish, wildlife, or ecologically sensitive resources are expected because of the Hwy 10/169 project. Impacts to existing vegetation, including removal of trees and other vegetation will occur from construction of the project. No birds protected under the Federal Migratory Bird Treaty Act will be destroyed or harassed by this project.

The introduction of exotic, non-native, or invasive species can change a diverse native plant community into a monotype of undesirable species. No noxious and invasive weeds will be spread during project construction. Construction BMPs will be used to control and prevent spreading of invasive species (including MnDOT's 2018 Standard Specifications for Construction, Section 2572).

As discussed in EAW Item 13.b., the NHIS database identified Blanding's turtles and native mussels, and a Regional Significant Ecological Area (RSEA). Blanding's turtles may be encountered onsite. Workers will be made aware of encountering Blanding's turtles, turtles may be moved if they are in harm's way. While the exact location of the RSEA is not known, care will be taken to protect native plant communities that may exist outside of the construction limits, such as the use of temporary fences for tree protection. The records for the native mussels are located within the Mississippi River, and the comment includes caution about the project not adding adverse conditions during construction or from permanent stormwater treatment facilities. No impacts are anticipated to the Mississippi River and therefore, none to native mussels. See Appendix I for results of the 2008 review and the recent communication with MNDNR.

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

Trees and vegetation within the project limits will be removed during construction. Trees and vegetation that lie outside construction limits will be protected by limiting construction activities through use of temporary fencing and other methods, consistent with MnDOT's Standard Specifications for Construction, item 2572.3. General guidelines for protecting and restoring vegetation included in MnDOT's 2018 Standard Specifications for Construction, Section 2572 will be adhered to during construction.

This project requires clearing and/or trimming of approximately 3.3 acres of trees. There are no documented northern long-eared bat maternity roost trees and/or hibernacula within the project area. Appropriate measures will be taken to meet the final 4(d) rule for the northern long-eared bat. To avoid a "take" of this species and impacts on their habitat, the final 4(d) rule states: "Incidental take caused by tree removal is prohibited if it: (1) Occurs within a 0.25 mile (0.4 kilometer) radius of known northern long-eared bat hibernacula; or (2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the known maternity tree during the pup season (June 1 through July 31)."

In accordance with MnDOT Technical Memo 17-04-ENV-02, project proponents have checked the MnDNR / USFWS map of townships known to contain northern long-eared bat hibernacula and/or roost trees, and the project falls outside an identified township. Since the project requires clearing more than 2.5 acres of trees, tree clearing will take place during the winter season - between November 1 and March 31 - to minimize impacts to protected bats during the pup rearing season (June 1 through July 31).

4.14 Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The proposed project was reviewed by MnDOT Cultural Resources Unit (CRU) staff for potential impacts to historic resources. The CRU found that the Area of Potential Effects (APE), consisting of proposed construction limits, had been previously surveyed. No significant or potentially significant structures are within the APE. There are no known or suspected archaeological sites within the APE as it is either intensively disturbed or has low probability to contain archaeological resources.

Three cemeteries are adjacent to the construction limits (see **Figure 3-1**). A survey was conducted using ground-penetrating radar (GPR) to assess potential for the project to impact unknown and unmarked burials which are protected by the Minnesota Private Cemeteries Act. Based on the GPR data, no burials are suspected in areas proposed for grading; however, there is potential for unmarked burials to remain undetected, therefore earthmoving activities will be monitored by a professional archaeologist at in-kind replacement of a culvert within Forest Hill Cemetery and selected areas near Calvary Cemetery.

4.15 Visual

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The project area is composed of an existing highway corridor that is largely developed with industrial, commercial, and multi-family residential land uses. There are no scenic views or vistas within the project area. Negative visual impacts are not anticipated as the project area consists of existing transportation infrastructure, along with commercial, institutional, and residential developments, and open space (cemeteries and parks).

The proposed project includes grade separations of Highway 10/169. An overpass of Hwy 10/169 over Thurston Ave will be introduced, as well an underpass of Fairoak Ave under Hwy 10/169. Intersections of Hwy 10/169 and Main St and Greenhaven Rd will also be replaced with roundabouts. Some trees and shrubs will be removed as part of construction activities; shrubs and trees will also be replaced as part of construction.

Visual impacts associated with construction will include the presence of heavy construction equipment and disruption of the existing land scape. These impacts will be noticeable to those traveling through the project area, and those visiting, living, or working in the project area. This may present an adverse impact during construction; however, it is temporary and will be removed after construction.

4.16 Air

a. **Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project’s effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

The proposed uses of the site will not generate stationary source air emissions.

b. **Vehicle emissions - Describe the effect of the project’s traffic generation on air emissions. Discuss the project’s vehicle-related emissions effect on air quality.**

Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

The following summarizes the results of the Air Quality Analysis Report in **Appendix J**.

Air Quality Evaluation for Transportation Projects

Motorized vehicles emitting airborne pollutants which affect air quality. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing vehicles volumes and congestion levels.

The air quality impacts analysis for transportation projects addresses criteria pollutants - a group of common air pollutants regulated by the EPA on the basis of criteria (information on health and/or environmental effects of pollution). The EPA's Criteria pollutants include ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Projected concentrations of these pollutants are compared to National Ambient Air Quality Standards (NAAQS). The EPA also regulates Mobile Source Air Toxics (MSAT), in addition to the criteria air pollutants.

Qualitative analyses were conducted for ozone, particulate, nitrogen dioxide, lead, and sulfur dioxide. The proposed project will not cause exceedances of the NAAQS for any of these pollutants (see the Air Quality Analysis Report in **Appendix J**).

The following air quality elements are addressed in the following sections: conformity to Minnesota's State Implementation Plan (SIP), a Carbon Monoxide (CO) Analysis, and a Mobile Source Air Toxics (MSAT) analysis.

Conformity of Project Alternatives to State Implementation Plan (SIP)

The Hwy 10/169 project area is designated by EPA as in attainment (or complying) with the NAAQS for all air pollutants. While the project area is in attainment with the CO NAAQS, the project area was formerly a nonattainment area for CO and is currently a "maintenance" area for this pollutant. Therefore, Transportation Conformity rules (40 CFR 93, Subpart A) apply only to vehicle emissions of CO in the project area.

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A) that describe the methods required to demonstrate SIP compliance for transportation projects. This project is included in the Metropolitan Council's *2019-2022 Transportation Improvement Program* (TIP), and is listed as Regionally Specific. This project is not included in the transportation conformity section of Metropolitan Council's *2040 Transportation Policy Plan* (TPP) (Appendix E: Additional Air Quality Information) as a regionally significant project.

On November 8, 2010, the EPA approved a limited maintenance plan request for the Twin Cities maintenance area. Under a limited maintenance plan, the EPA has determined that there is no requirement to project emissions over the maintenance period and that,

> *…an emission budget may be treated as essentially not constraining for the length of the maintenance period. The reason is that it is unreasonable to expect that our maintenance area will experience so much growth within this period that a violation of CO National Ambient Air Quality Standard (NAAQS) would result.*

(Source: US EPA Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas, October 6, 1995, page 3-4)

Therefore, no regional modeling analysis for the Long Range Transportation Policy Plan (LRTPP) and TIP is required. However, federally- funded and state-funded projects are still subject to "hot-spot" analysis requirements. The limited maintenance plan adopted in 2010 determines that the level of CO emissions and resulting ambient concentrations will continue to demonstrate attainment of the CO NAAQS.

Project Alternatives and CO

The CO evaluation addresses the project area's worst-operating (hot spot) intersections. The EPA requires hot spot analysis for intersections with 82,300 or more vehicles entering per day. None of the intersections in the project area currently exceed 82,300 entering vehicles per day. Therefore, no hot-spot analysis or screening procedure was needed nor completed.

Improvements in vehicle technology and in motor fuel regulations have resulted in continued reductions in vehicle emission rates. The EPA MOVES 2010b emissions model estimates that emission rates will continue to decline through 2040. Consequently, year 2040 vehicle-related CO concentrations in the project area are likely to be lower than existing concentrations even considering the increase in development-related and background traffic.

On November 8, 2010, the EPA approved a limited maintenance plan request for the Twin Cities maintenance area. Under a limited maintenance plan, the EPA has determined that there is no requirement for project emissions over the maintenance period and that "an emission budget may be treated as essentially non-constraining for the length of the maintenance period. The reason is that it is unreasonable to expect that our maintenance area will experience so much growth within this period that a violation of CO NAAQS will result." Therefore, no regional modeling analysis for the LRTPP and TIP is required; however, federally funded and state funded projects are still subject to "hot-spot" analysis requirements. The limited maintenance plan adopted in 2010 determines that the level of CO emissions and resulting ambient concentrations will continue to demonstrate attainment of the CO NAAQS.

How do project alternatives address Mobile Source Air Toxics?

With Passage of the Clean Air Act Amendments (CAAA) in 1990, Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their

Integrated Risk Information System (IRIS).[3]

The EPA has also identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA).[4] These are acrolein, benzene, 1,3-butidiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter.

While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules. The 2007 EPA rules are aimed at dramatically decreasing MSAT emissions through cleaner fuels and cleaner engines.

FHWAs' tiered approach for determining the need for MSAT analysis in NEPA documents is provided below:

1. No analysis for projects without potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential for MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential for MSAT effects

FHWA guidance for MSAT analysis notes that for a project to fall into the third tier (quantitative MSAT analysis) the project would need to:

1. Create new capacity or add significant capacity to urban highways (such as interstates, urban arterials, or urban collector-distributor routes) and have traffic volumes where the annual average daily traffic (AADT) is projected to range from 140,000 to 150,000 vehicles per day or greater by the design year; and

2. Be located in proximity of populated areas

The proposed project is located in the city of Anoka with projected AADTs ranging from 67,000 to 90,000 in the affected road segments. Based on the information above, this project meets the criteria for the second category, thus calling for a qualitative MSAT emissions assessment. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives.

For both the build and the no build alternative, the amount of mobile source air toxics (MSAT) emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the estimated VMT for the build and the no build alternatives are nearly the same, varying by less than six percent, it is expected there would be no appreciable difference in overall

[3] http://www.epa.gov/iris/
[4] http://www.epa.gov/ttn/atw/nata1999/

MSAT emissions among the various alternatives.

Also, regardless of the alternative, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

During construction, particulate matter emissions will temporarily increase due to the generation of fugitive dust. The following dust controls measures will be undertaken as necessary:

- Minimize the period and extent of areas being exposed or graded at any one time
- Spray construction areas and haul roads with water, especially during periods of high wind or high levels of construction activity
- Minimize the use of vehicles on unpaved surfaces
- Cover or spray with water material piles and truckloads

4.17 Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

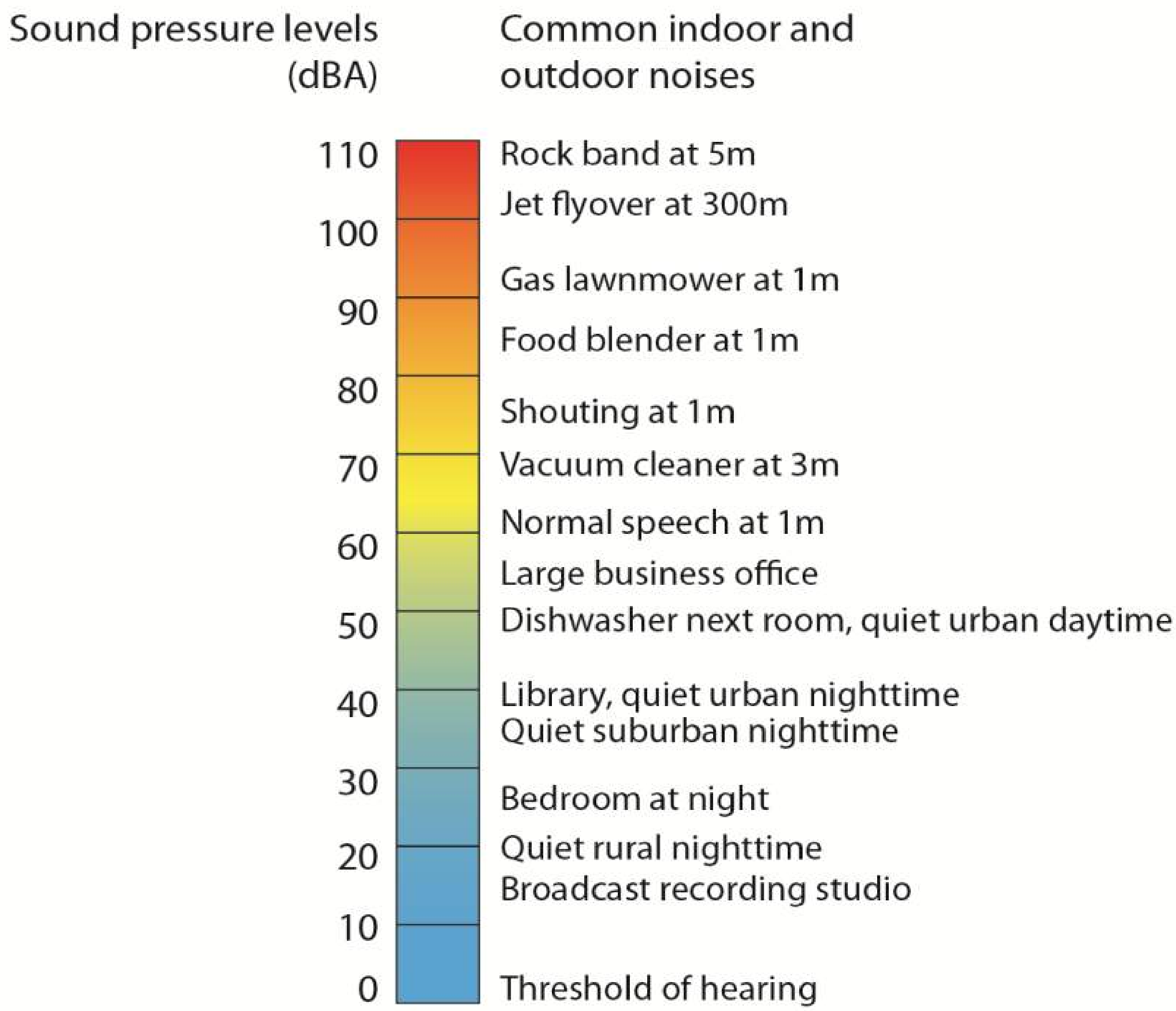
A detailed noise impact assessment study was conducted for this project. The study, including methodology and results, are provided in **Appendix K**.

Noise and Noise Descriptors

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic measure of sound energy relative to a reference energy level. For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a three dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dBA increase and it is heard as twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels during the loudest traffic hour of the day. This is expressed in terms of the L_{eq} noise level for a one-hour period. The L_{eq} is defined as "the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period." The L_{eq} is compared to FHWA noise abatement criteria.

The following chart (Minnesota Pollution Control Agency, https://www.pca.state.mn.us/air/noise-pollution) provides a rough comparison of the noise levels of some common noise sources.



Regulatory Framework

Applicable Rules and Regulations

A noise analysis was performed in accordance with MnDOT and FHWA requirements. In Minnesota, federal regulations define noise impacts. In 2016, the Commissioners of the MPCA and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of highway projects under MnDOT's jurisdiction are statutorily exempt from Minnesota State Noise Standards (MN Rule 7030) if the project applies the FHWA traffic noise requirements. As a result, any required noise analysis will follow FHWA criteria and regulations only. This project, therefore, will address the noise impacts relative to the Federal Noise Abatement Criteria.

Federal Noise Abatement Criteria (NAC)

In the Federal NAC, for residential and recreational uses (Federal Land Use Category B), the Federal Leq standard is 67 dBA. For commercial areas (Federal Land Use Category C), the Federal Leq standard is 72 dBA. Locations where noise levels are “approaching” (defined in

Minnesota as being within one decibel of the criterion threshold, i.e. 66/71 dBA) or exceeding the criterion level must be evaluated for noise abatement feasibility and reasonableness. In addition to the identified noise criteria, the FHWA also defines a noise impact as a "substantial increase" in the future noise levels over the existing noise levels. MnDOT considers an increase of five dBA or greater a substantial noise level increase.

Noise Impact Assessment Methodology

The noise analysis software TNM was used to model existing and future (2041) build and no-build noise levels at receptor locations. Traffic noise impacts were assessed by modeling peak and 2041 build and no-build noise levels at receptor sites located within the project study area. Peak noise hour traffic was based on a modeling analysis of the impacts of expected hourly total traffic and heavy truck volumes. In addition to the noise modeling, noise monitoring was conducted at locations along the project corridor to confirm existing noise levels and to assist in validating the model results.

Noise modeling receptors were selected at commercial, recreational, institutional, and residential sites along the corridor. Receptor locations were chosen based on guidance provided in the 2017 MnDOT Noise Policy. Receptor locations, shown on **Figure 4-6**, were divided into eight areas. These areas are summarized below and in detail in **Appendix K**:

- Area A – South of Hwy 10 and West of Cutters Grove Parkway;
  - Residential Receptors R85-R104, R170-R177, R179-R183
- Area B – South of Hwy 10 Between Cutters Grove Parkway and Fairoak Ave
  - Residential Receptors R110-R122, R125-R128, R130-R133, R140, R130-2nd, R130-3rd, R131-2nd, R131-3rd, R132-2nd, R133-2nd, R133-3rd
  - Commercial Receptors R105- R109, R124, R129, R134, R135, R1352, R141
  - Church Receptor R123, R130-Church
- Area C – South of Hwy 10 Between Fairoak Ave and Main St
  - Residential Receptors R142-R147, R147-1, R147-2, R147-3, R147-4, R153-R157
  - Commercial Receptors R141, R150-R152, R158, R160, R162
  - Recreational Receptors (Ballfield) R149-1 and R149-2
  - Memorial Receptor R149 (Relocated by City through an initiative separate from this project)
- Area D – South of Hwy 10 Main St and HWY 10
  - Commercial Receptor R161
  - Cemetery Receptor R159
- Area E – North of Hwy 10 and East of Greenhaven Rd
  - Residential Receptors R1, R2, R202, R203, R204, R202-2nd, R203-2nd, R204-2nd, R1-2nd, R1-3rd, R2-2nd

- Area F1 – North of Hwy 10 Between Fairoak Ave and Thurston Ave
    - Residential Receptors R12-R16, R18-R26, R28-R68, R72-R80, R771, R772
    - Commercial Receptors R17, R27, R69-R71, R82
    - Cemetery Receptor R81
- Area F2 – North of Hwy 10 Between Greenhaven Rd and Fairoak Ave
    - Healthcare Receptor R5
    - Commercial Receptors R3, R4, R6-R11
- Area G – North of Hwy 10 West of Thurston Ave
    - Educational Receptors R84, R163
    - Commercial Receptor R83, R822
    - Daycare Receptor R832

In addition to these areas, noise impacts were also evaluated at locations representing two recreational trail crossings. One is along Thurston Ave/Cutters Grove Ave, and the other is along Fairoak Ave.

Noise Impact Assessment Results by Area

- Area A – modeled noise levels do not approach the Federal NAC at any of the 33 modeled locations under existing, no-build, or build conditions.
- Area B –
    - Under the existing scenario, no modeled receptor locations approach or exceed the Federal NAC
    - Under the no-build scenario, six modeled receptor locations approach or exceed the Federal NAC, and
    - Under the build scenario, three modeled receptor locations approach or exceed the Federal NAC

  Due to certain project elements including walls and barriers, certain receptor locations have lower modeled noise levels under the build scenario than under the no-build and existing scenarios.
- Area C – modeled noise levels do not approach the Federal NAC at any of the modeled locations under existing, no-build, or build locations.
- Area D – modeled noise levels do not approach the Federal NAC at any of the modeled locations under existing, no-build, or build locations.

  Due to certain project elements including walls and barriers, certain receptor locations have lower modeled noise levels under the build scenario than under the no-build and existing scenarios.
- Area E – modeled noise levels do not approach the Federal NAC at any of the 33 modeled locations under existing, no-build, or build conditions.

- Area F1 –
  - One receptor exceeds the Federal NAC under the existing conditions,
  - Three receptors exceed the Federal NAC under the no-build condition, and
  - Four receptor locations exceed the Federal NAC under the build condition.
- Area F2 –
  - Under the existing scenario, no modeled receptor locations approach or exceed the Federal NAC,
  - Three receptor locations exceed the Federal NAC under the no-build condition, and
  - Three receptor locations exceed the Federal NAC under the build condition.
- Area G –
  - One receptor exceeds the Federal NAC under the existing conditions,
  - Two receptor locations exceed the Federal NAC under the no-build condition, and
  - Two receptor locations exceed the Federal NAC under the build condition.

Two recreational trails cross Hwy 10 on the project corridor. One is along Thurston Ave/Cutters Grove Ave and the other will be along Fairoak under the build condition. Both will pass under Hwy 10 and are immediately next to the crossing roadways under the build condition. Each of the four modeled locations representing these trails exceeds the Federal Noise Abatement Criteria under the existing, no-build, and build conditions. Because they are immediately next to the crossing roadways, it is not feasible to try to mitigate the noise at these trail locations. Noise impacts due to this project are expected to be insignificant beyond the project area.

Construction Noise

Activities required to construct the proposed project will result in increased noise levels over existing conditions. These impacts will largely be tied to construction equipment and pile driving. Peak noise levels of construction equipment obtained at 50 feet away are shown in **Table 4-7**. The equipment in this table would typically be used for site grading/preparation, which is typically the road construction phase that results in the highest noise levels.

Table 4-7: Typical Construction Noise Levels at 50'

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA) Range	Peak Noise Level (dBA) Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101
Source: Environmental Protection Agency and FHWA				

Elevated noise levels are unavoidable for temporary construction activities associated with this type of roadway construction project. High impact equipment noise, including pile driving, pavement sawing, or jackhammering, will be used during project construction. These high impact construction activities will be limited in duration to the extent possible.

MnDOT and the agency's contractor(s) are exempt from local noise ordinances. However, it is MnDOT's practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to a reasonable extent. Construction of the project is expected to last for three construction seasons. Advanced notice will be provided to affected communities of any planned and abnormally loud construction activities.

High-impact equipment noise, including pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of this project. High-impact noise construction activities will be limited in duration to the greatest extent possible. When feasible, construction will take place primarily during the less noise-sensitive daylight hours to avoid impacts during hours associated with sleep. However, night construction may be required to expedite construction, minimize traffic impacts, and improve safety. Construction or maintenance activities that will generally be prohibited during the period from 8:30 p.m. to 7:00 a.m. include pile driving/removal, concrete pavement demolition, pavement sawing, concrete crushing, and jack hammering. Construction equipment will also be required to be properly muffled and in working order.

Measures to Minimize or Mitigate Effects of Noise

Because the Federal NAC would be approached or exceeded at modeled receptor sites in Areas B, F1, F2, G, and trail crossings at Fairoak Ave and Thurston Ave/Cutters Grove mitigation measures have been analyzed.

For a noise wall to be proposed as part of a project, it must be both feasible and reasonable. Feasibility refers to physical constraints and engineering considerations (i.e., can a noise wall be constructed at this location). For noise barriers to be considered reasonable, it must meet the following three criteria:

1) It must be acoustically effective by providing a substantial reduction in noise, defined as a five decibel reduction or more. Additionally, one receiver must receive a seven decibel reduction or greater to meet the reasonableness reduction design goal.
2) It must meet MnDOT's cost effectiveness criteria of $78,500 per benefitted receptor (based on a barrier construction cost of $36/square foot), and
3) It must consider the viewpoint of the benefited residences and owners.

Benefited receptors (i.e., residences, commercial entities, industrial entities) are those that are predicted to experience noise level reductions of 5 dBA or more with the analyzed noise barrier.

The noise barriers analyzed for the project are shown in **Figure 4-6** in **Appendix A**. Modeled noise levels exceed or approach Federal Noise Abatement Criteria at receptor locations in four of the nine analyzed areas adjacent to the project (excluding the trail receptor locations as discussed previously). The four locations are:

- Area B, south of TH 10 between Cutters Grove Pkwy and Fairoak Ave,
- Area F1, north of TH 10 between Fairoak Ave and Thurston Ave,

- Area F2, north of TH 10 between Greenhaven Blvd and Fairoak Ave, and
- Area G, north of TH 10 and west of Thurston Ave.

Barriers protecting these four areas were analyzed to determine their feasibility and reasonableness per MnDOT/FHWA requirements. No noise barriers along the corridor were found to meet the MnDOT/FHWA feasibility and reasonableness requirements for noise barrier construction, no walls are proposed for this project.

Statement of Likelihood

Traffic noise analysis completed to date have resulted in the determination that no highway traffic noise abatement measures are required along Hwy 10 between Thurston Ave and Main St. Noise analyses were conducted based on preliminary design studies. Final mitigation decisions will be subject to final design considerations and if applicable, the viewpoint of benefited residents and property owners.

If it subsequently develops during final design that conditions have substantially changed, noise abatement measures may be provided. In this case, affected benefited receptors and local officials will be notified of plans to consider noise abatement measure prior to the completion of the final design process. This notification would explain changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and an explanation of noise barrier feasibility and reasonableness. Any final decision regarding installation of the proposed abatement measure will be made upon completion of the project's final design and the public involvement process.

4.18 Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

1) Existing and proposed additional parking spaces

Construction of improvements on Thurston Ave and the Green Haven Pkwy will impact the parking lot at the Secondary Technical Education Program (STEP) School which will require adjustments to the lot's layout. Access modifications to Pinewski's Ski & Board Shop will affect existing parking. The layout of both the STEP and Pinewski's Ski & Board Shop are still in development. The project team is coordinating with representatives from locations regarding changes to parking. The project will replace parking on site at both locations, at a 1:1 ratio or better.

2) Estimated total average daily traffic generated

The proposed project will not generate new vehicle trips because roads are not destinations (as are developments, businesses, schools, institutions, or residences). The proposed project will accommodate existing traffic levels and future increases in traffic forecast for area roadways. Forecasted traffic volumes without the project (No Build) for years 2021 and 2041 are shown on **Figure 4-7**, No Build AADT; forecasted traffic with the project are shown on **Figure 4-8**, Build AADT. **Table 4-8** below shows the existing and forecasted ADT along Hwy 10. See Section 3.0, Purpose and Need, for a discussion on project area traffic operations.

Table 4-8: Hwy 10 ADT Comparison

Location Along Hwy 10	Year				
	Existing (2017)	2021 No-Build	2021 Build	2041 No-Build	2041 Build
Sunfish Lake Blvd to Thurston Ave	54,400	56,300	57,000	67,100	72,100
Thurston Ave to W Main St	60,600	64,100	64,700	84,800	89,700
W Main St to TH 47	56,400	58,100	58,500	67,100	70,400
TH 47 to 7th Ave	74,000	75,600	75,800	84,300	85,600
7th Ave to Round Lake Blvd	80,100	81,700	81,800	90,400	90,900

3) Estimated maximum peak hour traffic generated and time of occurrence

As noted in the item above, the proposed project will not generate new trips. Rather, it will accommodate forecasted traffic growth. The project corridor carries a high level of commuter traffic between the Twin Cities and its northwestern suburbs. The AM peak hour traffic occurs from 7:00 AM to 8:00 AM. Traffic during the AM peak hour is predominately in the southeast direction. The AM peak hour traffic accounts for approximately 7.5 to 8 percent of the daily traffic along Hwy 10. The PM peak hour occurs from 4:15 PM to 5:15 PM. Traffic during the PM peak hour is evenly split in both the southeast and northwest directions analyzing existing (2017) and 2021 traffic. The forecasted 2041 PM peak hour traffic is predominately in the southeast direction. The PM peak hour traffic accounts for approximately 7.5 to 8.5 percent of the daily traffic along Hwy 10. **Table 4-9** shows the peak hour Hwy 10 traffic in each direction and where this peak traffic is located.

Table 4-9: Maximum Directional Peak Traffic on Hwy 10

Year	Peak Hour	Volume (ADT)	Direction	Location
2017	AM	2900	EB	Between Fairoak Ave and W Main St
		2000	WB	Between W Main St and Fairoak Ave
	PM	2500	EB	Between Fairoak Ave and W Main St
		2500	WB	Between Fairoak Ave and Thurston Ave
2021 No Build	AM	3100	EB	Between Fairoak Ave and W Main St
		2100	WB	Between W Main St and Fairoak Ave
	PM	2700	EB	Between Fairoak Ave and W Main St
		2700	WB	Between Fairoak Ave and Thurston Ave
2021 Build	AM	3000	EB	Between Thurston Ave and W Main St
		2000	WB	Between W Main St and Thurston Ave
	PM	2700	EB	Between Thurston Ave and W Main St
		2700	WB	Between Thurston Ave and Sunfish Lake Blvd
2041 No Build	AM	3800	EB	Between Fairoak Ave and W Main St
		2550	WB	Between W Main St and Fairoak Ave
	PM	3500	EB	Between Fairoak Ave and W Main St
		3200	WB	Between Fairoak Ave and Thurston Ave
2041 Build	AM	3900	EB	Between Thurston Ave and W Main St
		2700	WB	Between W Main St and Thurston Ave
	PM	3600	EB	Between Thurston Ave and W Main St
		3300	WB	Between Thurston Ave and Sunfish Lake Blvd

4) Indicate source of trip generation rates used in the estimates

Traffic forecasts for the project area were determined based on historical Annual Average Daily Traffic (AADT) counts available from MnDOT, current year traffic count data collected in May 2017, and the Twin Cities Regional Model (year 2000 model combined with a future model for year 2030 and updated 2040 trip tables). Additional details on the forecast methodology used are provided in **Appendix B**, Hwy 10 Existing Conditions & Traffic Forecasting.

5) Availability of transit and/or other alternative transportation modes

Commuter Bus Transit Service

Three Metro Transit bus routes serve the project area, as shown on **Figure 4-9**. Routes 850 and the 852 Express serve Anoka and Coon Rapids; Route 887 serves St. Cloud by connecting to the Northstar train at several stops and downtown Minneapolis by bus. These routes generally provide peak hour commuter bus service. Ave

Commuter Rail Service

The Northstar Commuter Rail Line runs through Anoka, stopping at Anoka Station, see **Figure 4-9**. This fixed rail route runs north/south from the City of Big Lake in Sherburne

County to Downtown Minneapolis. Weekdays, this route runs southbound from 5:00 am to 8:10 am and then again once in the afternoon. The route travels northbound from 3:57 pm to 7:07 pm with a morning trip leaving Downtown Minneapolis at 6:16 am, arriving in Big Lake at 7:07 am. This route also has an abbreviated schedule on weekends. The Northstar Commuter Rail Line also serves many Twins and Vikings home games. Schedules for dates and times are available on metrotransit.org.

Other Transit Facilities and Services

Transit Facilities

Anoka has one transit station and one park and ride facility, both located at Anoka Station, shown on **Figure 4-9**. This station primarily serves the Northstar Commuter Rail Line. Route 805 has bus stops along 4th Ave (CSAH 31) and Pierce St (CSAH 30), adjacent to Anoka Station. The Anoka Station is fully ADA compliant.

Transit Advantages

Within the project area, the existing 10' shoulder lane may be used by buses. This is considered a transit advantage. Buses may use the shoulder only when traffic is moving at less than 35 miles per hour, at least once per week. To use the shoulders, buses must save more than eight minutes in travel time per trip and must also be used by more than six buses per day. Currently, buses do not use the shoulder lanes within the project area.

Dial-a-Ride Service

Anoka is serviced by Transit Link, the dial-a-ride service provided through the Metropolitan Council at the County level. Transit Link provides metro-wide transit connections and access to qualifying rides, such as last mile service, connections between transit stations, or to and from areas not serviced by regular bus routes. Any member of the public may reserve a qualifying ride. Upon reservation, each trip is assessed to ensure it does not overlap with regular route bus services. Starting and ending destinations must be more than ¼ mile from regular route transit in winter months (November – March) and more than ½ mile from regular route transit in summer months (April- October). Transit Link Service does not operate on Thanksgiving Day, Christmas Day, and New Year's Day.

Non-Motorized Transportation

Non-motorized transportation facilities within the project area are limited and do not provide complete connections to local land uses, see **Figure 4-10** for the existing Non-Motorized Transportation context. Despite lack of dedicated facilities, pedestrians and bicyclists frequently walk alongside roadways within the project area, including along the south frontage road and along the shoulders of the highway. Non-motorized travelers cross Hwy 10/169 at the traffic signals at Thurston Ave and Fairoak Ave, as well as at un-signalized and unmarked locations.

The project will provide non-motorized transportation opportunities by creating sidewalk/trail facilities along the north and south sides of the project corridor and side streets, and at intersections and crossings of Hwy 10/169. Existing transit service will be maintained during and post-construction.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic

improvements necessary. The analysis must discuss the project's impact on the regional transportation system.
***If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance.**

The project will address existing traffic congestion and future traffic congestion, which is now occurring and is expected to continue based on an increase in forecasted traffic volumes (shown on **Figure 4-7**). This project's purpose is to improve traffic operations and reduce crashes. The project will result in improved mobility and reliability for all users of the project corridor. **Table 4-10** shows the travel time along both eastbound and westbound Hwy 10 during the existing and forecasted Build and No Build scenarios. In the 2017 PM peak hour it takes westbound Hwy 10 traffic on average over five minutes to travel from TH 47 to Sunfish Lake Blvd. In the 2021 No Build PM peak hour it is anticipated to take westbound Hwy 10 traffic less time than in 2017. This is because the traffic signals were assumed to be retimed and more time was given to Hwy 10. The 2021 No Build AM peak hour travel time for eastbound traffic is anticipated to increase by over a minute from existing. In 2041 No Build, the PM peak traffic throughout the project area becomes gridlocked and is anticipated to take over ten minutes to travel from TH 47 to Sunfish Lake Blvd along westbound Hwy 10. During the 2041 No Build AM peak hour, traffic along eastbound Hwy 10 is anticipated to take over six minutes to travel from Sunfish Lake Blvd to TH 47. Under the Build scenario traffic is anticipated to take less than three minutes to travel eastbound or westbound along Hwy 10 through 2041.

Table 4-10: Hwy 10 Travel Time

Year	Option	Peak	Direction	Average Travel Time
2017	No Build	AM	Eastbound	2 min 49 s
			Westbound	3 min 6 s
		PM	Eastbound	3 min 23 s
			Westbound	5 min 8 s
2021	No Build	AM	Eastbound	3 min 59 s
			Westbound	3 min 9 s
		PM	Eastbound	3 min 49 s
			Westbound	4 mins 6 s
2021	Build	AM	Eastbound	2 min 19 s
			Westbound	2 min 45 s
		PM	Eastbound	2 min 20 s
			Westbound	2 min 16 s
2041	No Build	AM	Eastbound	6 min 8 s
			Westbound	3 min 14 s
		PM	Eastbound	4 min 56 s
			Westbound	10 min 5 s
2041	Build	AM	Eastbound	2 min 54 s
			Westbound	2 min 16 s
		PM	Eastbound	2 min 26 s
			Westbound	2 min 20 s

Note:

Eastbound (Sunfish to TH 47)

Westbound (TH 47 to Sunfish)

Table 4-11 shows the expected traffic operations in 2041 with the project.

Table 4-11: Future Year (2041) Build Conditions Traffic Operations Analysis Summary

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd *Signalized Intersection*	AM	70	E	205	F	NBT	EBT	4375	5725
	PM	94	F	397	F	EBL	WBT	2050	4875
TH 10 at Thurston Ave *Roundabout*	AM	8	A	15	B	WBR	WBR	25	975
	PM	11	B	16	C	NBLT	SB	25	400
Main St at Church St/EB TH 10 Ramps *Roundabout*	AM	10	A	52	F	EBT	EB	50	400
	PM	12	B	34	D	EBT	NB	75	575
Main St at WB TH 10 Ramps *Roundabout*	AM	5	A	11	B	EBL	WB	25	275
	PM	9	A	17	C	EBT	NB	25	375
EB TH 10 Ramps at TH 47 *Signalized Intersection*	AM	27	C	94	F	WBL	NBR	175	675
	PM	53	D	112	F	WBL	NBR	800	2200
WB TH 10 Ramps at TH 47 *Signalized Intersection*	AM	95	F	200	F	WBL	WBL	2000	3050
	PM	96	F	266	F	WBL	WBL	2025	3050
EB TH 10 Ramps at 7th Ave *Signalized Intersection*	AM	17	B	61	E	EBL	EBL	175	475
	PM	26	C	70	E	EBL	NB	250	900
WB TH 10 Ramps at 7th Ave *Signalized Intersection*	AM	122	F	285	F	SBT	SBT	2500	2700
	PM	48	D	77	E	WBL	SBR	150	725

*Delay in seconds per vehicle
**Maximum delay and LOS on any approach and/or movement
***Limiting Movement is the highest delay approach.

The improvements comparing 2041 Build to No Build are detailed below for each intersection along Hwy 10.

Hwy 10 and Sunfish Lake Blvd

- Intersection delay is reduced during the AM peak hour by about one minute.
- Intersection delay is shown to increase in the PM peak hour by almost a minute, however, in the No Build scenario only 40% of the demand traffic can make it through the intersection due to the backups in the network, but in the Build scenario 86% of the demand traffic is able to make it through. In Vissim only the delay of the traffic that makes it through the intersection is counted so the No Build is missing the delay of over half the vehicles.
- The average queues during both peak hours are reduced by about 1000 feet.

Hwy 10 and Thurston Ave

- Intersection delay is reduced by about two minutes during the AM peak hour and nearly three minutes during the PM peak hour.
- Limiting movement delay is reduced by over six minutes during the AM peak hour and over twenty minutes during the PM peak hour.
- The maximum queues are anticipated to extend over two miles under No Build conditions, but under the Build scenario all queues are acceptable.

Main St at EB Hwy 10 Ramps

- Limiting movement delay is reduced by about one minute during the AM peak hour and over 25 minutes during the PM peak hour.

Main St at WB Hwy 10 Ramps

- Limiting movement delay is reduced by 30 seconds during the AM peak hour and over four minutes during the PM peak hour.

TH 47 at EB Hwy 10 Ramps

- Intersection delay is reduced by 18 seconds during the AM peak hour and about a minute during the PM peak hour.
- Limiting movement delay is reduced by about a minute during the AM peak hour and nearly two minutes during the PM peak hour.
- four minutes during the PM peak hour.
- Additionally, more traffic can make it through the intersection during the Build scenario that the No Build. During the AM peak hour 6% more traffic makes it through and during the PM peak hour 22% more traffic makes it through.

TH 47 at WB Hwy 10 Ramps

- Intersection delay is reduced by 24 seconds during the AM peak hour and 6 seconds during the PM peak hour.
- Limiting movement delay is reduced by about a minute during the AM peak hour and over a minute during the PM peak hour.
- During the AM peak hour 7% more traffic makes it through and during the PM peak hour 26% more traffic makes it through.

7th Ave at EB Hwy 10 Ramps

- Intersection delay increases by five to seven seconds during the peak hours, but remains acceptable at LOS B and LOS C during the AM and PM peak hours respectively.
- Although there is a slight increase in delay, operations are improved as more traffic can make it through the intersection during the Build scenario that the No Build. During the AM peak hour 2% more traffic makes it through and during the PM peak hour 20% more traffic makes it through.

7th Ave at WB Hwy 10 Ramps

- Intersection delay is reduced by 47 seconds during the AM peak hour and nearly three minutes during the PM peak hour.
- Limiting movement delay is reduced by over four minutes during the PM peak hour.
- During the AM peak hour 1% more traffic makes it through and during the PM peak hour 21% more traffic makes it through.

The Hwy 10 Improvements: Existing Conditions and Traffic Forecasts memo, included in **Appendix B** documents existing and forecast traffic conditions. The project will remove the transit advantage of the existing bus shoulder lane on Hwy 10/169 within the project area. Buses will no longer be able to use the shoulder for travel through the project area.

As noted above, buses do not currently use the 10' bus shoulder lane. This lane would also need to be reconstructed to 12' to meet existing design standards for accommodating buses on the shoulder.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

The project is not expected to result in negative transportation effects, therefore no measures have been identified to minimize or mitigate project related transportation effects.

4.19 Cumulative Potential Effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

This section addresses the incremental impact of this proposed project when added to other past, present, and reasonably foreseeable future actions, regardless of the agency, organization, or individual(s) undertaking the actions. The geographic scale considered for cumulative potential effects is the area proximate to the project limits and area directly adjacent to the project area. Projects considered are planned for construction between 2019 and 2023. Project related environmental effects that could combine with other potential environmental effects and the geographic extent of the anticipated impacts are summarized in **Table 4-12**.

Table 4-12: Project Related Environmental Effects and Geographic Extent

Item #	Topic/Issue	Project-Related Environmental Effects	Geographic Extent & Future Potential Impacts
EAW Item #9	Land Use	Identified areas will be required for permanent acquisition. Easements – both permanent and temporary – will also be required for the project.	Project area
EAW Item #10	Soils and Topography (Erosion and Sedimentation Control)	Disturbed ground and soils during project construction	Project area
EAW Item #11	Water Resources	• No new wells or abandonment of wells is anticipated • Increase in impervious surface area (3.46 acres) • No wetlands impacted	Project area

Item #	Topic/Issue	Project-Related Environmental Effects	Geographic Extent & Future Potential
EAW Item #12	Existing Contamination or Potential Environmental Hazards	• 17 medium potential medium risk sites identified in Phase I ESA • 3 potential high-risk sites identified in Phase I EAS	500’ buffer of construction limits
EAW Item #17	Noise	• Modeled noise levels approaching/exceeding federal NAC. • Modeled noise levels above state standards. • No noise walls will be included based on cost effectiveness.	Project area
EAW Item #18	Transportation	• Improved travel times and reliability. • Improved safety, including at existing, at-grade intersections	Project Area
EA Section 5.2, Relocation and Right-of-Way	Right-of-Way	• 5.88 acres of right-of-way needed, affecting 13 properties (16 individual parcels); 3 total acquisitions • 7.97 acres of temporary easement needed, affecting 23 properties	Project area
EA Section 5.6, Section 4(f)	Section 4(f) Resources	• Temporary occupancy at John Ward Park while reconfiguring parking and adding a multi-use path	Ward Park

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

The 2019-2022 State Transportation Improvement Program (STIP), the City of Anoka, the City of Ramsey, and the Anoka County websites and plans were reviewed to identify present and other reasonably foreseeable future projects near the Hwy 10/169 project corridor. Reasonably foreseeable future projects in the direct vicinity of the study area are listed in **Table 4-13**. The consideration for this topic included future development opportunities and potential effects on traffic operations, safety, and travel times.

Table 4-13: Reasonably Foreseeable Future Projects in the Vicinity of the Project Area

Project Name (STIP # if Applicable)	Agency	Description	City	Timeframe
US 10 Rum River Bridge Replacement and Corridor Improvements	MnDOT	Reconstruct Ferry St Interchange, Replace US 10 Rum River Bridge, Rehab other bridges	Anoka	2022-2023
Green Haven Parkway	City of Anoka	Extension of Green Haven Parkway on north side of Hwy 10/169 between Fairoak Ave to Jacob Lane.	Anoka	Unknown

<u>Transportation Improvements</u>

Green Haven Parkway

The City of Anoka is leading construction of Green Haven Parkway, located on the north side of Hwy 10/169, parallel to the highway. A portion of Green Haven Parkway – from Thurston Ave to Garfield St/Verndale Ave - was constructed in 2017. The City is planning to construct an additional leg of the Parkway from Fairoak Ave to Jacob Lane.

Once completed, this new local street will provide an alternative option to US 10/169 for local east/west trips on the north side of the highway. This new local road will also improve accessibility and mobility in the vicinity of Anoka Enterprise Park (a business and industrial park). All phases will include non-motorized transportation accommodations.

Future Land Development

The City of Anoka's 2040 Comprehensive Plan and Future Land Use Map shows a mix of commercial, industrial, multi-family residential, and multi-optional development. At this time, there are no firm plans for large-scale future developments within or adjacent to the project area.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

Environmental effects resulting from the Hwy 10/169 Project are summarized in **Table 4-12**. Other reasonably foreseeable future projects may also impact the resources are identified in **Table 4-13**. Traffic analysis completed for this project considered potential future development, therefore, the cumulative impact of those projects should result in improved traffic conditions. Other impacts, from the projects identified in **Table 4-10** will be addressed through appropriate regulatory permitting and approval processes. Therefore, these impacts will be individually mitigated to ensure that cumulative impacts are minimized.

Because the corridor is mostly developed, considering the types of transportation projects listed in **Table 4-13** along with the regulatory permitting and approval processes required, the proposed project will have a minimal cumulative impact on the environment.

Development timelines depend on market forces and private land owner decisions. The timing and extent of future developments within the study area is unknown and is dependent on several factors, including market forces and private land owner decisions.

If the anticipated development were to occur, it is possible that these environmental effects could occur: changes in land use; ground/soil disturbance; water quality impacts, if impervious surface increases; potentially encountering contaminated and hazardous materials; loss of vegetation/trees; changes in traffic volumes and patterns on the surrounding road network. These effects could combine with effects associated with construction of this Hwy 10/169 Project. Potential impacts to resources identified in this section can be avoided or minimized through existing regulatory controls. During development of this EA/EAW, no potentially significant cumulative impacts to resources affected by the project were identified.

4.20 Other Potential Environmental Effects

If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

No additional adverse environmental impacts are anticipated in addition to those addressed or discussed in Section 5.0 – Additional Federal Issues.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent ~~to the~~ entire EQB distribution list.

Name and Title of Signer: Marc Karnowski
MnDOT Director of Environmental Stewardship

Date: 8-12-19

5. Additional Federal Issues

FHWA Technical Advisory T 6640.8A, Guidance for Preparing Environmental and Section 4(f) Documents, effective November 27, 1987 provides guidance in the format, content and processing of NEPA and Section 4(f) studies and documents. It includes the following impact categories not addressed in the EAW:

- Social Impacts
- Relocation and Right-of-Way Impacts
- Environmental Justice
- Non-Motorized Transportation Improvements
- Section 7 – Endangered Species Act
- Section 4(f) – Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites
- Section 6(f) – Land and Water Conservation Act
- Section 106 – Historic and Archaeological Resources
- Construction Impacts
- Economics
- Farmland Protection Policy Act
- Indirect Effects

5.1 Social Impacts

The following social impacts were evaluated for the Hwy 10/169 Safety and Mobility Improvement Project:

- Travel Patterns
- Access
- Accessibility
- Community Facilities and Public Services
- Community and Neighborhood Cohesiveness
- Transportation Sensitive Populations
- Income Equity
- Relocation and Right-of-way

5.1.1 Travel Patterns

Vehicular and non-motorized travel patterns may change over time as a result of the Hwy 10/169 proposed improvements. Due to the closure of the Hwy 10/169 and Fairoak Ave intersection, more traffic will use the Main St West and the Thurston Ave intersections. Local trips will shift from the regional network to the local network. Likewise, the improvement of local connections will provide for more accessible non-motorized trails, meaning some local trips could shift from vehicular to bicycle or pedestrian. **Table 5-1** below shows how traffic will increase or decrease when comparing the Build and No Build scenarios.

Table 5-1: Local Roadway ADT Comparison

Location	Year				
	Existing (2017)	2021 No-Build	2021 Build	2041 No-Build	2041 Build
Green Haven Pkwy East of Thurston Ave	0*	900	2,200	1,800	3,200
Cutters Grove Ave South of Hwy 10	5,100	5,300	8,200	6,500	10,400
Frontage Rd Northwest of Fairoak Ave	2,800	2,900	3,600	3,200	4,000
Jacob Ln East of Fairoak Ave	3,600	5,500	4,600	7,100	6,300
Fairoak Ave South of Jacob Ln	3,800	3,900	700	4,300	800

*New Roadway Connection

Table 5-1 shows that most local roadway will increase under the Build scenario. Jacob Lane and Fairoak Ave, however are shown to have lower No Build than Build volumes. The project eliminates direct access between Hwy10/169 and Fairoak Ave which explains the significant difference in traffic along Fairoak Ave. Analyzing traffic patterns on Jacob Lane, the Build traffic is slightly lower than the No Build forecasts as traffic was known to use Jacob Lane as a cut through between Main St and Fairoak Ave for traffic instead of Hwy 10/169. Without the excessive backups and eliminating access at Fairoak Ave results in no cut through traffic.

5.1.2 Access

The proposed project will eliminate: two at-grade intersections traffic signals on Hwy 10/169 in the project area. The Thurston Ave signal will be replaced with a full-access interchange. Hwy 10/169 access closures that will be included in the project include:

- The signal at Fairoak Ave will be replaced with an underpass of the local roadway underneath the highway
- Right-in/right-out public St access points onto Hwy 10/169 will be closed at:
    - Cutters Lane
    - near SuperAmerica and Culvers
    - Verndale Ave
- Six private, direct driveway accesses onto Hwy 10/169

Westbound Hwy 10/169 Traffic Congestion in Afternoon at Fairoak Ave

Local access will be served with supporting roadways leading to interchanges at Main St and Thurston Ave. Improvements to the local supporting roadway system, including closure of direct accesses and grade separated intersections at Thurston and Fairoak Aves, will result in local trips, including pedestrians and bicyclists, to be able to better travel throughout the city. Emergency access throughout the corridor will be maintained at all times during construction.

5.1.3 Accessibility

The project requires providing accessibility to a program, activity or service, and by law, the project must comply with provisions set by the Americans with Disabilities Act (ADA) of 1990, or by state or local access codes if they contain more stringent requirements. The project will comply with the required accessibility provisions. The project includes pedestrian ramps, signals, and crosswalks which will be made accessible to and usable to people with disabilities. Pedestrian accommodations will meet ADA/Public Rights-of-Way Accessibility Guidelines (PROWAG) requirements.

5.1.4 Community Facilities and Public Services

Community facilities partially located in or adjacent to the project area include:

- **Anoka Technical College (1355 Hwy 10)** and **Secondary Technical Education Program (STEP) (1353 Hwy 10)** – The project will alter access to the schools. A roundabout will be built at Thurston Ave and Green Haven Pkwy (new intersection), facilitating access from both the local and regional networks. The current four-way stop at Thurston Ave and Vista Way will be modified into a right-in/right-out. The right-in/right-out access on Highway 10/169 will be closed, making Thurston Ave the only entry point to the school.

  Following construction, the proposed transportation improvements are expected to enhance movement around the campus for all modes of transportation. Improvements include sidewalks/trails, service road, and transit stops. Removing the access point on Hwy 10/169 will improve safety for both local and regional users. The roundabout is anticipated to reduce back-ups and congestion that currently take place at the four-way stop, which extend to the Hwy 10/169 and Thurston Ave intersection.

- **John Ward Park (2400 Forest Ave)** – John Ward Park includes amenities such as play equipment and ball fields. Realignment of Church St will alter access to the park, as well as require reconfiguration of the existing parking area on the north side of the park. The existing gravel lot in the northeastern corner of the park will be paved. Access points other than those along Church St will remain unchanged. A multi-use trail will be provided to connect the reconfigured parking area to the ball field and bleachers in the northwest corner of the park. **Section 5.6** and **Appendix M** of this document address these effects relative to Section 4(f).

5.1.5 Community and Neighborhood Cohesiveness

Because the proposed project will not displace any residents or close roadways, long-term adverse effects to the project area's communities and neighborhoods are not anticipated. This project is anticipated to support community and neighborhood connectivity and cohesiveness through the following improvements.

Frontage Road Improvements—The project will connect the currently discontinuous frontage road between Cutters Grove Ave/Thurston Ave to Main St. This connection also effectively extends Main St from downtown Anoka to Thurston Ave, making the area more easily accessible and for all roadway users without needing to use Hwy 10/169 for a portion of the local trip. This supports local connections between neighborhoods, amenities, and businesses in the project area.

Fairoak Ave Improvements – The underpass and sidewalks/trails at Fairoak Ave will become part of the City of Anoka's designated trail system. This will improve safety from the current at-grade intersection on Hwy 10/169, preserving and augmenting connections between the northern and southern neighborhoods.

The frontage road on the south side of Hwy 10/169 will be improved to better accommodate all traffic, including trucks and non-motorized travelers

5.2 Relocation and Right-of-Way Impacts

The proposed project will require acquisition of privately-owned land for public transportation right-of-way (ROW), as well as temporary easements during construction. The project will also affect parcels owned by the City of Anoka. Based on preliminary design and associated construction limits, ROW impacts are depicted in **Figure 5-1**. For acquisitions from privately-owned property, this information is summarized in **Table 5-2**.

Table 5-2: Land Acquisition Requirements – Private Properties

Acquisition Type	Number of Properties*	Combined Acquisition Area
Total Temporary Easement	23**	7.97
Total Right-of-way	13***	5.88

*Three properties include multiple affected parcels (Tire Zoo, Perkins, Anoka Technical College).
**Eight of these also include right-of-way as captured in the following row.
***Three of these are total acquisitions; eight of them also include temporary easements as captured in the preceding row.

A total of 28 properties will be affected: 13 ROW, eight of which also include temporary easements, and 15 temporary easements only. Three of the 13 ROW acquisition properties will be total acquisitions: Wright Tire, Tire Zoo, and Sign Station as identified in **Figure 5-1**. The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources will be available to the relocated business organization without discrimination. The project will also affect City-owned properties identified in **Figure 5-1**. This figure depicts portions of City-owned parcels within construction limits; the total combined area is 7.79 acres from 12 parcels.

5.3 Environmental Justice

5.3.1 Regulatory Context

This environmental justice analysis complies with the Presidential Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (February 11, 1994). This EO directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their actions on minority and/or low-income populations. The Presidential Memorandum accompanying the EO calls for federal agencies to address impacts to minority and low-income populations in the NEPA review process.

Furthermore, USDOT Order 5610.2(a) sets forth the USDOT policy to consider EJ principles in all USDOT programs, policies, and activities. It describes how the objectives of EJ are integrated into planning and programming, rulemaking, and policy formulation. This chapter only addresses impacts to minority and low-income populations that will be caused by the Project, because the No Build Alternative would not directly or indirectly change existing conditions of the surrounding environment. The methodology for this analysis also complies with 2012 FTA Circular on Environmental Justice (FTA Circular 4703.1 August 2012).

5.3.2 Data Sources and Methodology

American Community Survey (ACS)[5] 2012-2016 data were used as a primary source for

[5] The ACS is an ongoing survey that provides data on age, sex, race, family and relationships, income and benefits, health insurance, education, veteran status, disabilities, where people work and how they get there, and where people live and how much people pay for essentials. The purpose of the ACS is to provide an annual data set that enables communities, state governments, and federal programs to plan investments and services. ACS provides period estimates that describe the average characteristics of population and housing over a period of data

identifying minority and low-income populations. ACS 2012-2016 Five-Year Estimates were used to quantify minority populations and low-income populations at the block group level, which is the smallest geographic unit for which low-income population data are available. For the purposes of this analysis, the study area was defined as any block group within ¼ mile of the Project area, for a total of seven block groups in the project area; see **Appendix L**, **Figure L-1**.

5.3.3 Minority Populations

According to MnDOT/FHWA direction on conducting environmental justice analysis, a minority community is generally described as one where the minority population is either 10 percentage points higher than the county average; or greater than 50 percent of the total geographic unit; or determined based on input from local officials or stakeholders. The term "minority" is defined as anyone who identifies as black or African American, American Indian or Alaska Native, Asian American, Native Hawaiian or Pacific Islander, Hispanic/Latino, or multiracial.

To provide community context, the percentage of the population that identifies as a minority in each block group was compared to the percentage of the population that identifies as a minority in the county and the Cities of Anoka and Ramsey (see **Appendix L**, **Tables A** and **B** and **Figure L-1**). None of the block groups have higher percentages of residents whom identify as a minority than the county. None of the block groups in the City of Anoka have higher percentages of minority residents than the city. Both block groups in the City of Ramsey have higher percentages of minority residents than the city, but they are less than 10 percentage points higher.

5.3.4 Low-Income Populations

The FHWA order also defines low-income persons as individuals whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. Poverty thresholds are updated each year by the Census Bureau and vary based on family size and composition. The HHS Poverty guidelines for 2018 indicate a poverty level income for a single person is $12,140; for a family of four, the poverty level income is $25,100.

To provide community context, the percentage of the population with incomes at or below the poverty threshold in each block group was compared to the percentage of the population with incomes at or below the poverty threshold for the county and the Cities of Anoka and Ramsey as a whole (see **Appendix L**, **Table C**). Out of the seven block groups, three block groups, all in the City of Anoka, have higher percentages of residents with incomes at or below the poverty threshold than the county and the city. Two of these block groups (4012 and 4023) have percentages of the population at or below the poverty level that are over 10 percentage points higher than the county average.

Block group 4012 is located on the north side of Hwy 10/169/Main St, extending from the Rum River to Anoka Technical College. Residences within block group 4012, and within the ¼ mile project buffer, are located between Hwy 10/169 and Green Haven Golf Course; residences consist of a mixture of single family and multi-family homes. A small portion of single-family residences are found along the edge of the ¼ mile buffer, as displayed in **Appendix L**, **Figure L-1**. No known low-income housing exists within block group 4012.

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collection. The ACS is administered continually and, unlike the Census, is a random sampling of people from all counties and county-equivalents in the United States.

A small portion of block group 4023 crosses into the ¼ mile project buffer, as displayed in **Appendix L**, **Figure L-1**. The remainder of block group 4023 extends southwest and southeast to the Mississippi and Rum Rivers. The portion of residences within the ¼ mile project buffer consist of single family and multi-family homes. One low-income housing exists within block group 4023, although it is approximately 0.5 miles away along the Rum River.

5.3.5 Determination of Effect

The potential adverse effects of the proposed project were considered to assess whether the effects fall disproportionately on low-income or minority populations. Issues that were considered when evaluating disproportionately high and adverse effects to low-income and/or minority communities included social impacts (see Section 5.1), noise impacts, visual impacts, air quality impacts, and right of way impacts.

5.3.5.1 Access

The proposed project will eliminate two at-grade intersections on Hwy 10/169. The Thurston Ave/Hwy 10/169 intersection will become an interchange, while the Fairoak Ave/Hwy 10/169 intersection will be removed. Fairoak Ave will cross over Hwy 10/169, supporting the local road network and providing access to businesses and neighborhoods. The project will also close three public street access points (right-in/right-outs onto Hwy 10/169 at: Cutters Lane, near SuperAmerica and Culvers, and Verndale Ave) and six private, direct driveway accesses onto Hwy 10/169.

Land uses near these existing access points will be served through the local network rather than the regional network on Hwy 10/169 after project completion. The frontage road south of Hwy 10/169 will connect to both the Main St and Thurston Ave/Cutters Grove Ave interchanges as well as several local streets. This frontage road will provide access to land uses adjacent to the highway.

The frontage road will provide a separate sidewalk for pedestrians, who currently walk on the frontage road. The low speed, local, frontage road will be available to bicyclists for travel. The proposed project will improve the local road network and pedestrian safety while ensuring access to neighborhoods, businesses, and Hwy 10/169.

No adverse access impacts are predominately borne by low-income or minority populations, and no access related impacts are anticipated to be more severe than the effects on non-minority or non-low-income populations.

5.3.5.2 Social Impacts

The project will not cause any residential relocations. The project will improve the local road network for motorists, bicyclists, and pedestrians, supporting community connectivity and cohesion. This includes improved multimodal access to Anoka Technical College, STEP and John Ward Park – community facilities located partially within the project area. Approximately 5.88 acres of private property will need to be acquired for the project; most of these acquisitions will not impact structures, pavement, or access to effected properties.

Based on the conditions considered in Section 5.1 and above, no adverse social impacts are anticipated.

5.3.5.3 Traffic Impacts

Traffic impacts are beneficial and accrue to the population in general throughout the project area. Removing two signalized intersections on Hwy 10/169 (Thurston Ave and Fairoak Ave) will improve traffic flow and decrease travel delays. Access closure at Fairoak Ave will address traffic queuing that currently occurs between the Fairoak Ave traffic signal and the Main St interchange. The construction of the Thurston Ave interchange will enhance safety conditions for all motorists, bicyclists, and pedestrians in the area. Roundabouts at the ramp terminal intersections, as well as the Thurston Ave and Green Haven Parkway intersection, will improve safety and mobility. Therefore, no adverse effects to drivers, including low-income and minority populations in the corridor, are anticipated.

5.3.5.4 Pedestrian Impact

Pedestrian impacts are largely beneficial and will improve conditions for the general population throughout the study area, including environmental justice populations. The project includes improved or new sidewalk/trail facilities within the study area and safer connections to local businesses and community facilities. Key pedestrian features in the project include:

- Underpass at Fairoak Ave, including a 10’ trail with boulevard on one side and 5’sidewalk with boulevard on the other, will become part of the City of Anoka’s designated trail system.
- New 5’ sidewalks with boulevards from Cutters Grove Ave east to Main St along the new frontage road.
- Replace existing 5’ sidewalk along Thurston Ave with a 12’ trail north of the service road intersection and a 10’ trail south of the service road intersection.
- Construct new 5’ sidewalk with boulevard along the service road west of Thurston Ave.
- Construct new 5’ sidewalk with boulevard along Jacob Lane.
- Replace existing 3-4’ sidewalk along Greenhaven Rd/Main St with 5’ sidewalk with boulevard, connecting to existing sidewalk that leads to the downtown area.
- Construct roundabouts at Thurston Ave will result in motorized vehicles travelling at lower speeds which will improve conditions for bicyclists and pedestrians crossing the intersection.

The new grade-separated intersection for Fairoak Ave will greatly improve pedestrian safety at this location, which has seen a number of pedestrian crashes, including a fatality. All new or improved facilities will be ADA accessible. Therefore, no adverse effects to pedestrians, including low-income and minority populations in the corridor, are anticipated.

5.3.5.5 Air Quality Impact

State of Minnesota air quality standards will be met throughout the project corridor. Reduced traffic congestion will likely improve air quality in the area, benefitting all residents, including low-income and minority populations.

5.3.5.6 Noise Impact

Section 4, Item 17 summarizes the anticipated traffic noise impacts of the project. Detailed information regarding traffic noise impacts is discussed in **Appendix K** – Noise Technical Memo. As discussed in Section 4, Item 17, the proposed project will result in the following impacts (areas are presented in **Appendix A**, **Figure 4-6**):

- Area A – modeled noise levels do not approach the Federal NAC at any of the 33 modeled locations under existing, no-build, or build conditions.
- Area B –
  - Under the existing scenario, no modeled receptor locations approach or exceed the Federal NAC
  - Under the no-build scenario, six modeled receptor locations approach or exceed the Federal NAC, and
  - Under the build scenario, three modeled receptor locations approach or exceed the Federal NAC

  Due to certain project elements including walls and barriers, certain receptor locations have lower modeled noise levels under the build scenario than under the no-build and existing scenarios.
- Area C – modeled noise levels do not approach the Federal NAC at any of the modeled locations under existing, no-build, or build locations.
- Area D – modeled noise levels do not approach the Federal NAC at any of the modeled locations under existing, no-build, or build locations.

  Due to certain project elements including walls and barriers, certain receptor locations have lower modeled noise levels under the build scenario than under the no-build and existing scenarios.
- Area E – modeled noise levels do not approach the Federal NAC at any of the 33 modeled locations under existing, no-build, or build conditions.
- Area F1 –
  - One receptor exceeds the Federal NAC under the existing conditions,
  - Three receptors exceed the Federal NAC under the no-build condition, and
  - Four receptor locations exceed the Federal NAC under the build condition.
- Area F2 –
  - One receptor exceeds the Federal NAC under the existing conditions,
  - Three receptor locations exceed the Federal NAC under the no-build condition, and
  - Three receptor locations exceed the Federal NAC under the build condition.
- Area G –
  - One receptor exceeds the Federal NAC under the existing conditions,
  - Two receptor locations exceed the Federal NAC under the no-build condition, and
  - Two receptor locations exceed the Federal NAC under the build condition.

These impacts will occur throughout the corridor and will not disproportionately affect low-income or minority populations.

The noise analysis evaluated noise walls throughout the project corridor for all residential areas equally, regardless of income status, race, or ethnicity of the affected neighborhood. A total of four noise walls were analyzed and evaluated against the feasibility and reasonableness criteria identified in the MnDOT Highway Noise Policy. None of the noise walls met MnDOT's feasibility and reasonableness criteria.

5.3.5.7 Right of Way

The project will require the permanent acquisition of approximately 5.88 acres of private property from several land owners in the study area. The preferred alternative will require the full acquisition of four parcels, totaling two acres, from three businesses. No acquisition or relocation of homes is anticipated.

The project will require the displacement of three businesses: Wright Tire, The Tire Zoo, and Sign Station, Inc. Based on coordination with business owners, it has been determined that none of these businesses are minority owned or operated.

Given the above business displacements, the project has the potential to create job losses through relocation of businesses. Job loss impacts will be avoided or minimized by the project partners working with businesses to find a suitable location in which to continue operations. New locations would ideally be near current locations so employee commutes, currently unknown, would not be substantially affected. Also, any new structures or building/site improvements for the displaced businesses would need to be completed prior to relocation so that disruption of business operations would be minimized. The acquisition and relocation program will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. Relocation resources will be available to relocated businesses without discrimination.

Based on coordination with impacted businesses, the project right of way and relocation impacts will not be predominately borne by low-income or minority populations. Furthermore, the right of way and relocation impacts on the environmental justice population will not be more severe than the effects on non-minority or non-low-income populations.

5.3.6 Environmental Justice Finding

Based on the available data and project outreach, it has been determined that low-income and/or minority populations are located within the study area. Based on the analysis presented above, the proposed project will not result in disproportionately high or adverse effects to low-income or minority populations.

5.4 Non-Motorized Transportation Impacts

The existing conditions in the project limits include pedestrian facilities that include crosswalks and sidewalks. Crosswalks exists at the intersections of Hwy 10 and Thurston and Fairoak Aves. Sidewalks currently exist on Greenhaven Rd from Green Haven Country Club and continue onto Main St.

During construction, the intersections of Thurston and Fairoak Aves will be grade separated thus removing the at-grade crossing of pedestrian on Hwy 10. New pedestrian facilities will be constructed with the underpasses at both locations along with enhancements to the Green Haven sidewalks.

5.5 Section 7 – Endangered Species Act

MnDOT's Office of Environmental Stewardship, as a delegate for the FHWA, was contacted to review the project area for federally-listed endangered, threatened, proposed, candidate species or listed critical habitat. MnDOT's Protected Species Coordinator, Christopher E. Smith, reviewed the project area and corresponded with the U.S. Fish and Wildlife Service's. Mr.

Smith's letter is included in **Appendix I** and is summarized below. Anoka County is within the distribution range or federally-listed, threatened, endangered species, proposed, and candidate species, as shown in **Table 5-3**.

Table 5-3: Minnesota Federally-Listed Species (Anoka County)

Species	Status	Habitat
Northern long-eared bat Myotis septentrionalis	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.

The Section 7 review for this project has been completed. The notice of determination, included in the e-mail documentation and a letter from MnDOT's Protected Species Coordinator to the U.S. Fish and Wildlife Service in **Appendix I** states that the project "may affect, but is not likely to adversely affect northern long-eared bats".[6] Northern long-eared bats hibernacula and/or roost trees have not been documented within or in close proximity to the project area.

Required measures aimed at avoiding and minimizing any potential impacts to the northern long-eared bat that are noted in MnDOT's letter to the U.S. Fish and Wildlife Service are summarized below and included in the List of Commitments in **Appendix N**.

- Operators, employees, and contractors working in areas of known or presumed bat habitat will be made aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist.
- If used, direct temporary lighting must be away from wooded areas during the bat active season (April 1 to Oct 31, inclusive).
- Approved lighting products and installation methods will be used to install new or replace existing permanent lights.
- Tree clearing will be avoided to the extent practicable to complete the proposed work. Tree clearing may occur, but limit tree clearing to the maximum extent practicable.
- All tree clearing activities will be restricted to when NLEB are not likely to be present, during winter months from November 1 to March 31.
- Tree removal must be limited to that specified in project plans. Contractors will understand clearing limits and how they are marked in the field.
- Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.
- Building demolition must be completed during the NLEB inactive season during winter months from November 1 to March 31.

Additional conservation measures will include: not using welded plastic mesh netting as a rolled erosion control product. Rather using "bio-netting" and/or "bio-netting." Additionally, revegetation of disturbed soils will follow MnDOT's Metro Vegetation Establishment

[6] The proposed project was reviewed under the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO).

Recommendations.

Approximately 3.3 acres of trees as well as vegetation will be removed within the construction limits will occur as part of the project.

5.6 Section 4(f) – Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites

The Section 4(f) legislation as established under the Department of Transportation Act of 1966 (49 USC 303, 23 USC 138) provides protection for publicly owned parks and recreation lands, wildlife and/or waterfowl refuges, and historic sites from conversion to a transportation use. The law, now codified in two places (49 USC 303 and 23 USC 138), is implemented by FHWA and the Federal Transit Administration (FTA) through regulations found in 23 CFR 774. According to FHWA guidelines, Section 4(f) applies to all projects that receive funding from or require approval by an agency of the US Department of Transportation (US DOT), including FHWA. Section 4(f) requires assessing whether a property use is anticipated. Use of a Section 4(f) property occurs when any of the conditions of "direct use", "constructive use", or "temporary occupancy" are met.

The proposed project lies partly within the boundary of the Mississippi National River and Recreation Area (MNRRA). Coordination took place with the National Park Service (NPS) regarding the proposed project and the MNRRA (see correspondence in **Appendix I**). The NPS discourages the staging of equipment and materials within the boundary of the MNRRA. Measures will also be taken to mitigate runoff and erosion in this area both during and after construction.

The MNRRA shares a boundary with the Mississippi River Corridor Critical Area (MRCCA) which is regulated by the DNR. The project area is within the River Neighborhood (CA-RN) district of the MRCCA. The MRCCA and CA-RN district are discussed in Section 4 of the EAW under item 9.a.iii. Development is limited in the setback areas, including transportation and vegetation removal activities. Maintaining a vegetated buffer to both physically and visually separate the River from the highway will be a high priority for this project.

The proposed improvements of Hwy 10 include realigning Church St, creating a parking lot within the former Church St, removing existing parking spaces, constructing a multi-use path within John Ward Park, and paving an existing gravel parking lot. The improvements within the boundary of Ward Park include conversion of approximately 20 parking spaces to green space, construction of a 10' multi-use path from the proposed parking lot to existing bleachers, and paving an existing gravel parking lot.

The duration of constructing the parking spaces and path within Ward Park are considered a temporary easement/occupancy. This determination has been made because:

- Duration is temporary (less than needed for project construction)
- No change in ownership of the land
- Scope of work is minor (i.e., the nature and magnitude of the changes to the park during construction are minimal)
- No anticipated permanent adverse physical impacts

- No interference with the activities or purpose of the resource (either temporary or permanent)
- The land used will be fully restored (to a condition at least as good as before the project), and

A signed agreement regarding the temporary occupancy determination at Ward Park between MnDOT and the City of Anoka (the official with jurisdiction over Ward Park) is included in **Appendix M**.

5.7 Section 6(f) – Land and Water Conservation Act

Section 6(f) of the Land and Water Conservation Fund Act of 1965 (LAWCON) specifies that any land or facility which has been planned, developed, or improved with LAWCON funds cannot be converted to uses other than parks, recreation, or open space unless land that is of at least equal fair market value and reasonably equivalent usefulness is provided. Anytime a transportation project would cause such a conversion, regardless of funding sources, such replacement land must be provided. The DNR maintains a list of properties in the state that are subject to Section 6(f) requirements, which is available on the DNR's LAWCON webpage.

Two parks subject to Section 6(f) are located near or within the project area: Ward Park and Mississippi River Community Park. Mississippi River Community Park is not within the project limits and will not be impacted by the proposed project. Ward Park is located south and west of Hwy 10/169 and Main St interchange, at the intersection of Forest Ave and Church St.

The proposed improvements of Hwy 10/169 include realigning Church St, creating a parking lot within the former Church St, removing existing parking spaces, constructing a multi-use path, and paving an existing gravel parking lot within Ward Park. The improvements within the boundary of Ward Park include conversion of approximately 20 parking spaces to green space, construction of a 10' multi-use path from the proposed parking lot to existing bleachers, and paving an existing gravel parking lot. Coordination took place with the MnDNR who determined the parking space removals, path within the park boundary, and paving an existing gravel parking lot does not violate the existing LAWCON funding contract. The original park boundary will not be impacted by non-recreational use. Therefore, there are no Section 6(f) impacts.

5.8 Section 106 – Historic and Archaeological Resources

The proposed project was reviewed by MnDOT's CRU staff for compliance with Section 106 of the National Historic Preservation Act. The APE was previously surveyed for historic properties. No significant or potentially significant historic structures are within the APE. No archaeological sites are known or suspected within the APE, which is either intensively disturbed or has low probability to contain archaeological sites (see correspondence in **Appendix I**).

5.9 Construction Impacts

5.9.1 Construction Dust and Noise

There will be dust associated with the construction activities. No unique concerns have been identified. Standard dust control measures will be followed in accordance with MnDOT standard specifications and local ordinances. See Item 17 of the EAW for discussion of construction noise.

5.9.2 Disposal of Excess Materials

Disposal of excess material will be in compliance with the guidelines listed in the standard specifications, and will not occur in wetlands, floodplains, or other sensitive areas. Erosion and sedimentation will be controlled in accordance with an erosion control plan and MnDOT standard specifications.

5.9.3 Traffic During Construction

The feasibility of staging the project under traffic and has concluded that it is possible and reasonable to maintain traffic during construction. A Transportation Management Plan (TMP) will be developed during final design. This plan will outline final decisions regarding the construction schedule, traffic impacts, detour routes, and allowable lane closures. The TMP will balance cost, safety, schedule impacts, coordination with other nearby and related projects, and best approach to minimize and mitigate traffic delay.

5.10 Economics

5.10.1 Economic Impacts

The proposed project will increase mobility along Hwy 10/169 which provides direct access to regional job centers and institutions, and to local communities and residential areas. Hwy 10/169 serves an important part in the state's and region's transportation system, supporting local and regional economic development in the northwestern suburbs of the Twin Cities and the St. Cloud area. The Hwy 10/169 Safety and Mobility Improvement Project will enhance local access to existing commercial and industrial/manufacturing businesses. This, along with improved level of service on Hwy 10/169 will contribute to overall freight mobility.

Improvements to the transportation system will also provide the infrastructure needed to support the future economic objectives identified in the City of Anoka's comprehensive plan. Roadway infrastructure improvements can create appealing site conditions for development and job creation. New development and/or redevelopment in the area will help strengthen the surrounding neighborhoods and businesses located in and adjacent to the project area.

The project will displace three businesses. A review of the local commercial real estate market indicates that there are a sufficient number of replacement sites available to relocate the eligible displaced businesses. Displacement of this business is not expected to result in a major economic effect on the City of Anoka or the surrounding area.

The project is not anticipated to divert substantial levels of traffic from commercial routes. In fact, the removal of signalized intersections at Thurston Ave and at Fairoak Ave and the construction of parallel routes on the north and south sides of Hwy 10/169 will potentially relieve Hwy 10/169 as local trips use the local routes rather than the highway to reach local destinations.

5.10.2 Fiscal Impacts

The project will require acquisition of some private property. Acquisition of this right-of-way is not expected to substantially impact the local tax base. Demographic trends and forecasts, in addition to local land use plans, indicate that it is reasonable to expect redevelopment in the project area, thus resulting in a net increase in the local tax base.

5.11 Farmland Protection and Policy Act

The Farmland Protection Policy Act (FPPA) is intended to minimize federal programs from unnecessarily and irreversibly converting farmland to nonagricultural uses. The FPPA covers prime farmland, unique farmland, and farmland of statewide or local importance. Agricultural lands within urbanized areas as designated on 2010 Census Urban Area Reference Maps are exempt from protection by the FPPA. The entire proposed project is within an urban area. There is no agricultural land within the project area.

The NRCS Web Soil Survey was used to review the soils within the project limits. No prime or unique farmland was identified, but farmland of statewide importance is located within the project limits in the area covered by the FPPA. However, the project limits are completely within existing MnDOT right of way in this area. Therefore, there will be no conversion of farmland to nonagricultural use as a result of the proposed project.

5.12 Indirect Effects

Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. As described in the response to EAW Item 9 (a), the proposed improvements are compatible with future land use plans. Therefore, the proposed project has a low potential for indirect effects to the project area's resources.

6. Public and Agency Involvement

A range of in-person and online public engagement opportunities have been available throughout the project development process. Opportunities to learn about the project and provide input are provided below.

6.1 Public and Agency Outreach

An informational project website provides information about progress and milestones of the Highway 10/169 Improvement Project (https://clients.bolton-menk.com/hwy10/). The website is updated frequently to reflect project scope changes, preliminary design options and to address new issues.

The City of Anoka has met with affected property owners throughout project development. Input from these stakeholders was considered during alternative development and evaluation. A public meeting/hearing will be held as part of the public comment period for this EA/EAW. The public meeting will provide a venue for attendees to ask questions and formally submit public comments verbally and/or in writing.

6.2 Public Comment Period and Public Hearing

Comments from the public and agencies affected by this project are requested during the public comment period described in the transmittal letter included in the Environmental Assessment distribution package. A combined public information meeting/public hearing will be held after this Environmental Assessment has been distributed to the public and to the required and interested federal, Native American Tribes, state and local agencies for review.

Preliminary design layouts and other project document will be available for review at the information meeting/public hearing. The public will also be able express comments and concerns about the project. Input received will become part of the hearing record.

6.3 Report Distribution

Copies of this document have been sent to agencies, local government units, libraries and others as per Minnesota Rule 4410.1500 (Publication and Distribution of an EAW). A copy of the EA is available at the MnDOT's Central Office Library and MnDOT's Metro Office (1500 County Road B2 W, Roseville). Local units of government with copies of the document include the City of Anoka (City Hall – 2015 S 1st Ave, Anoka) and Anoka County (County Office Building – 2100 3rd Ave, Anoka).

6.4 Process beyond the Public Comment Period

Following the comment period, MnDOT and FHWA will make a determination as to the adequacy of the environmental documentation. Further documentation could be accomplished by preparing an Environmental Impact Statement (EIS), by revising the Environmental Assessment, or by clarification in the Findings of Fact and Conclusion - whichever is appropriate. When the environmental documentation is determined adequate, MnDOT will identify a project alternative, either the No Build or the alternatives under consideration.

If an EIS is not necessary, as currently anticipated, MnDOT will prepare a "Negative Declaration" for the state environmental requirements. MnDOT will also prepare a request for a "Finding of No Significant Impacts" (FONSI) that will be submitted to the FHWA. If the FHWA agrees that this finding is appropriate, it will issue a FONSI.

Notices of the federal and state decisions and availability of the above documents will be placed in the Federal Register and the Minnesota Environmental Quality Boards (EQB) Monitor. MnDOT will also distribute the Negative Declaration and FONSI to the Environmental Assessment Worksheet (EAW) distribution list and publish notices in local newspapers announcing the environmental and project alternative decisions that were made.

Appendices

A. Figures
   - 2-1 Project Location
   - 2-2 Traffic Conditions
   - 2-3 Local Pedestrian Context
   - 2-4 Hwy 10 Access Planning Study Key Recommendations
   - 3-1 Preferred Alternative Project Layout (2 sheets)
   - 4-1 Project Location on USGS
   - 4-2 Existing Land Use
   - 4-3 Future, Planned Land Use
   - 4-4 Soils
   - 4-5 Water Resources
   - 4-6 Noise Analysis (2 sheets)
   - 4-7 No Build AADT
   - 4-8 Build AADT
   - 4-9 Existing Transit Routes and Facilities
   - 4-10 Non-Motorized Transportation Facilities
   - 5-1 Right-of-Way Needs and Affected City Parcels (2 sheets)

B. Existing Conditions and Traffic Forecasts Technical Memo (September 2017)

C. Hwy 10 Improvements: Safety Analysis (August2018)

D. Alternative Development and Screening Process Documentation
   1. Excerpts from *Highway 10 Access Planning Study*
   2. Anoka Solution Plan
   3. Green Haven Parkway Concept Development
      a. Greens of Anoka Redevelopment Master Plan Map
      b. Revised Alignment for Green Haven Parkway
   4. Hwy 10/169 and Thurston Ave/Cutters Grove Ave Interchange Planning Documentation
   5. Hwy 10/169 and Fairoak Ave Interchange Planning Documentation
   6. City of Anoka Council Work Session Materials
   7. Anoka City Council Resolutions Supporting Highway 10 Improvements

E. Benefit-Cost Analysis Technical Memo

F. Wetland Delineation Information
   1. Corps of Engineers Jurisdictional Determination Approval Letter
   2. Wetland Technical Review Memorandum

G. Minnesota Department of Health Well Logs

H. Phase I Environmental Site Assessment Summary Findings Map

I. Agency Correspondence
   1. MnDNR Natural Heritage Letter
   2. MnDOT Cultural Resources Unit Response Letter
   3. National Park Service Correspondence
   4. Contaminated Materials Management Team Correspondence
   5. Section 7 Federal Notification of Determination of Threatened and Endangered Species
   6. Section 6(f) Documentation: Mississippi River Community Park & John Ward Park

J. Air Quality

APPENDIX A

Figures

Figure 2-1 Project Location

August 2019

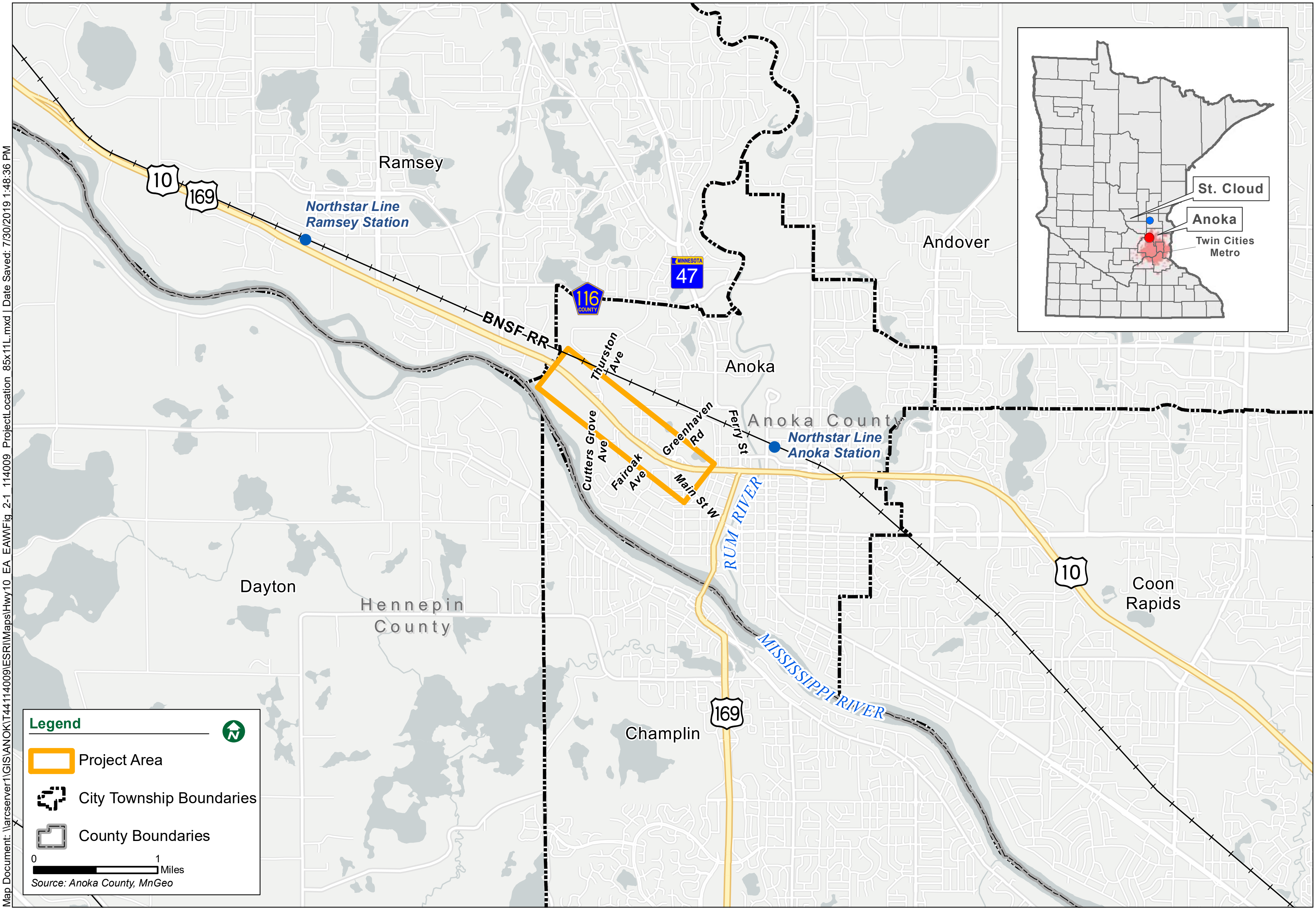

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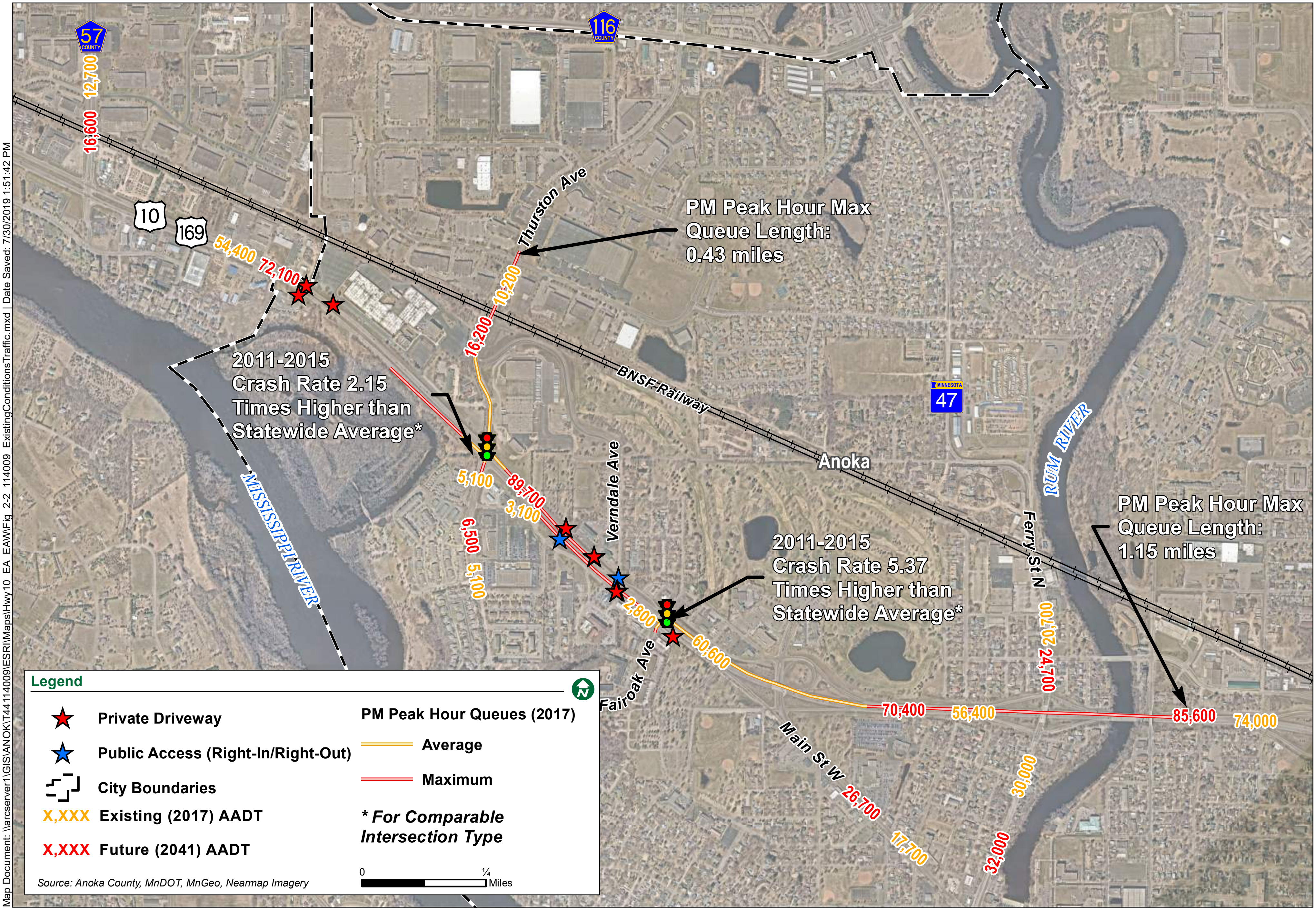
Figure 2-2 Existing Traffic Conditions

August 2019



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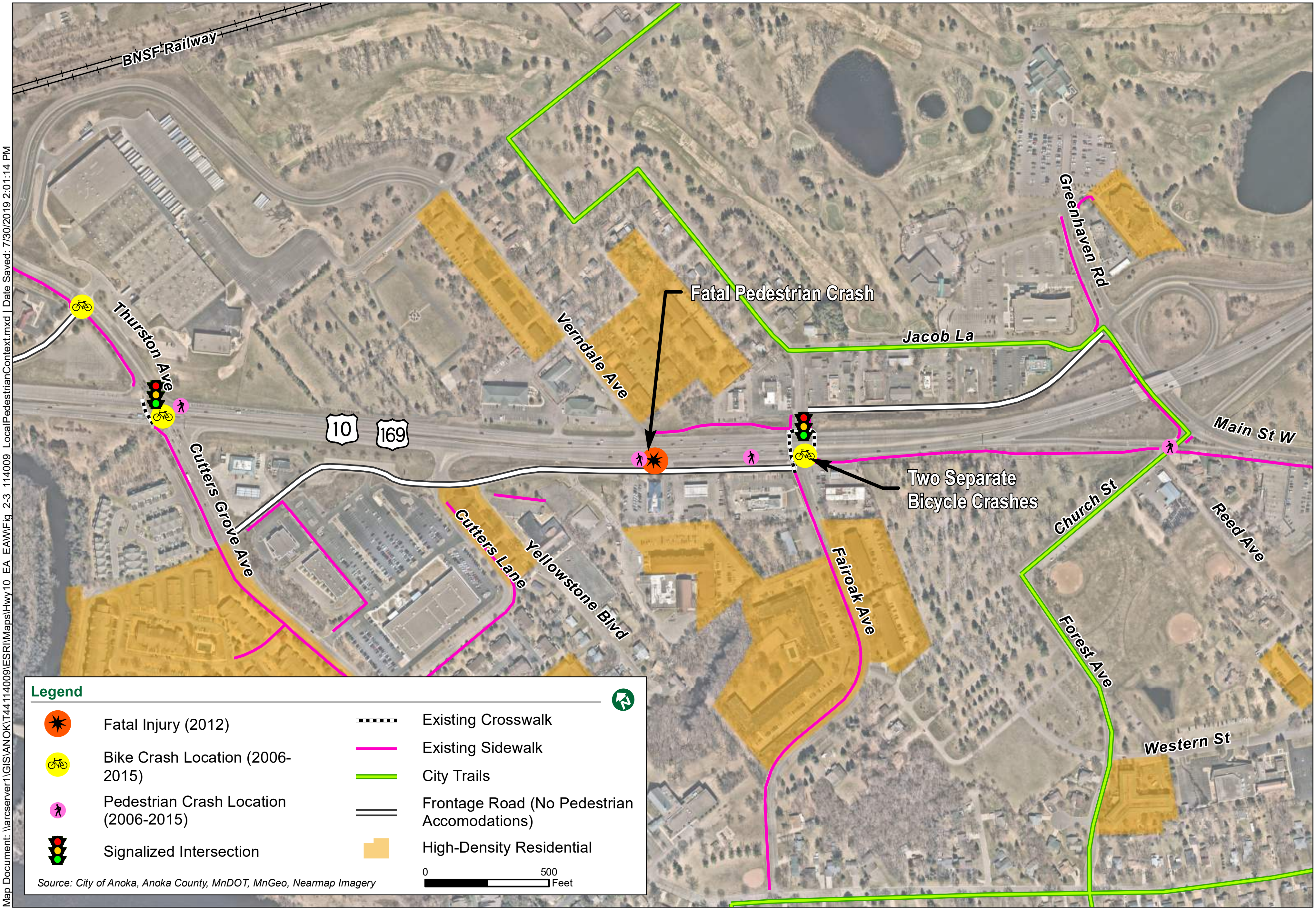

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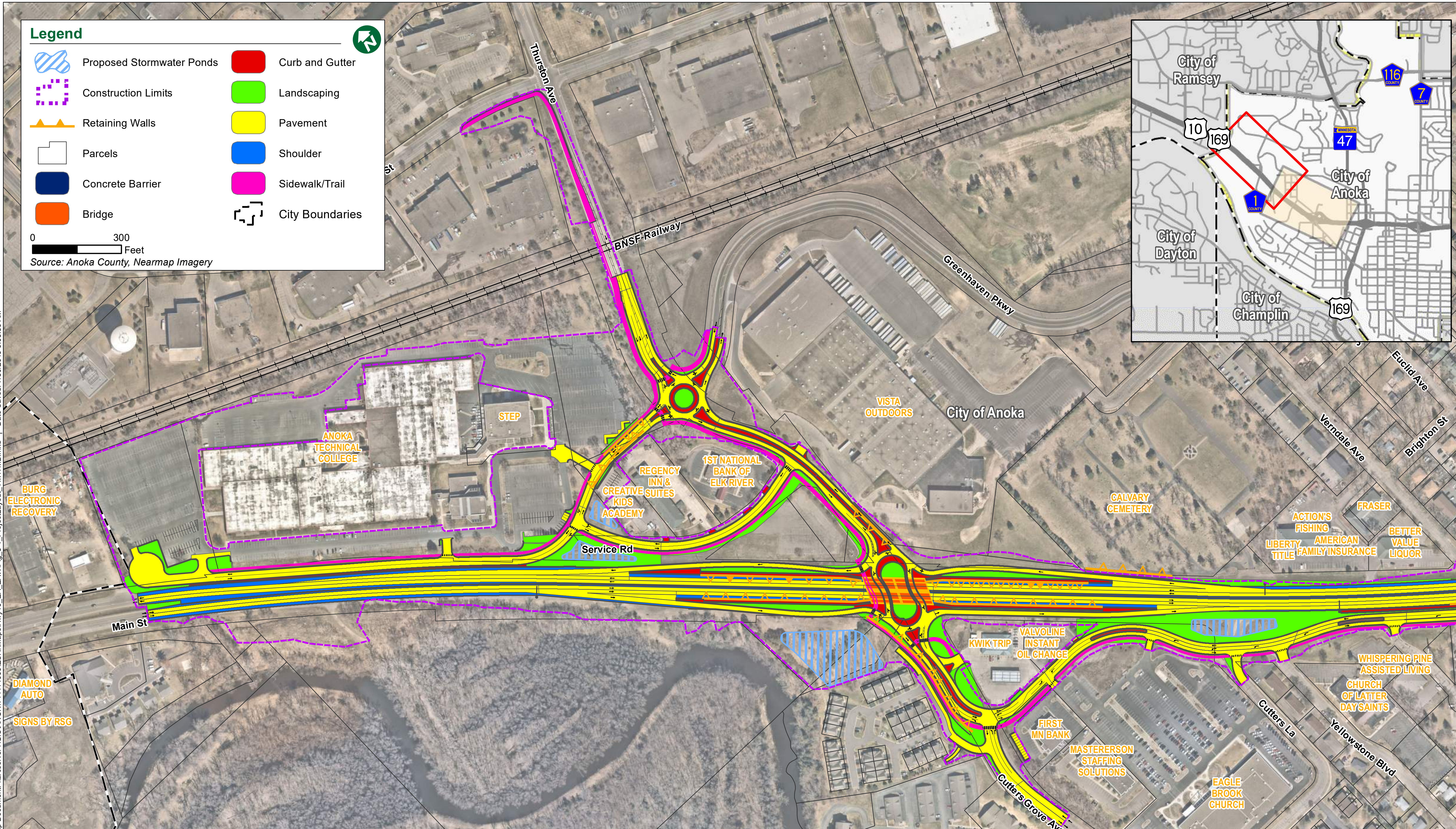

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DEPARTMENT OF TRANSPORTATION

Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 3-1 Preferred Alternative Project Layout (2 of 2)

August 2019

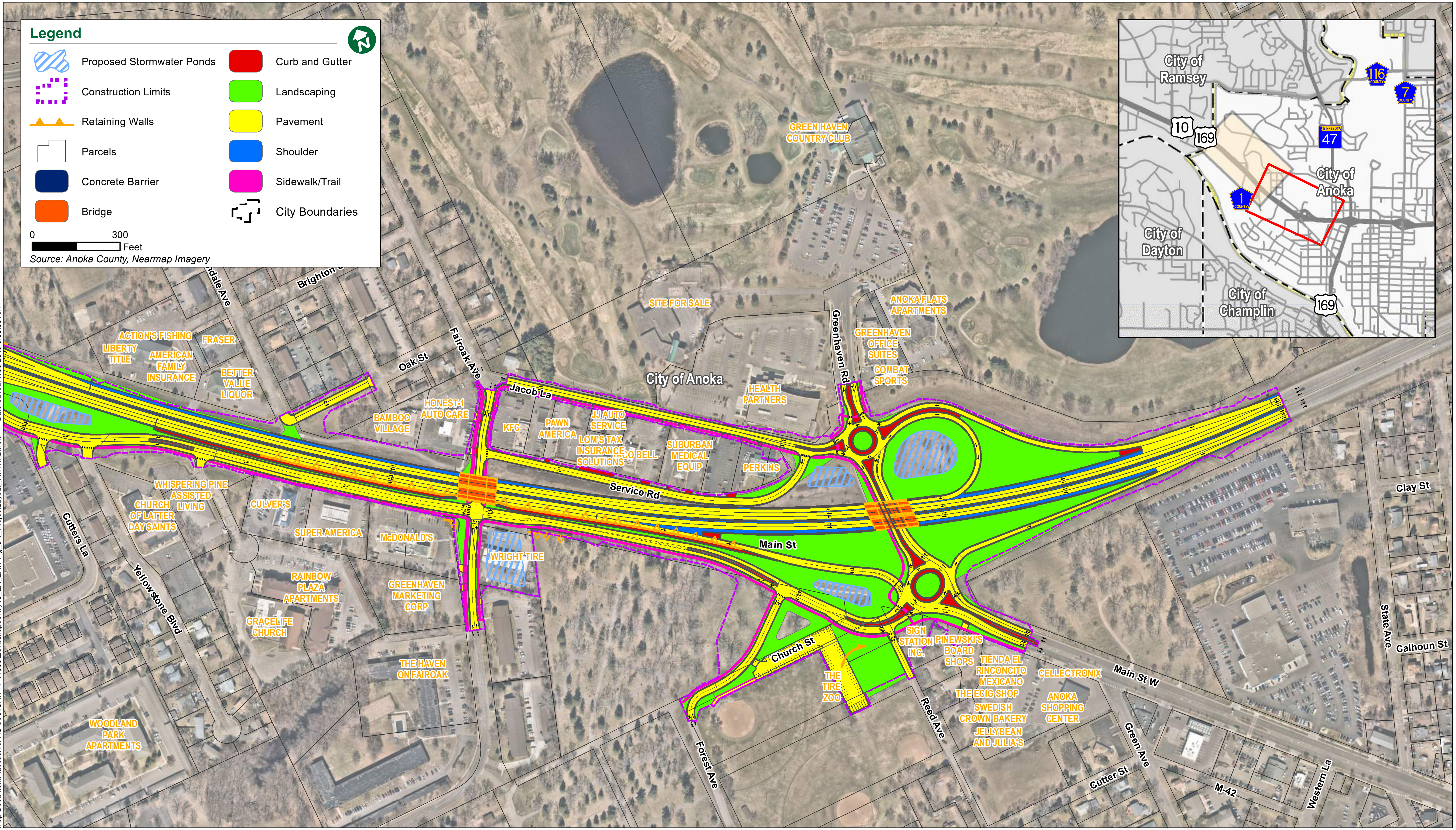

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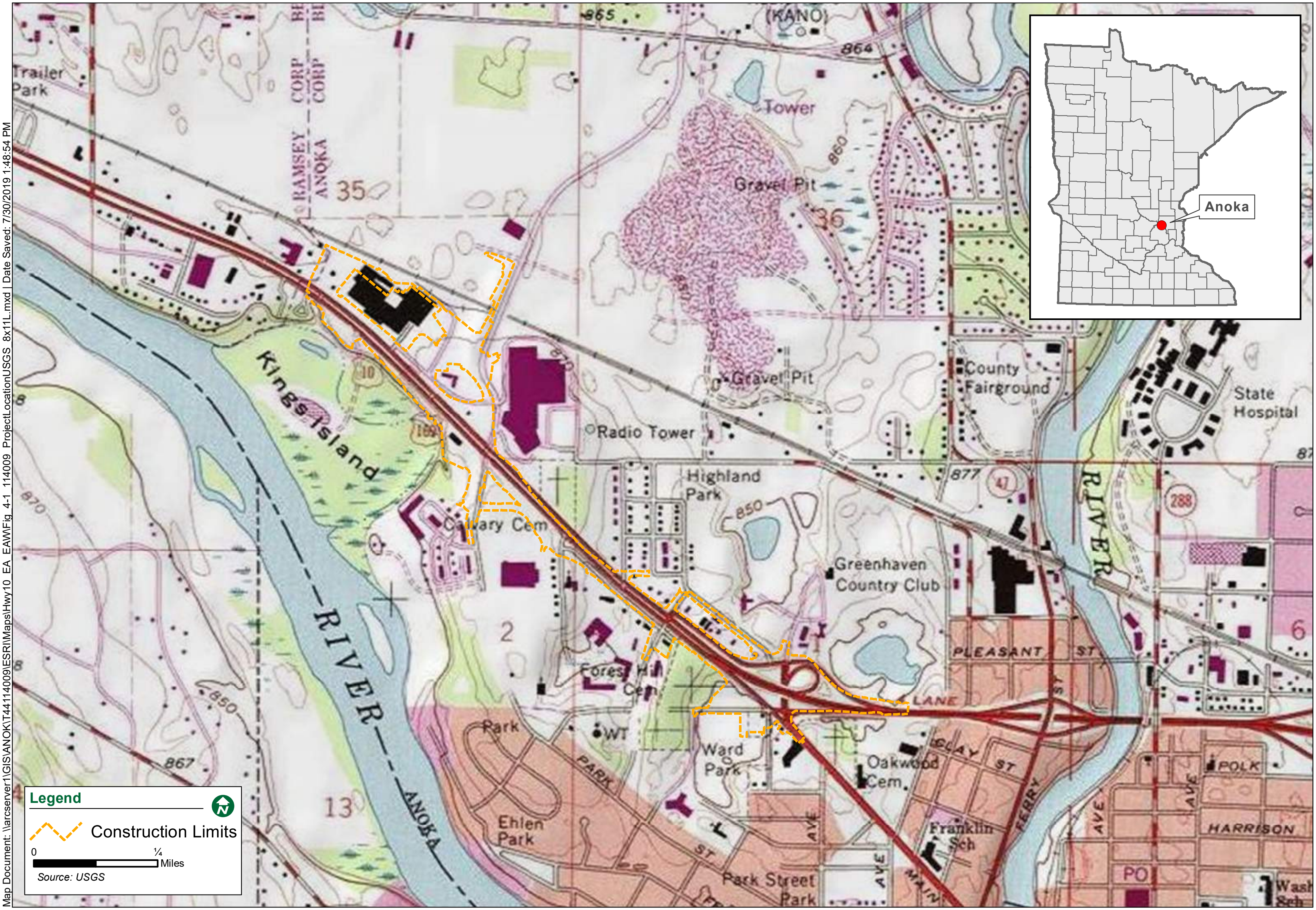
Figure 4-1 Project Location USGS

August 2019



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Anoka HWY 10/169 Improvement Project
Environmental Assessment

Figure 4-2 Existing Land Use

August 2019

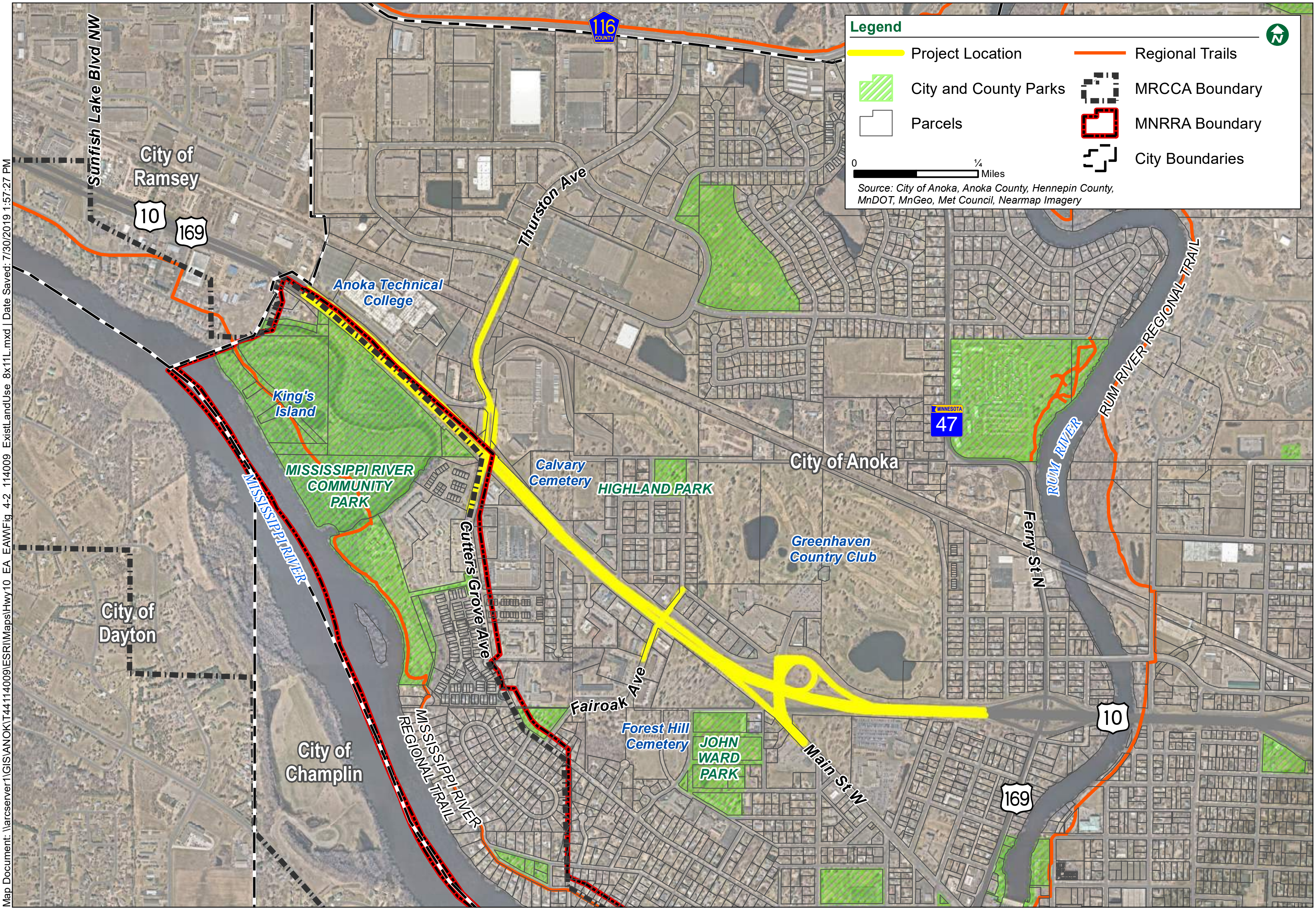

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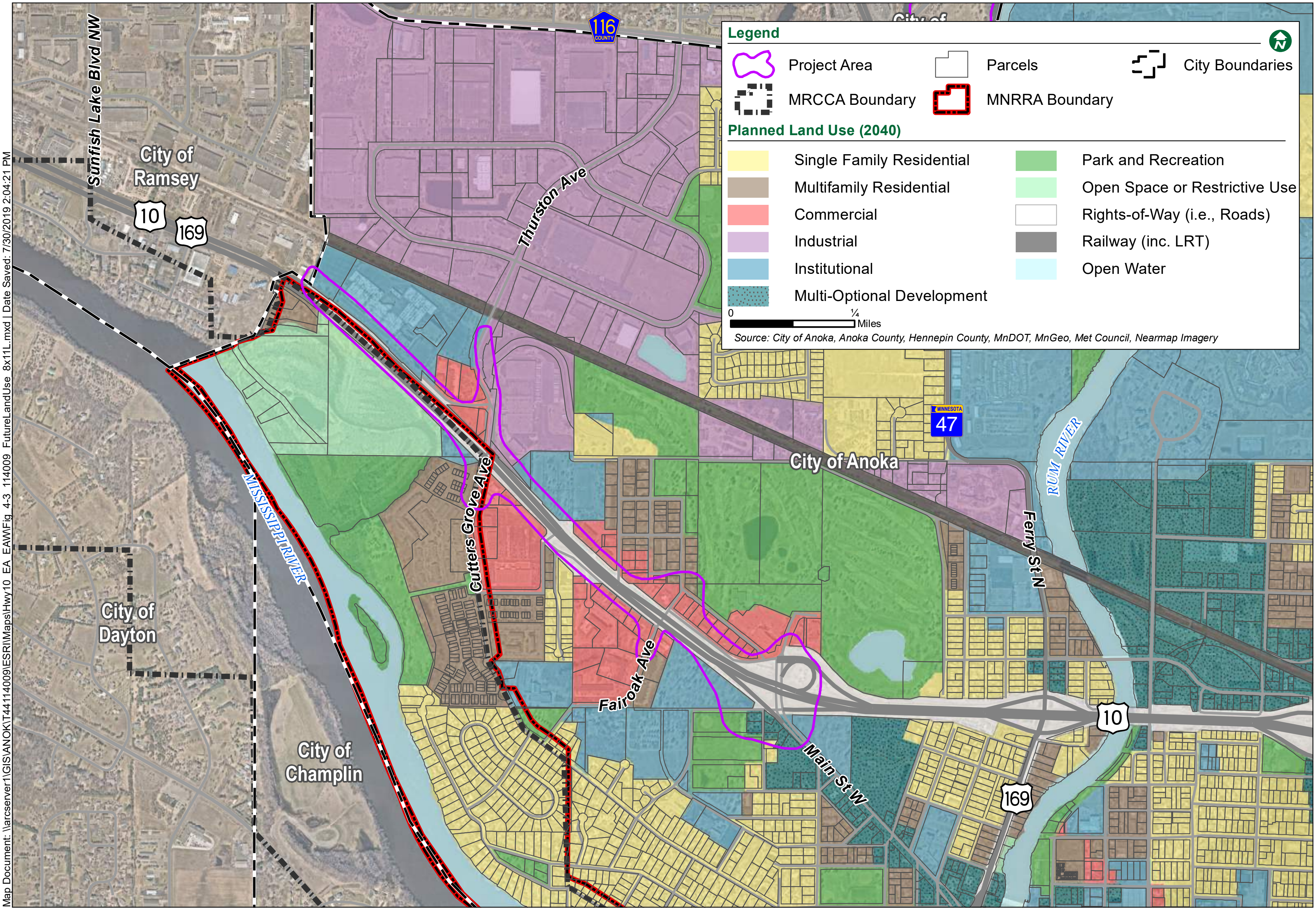
Figure 4-3 Future, Planned Land Use

August 2019



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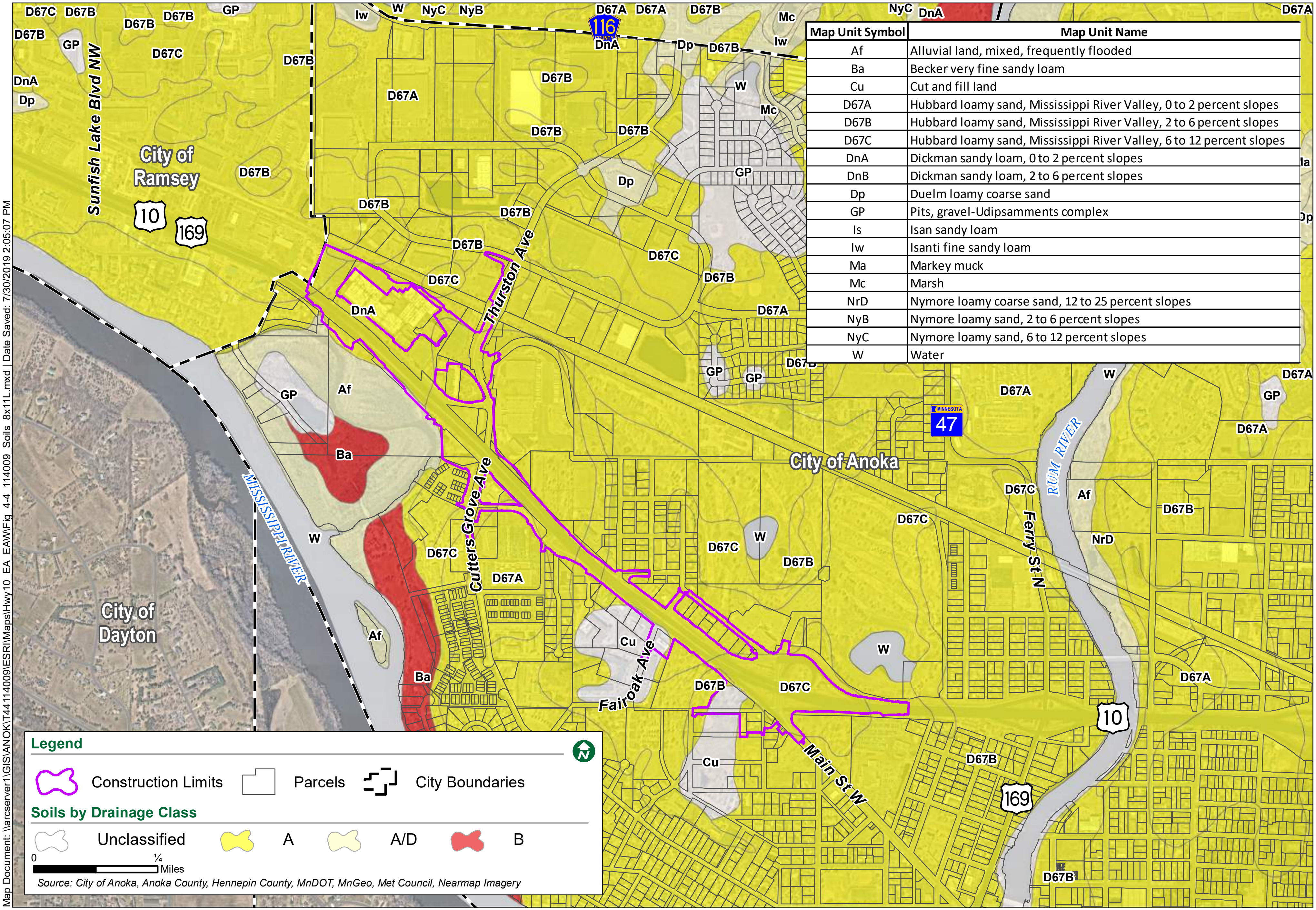
Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 4-4 Soils

August 2019



Map Unit Symbol	Map Unit Name
Af	Alluvial land, mixed, frequently flooded
Ba	Becker very fine sandy loam
Cu	Cut and fill land
D67A	Hubbard loamy sand, Mississippi River Valley, 0 to 2 percent slopes
D67B	Hubbard loamy sand, Mississippi River Valley, 2 to 6 percent slopes
D67C	Hubbard loamy sand, Mississippi River Valley, 6 to 12 percent slopes
DnA	Dickman sandy loam, 0 to 2 percent slopes
DnB	Dickman sandy loam, 2 to 6 percent slopes
Dp	Duelm loamy coarse sand
GP	Pits, gravel-Udipsamments complex
Is	Isan sandy loam
Iw	Isanti fine sandy loam
Ma	Markey muck
Mc	Marsh
NrD	Nymore loamy coarse sand, 12 to 25 percent slopes
NyB	Nymore loamy sand, 2 to 6 percent slopes
NyC	Nymore loamy sand, 6 to 12 percent slopes
W	Water

Map Document: \\arcserver1\GIS\ANOKA\T44114009\ESRI\Maps\Hwy10_EA_EAWFig_4-4_114009_Soils_8x11L.mxd | Date Saved: 7/30/2019 2:05:07 PM

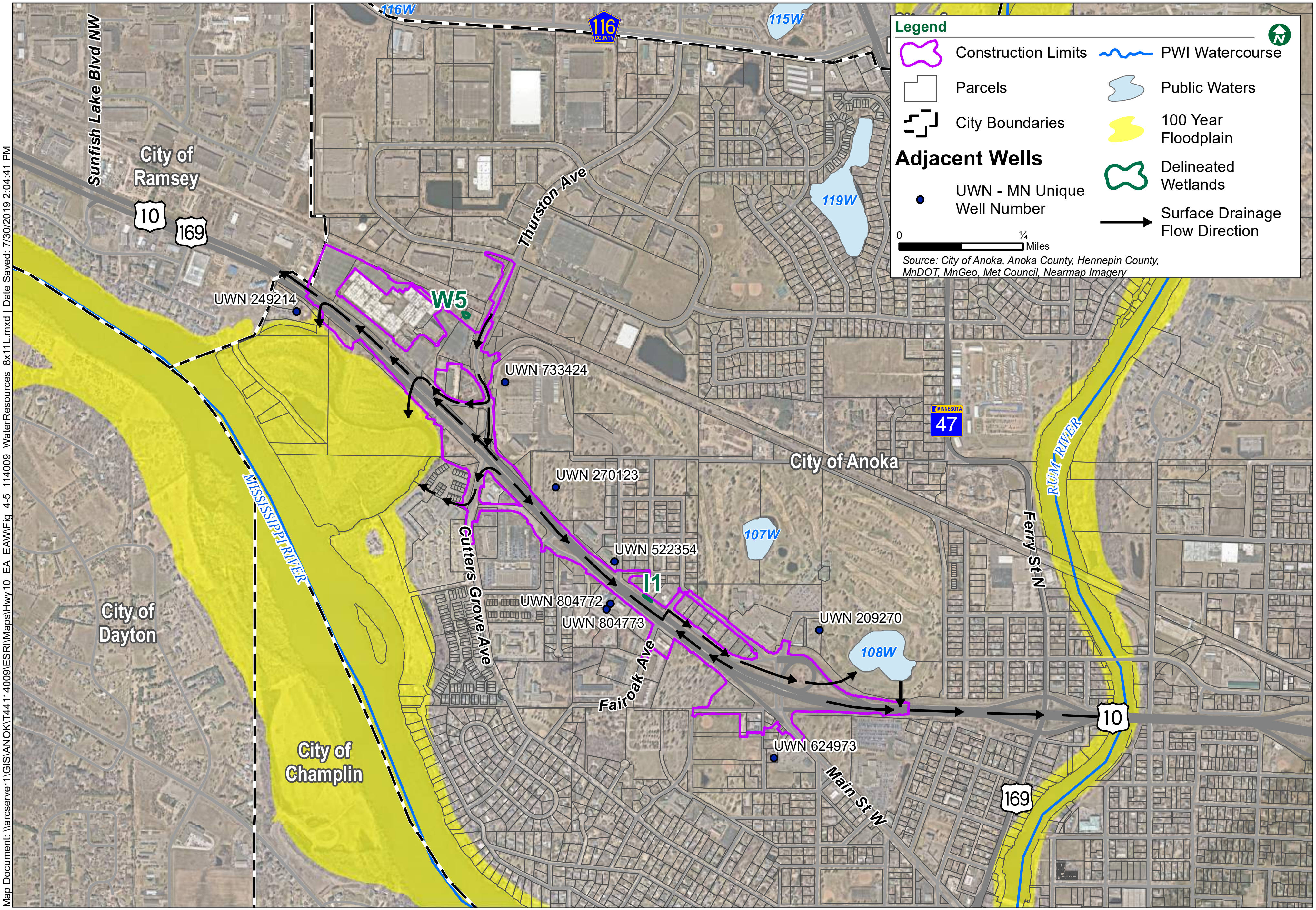
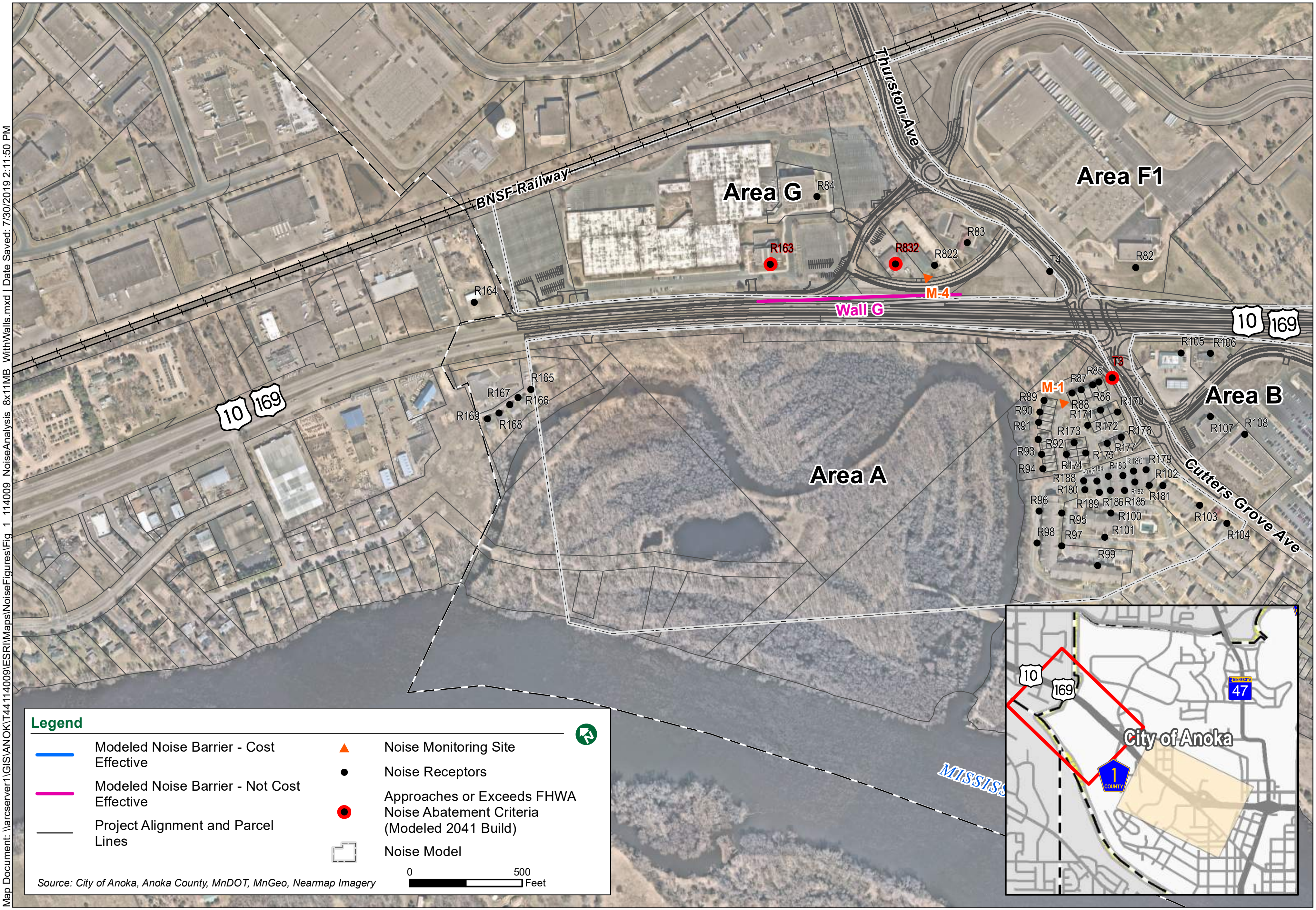

Legend
Construction Limits
Parcels
City Boundaries
PWI Watercourse
Public Waters
100 Year Floodplain
Delineated Wetlands
Adjacent Wells
UWN - MN Unique Well Number
Surface Drainage Flow Direction
0
¼
Miles
Source: City of Anoka, Anoka County, Hennepin County, MnDOT, MnGeo, Met Council, Nearmap Imagery
City of Ramsey
City of Anoka
City of Dayton
City of Champlin
Sunfish Lake Blvd NW
Thurston Ave
Cutters Grove Ave
Fairoak Ave
Ferry St N
Main St W
MISSISSIPPI RIVER
RUM RIVER
10
169
116
47
116W
115W
119W
107W
108W
W5
I1
UWN 249214
UWN 733424
UWN 270123
UWN 522354
UWN 804772
UWN 804773
UWN 209270
UWN 624973

Figure 4-6 Noise Analysis West

August 2019



Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 4-6 Noise Analysis East

August 2019

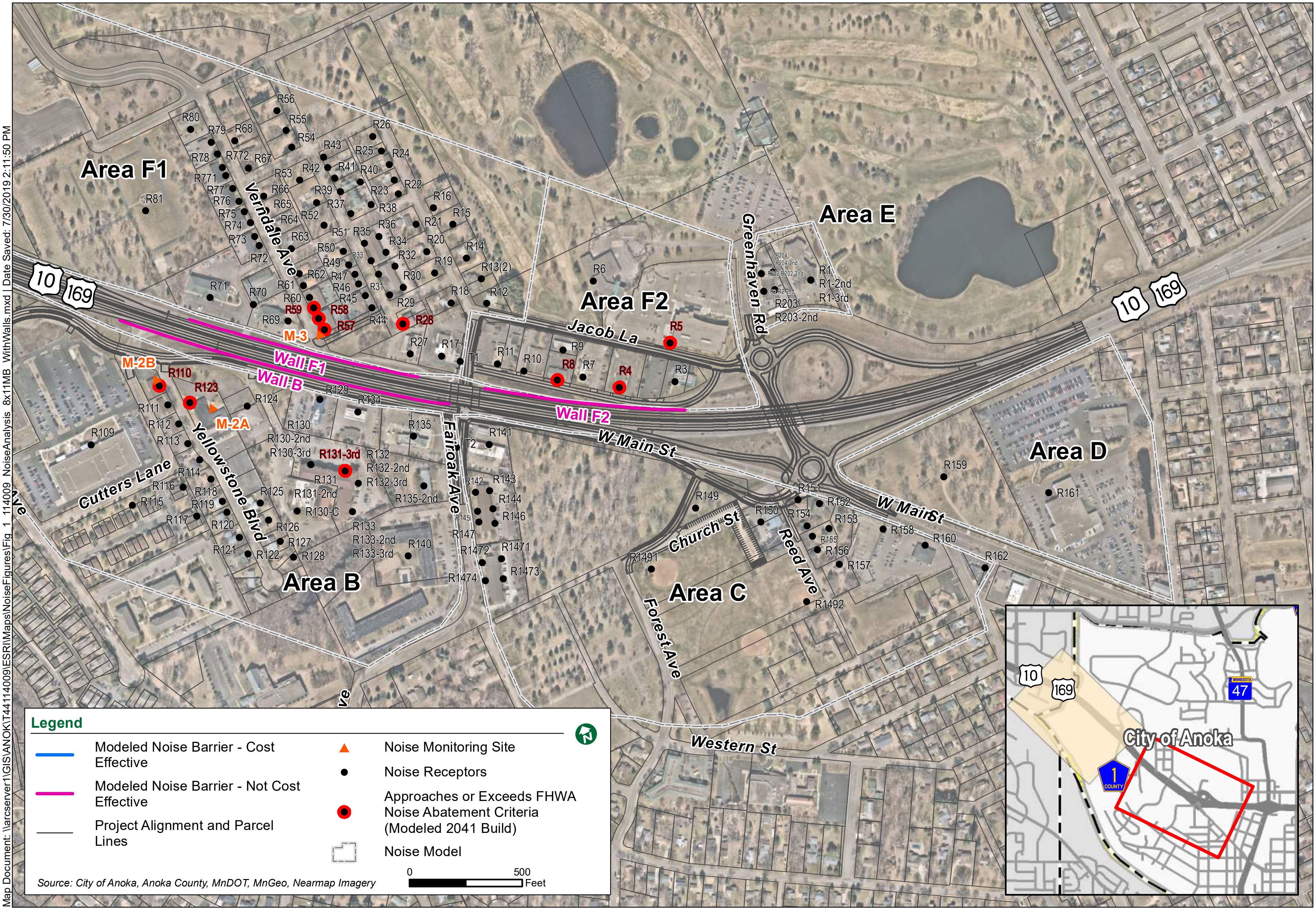


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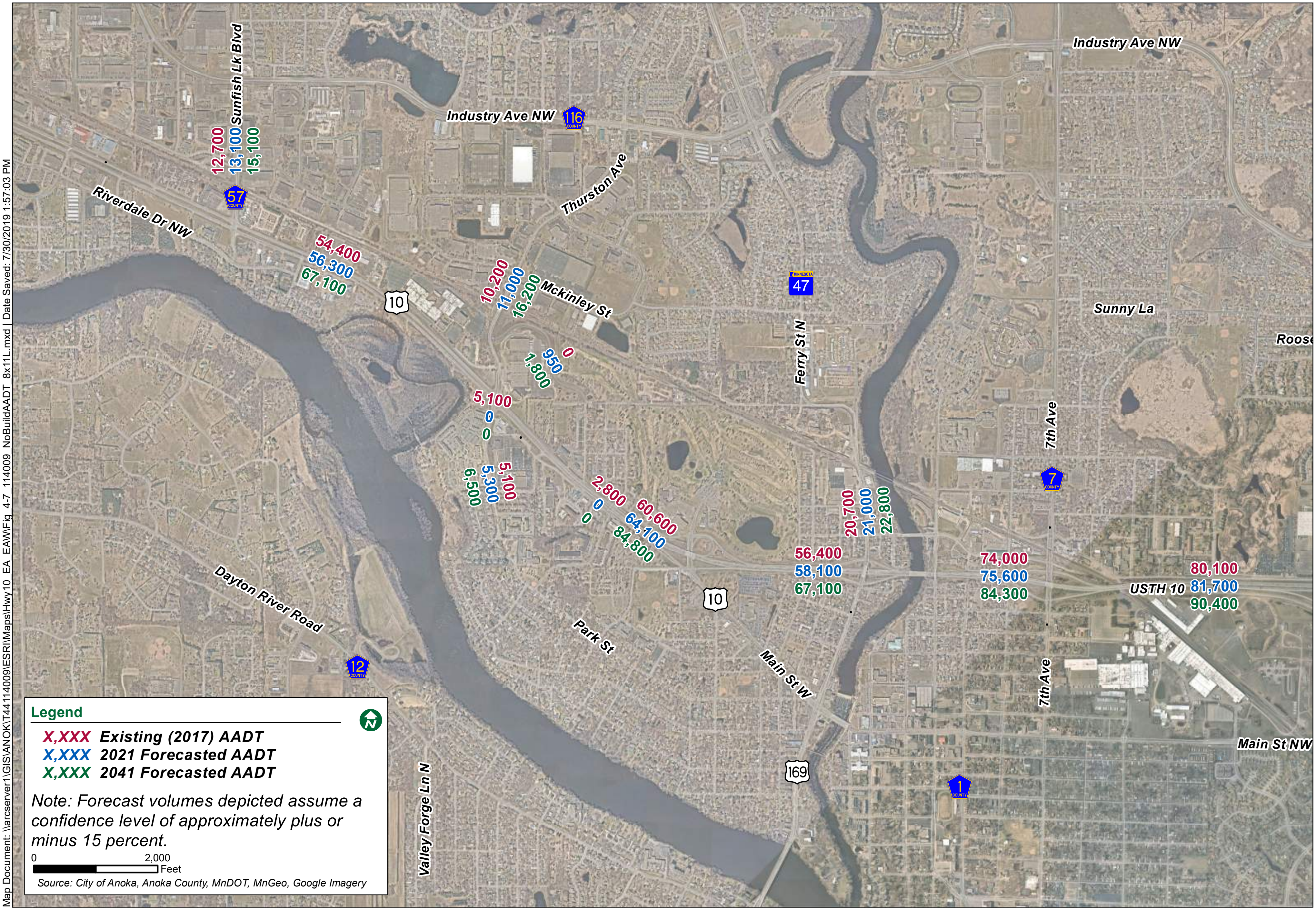
Figure 4-7 No Build AADT



Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 4-8 Build AADT

August 2019

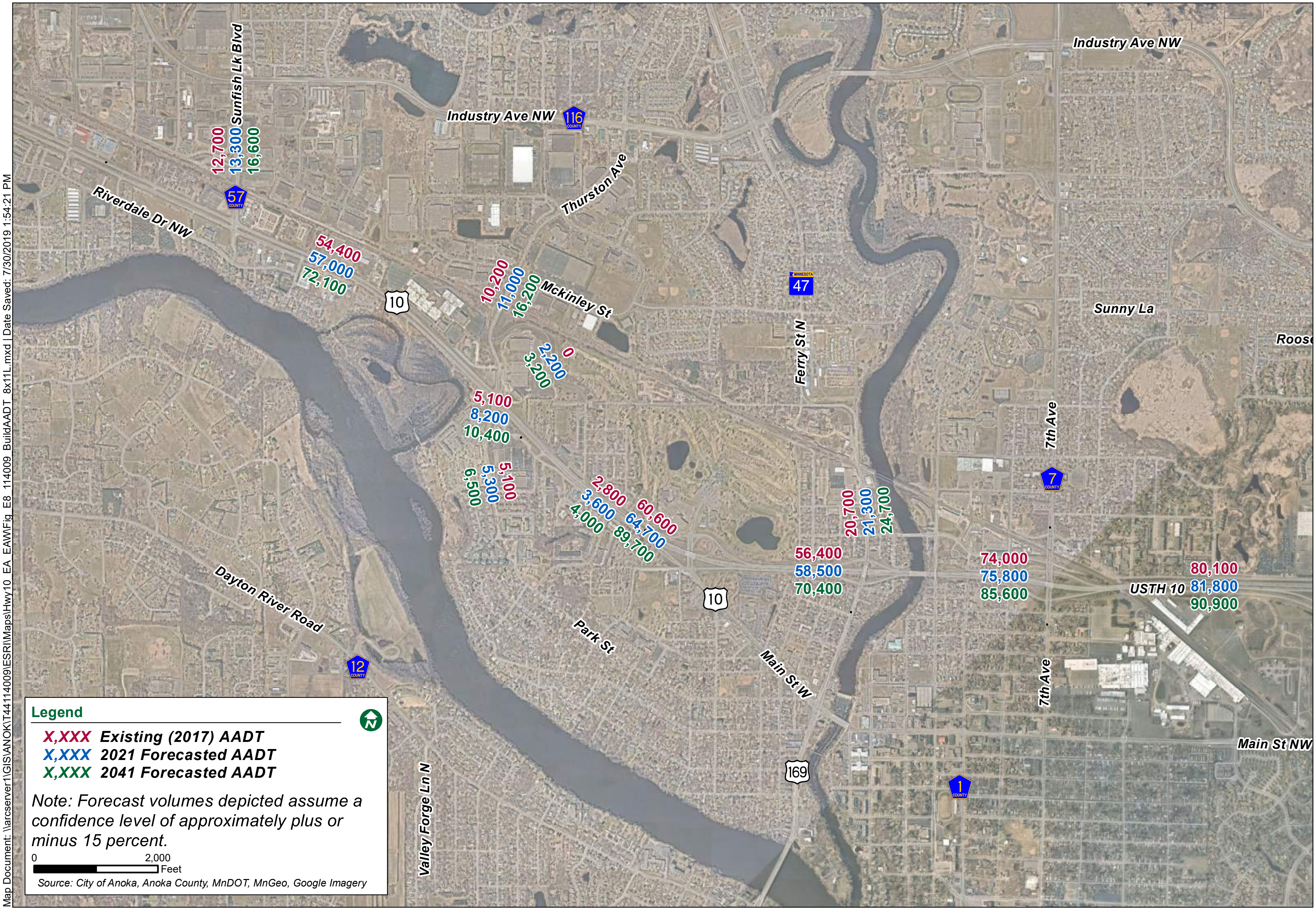
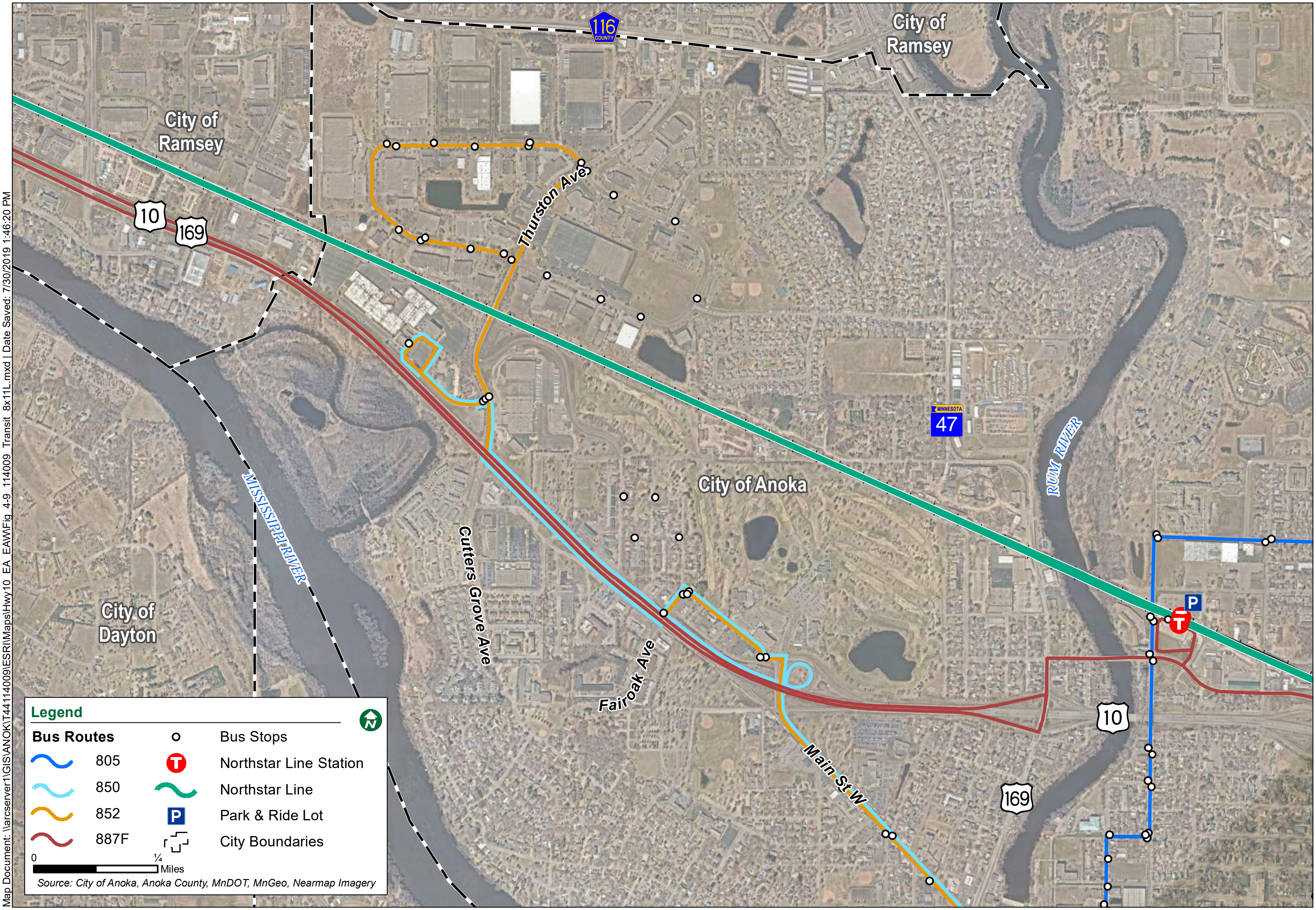
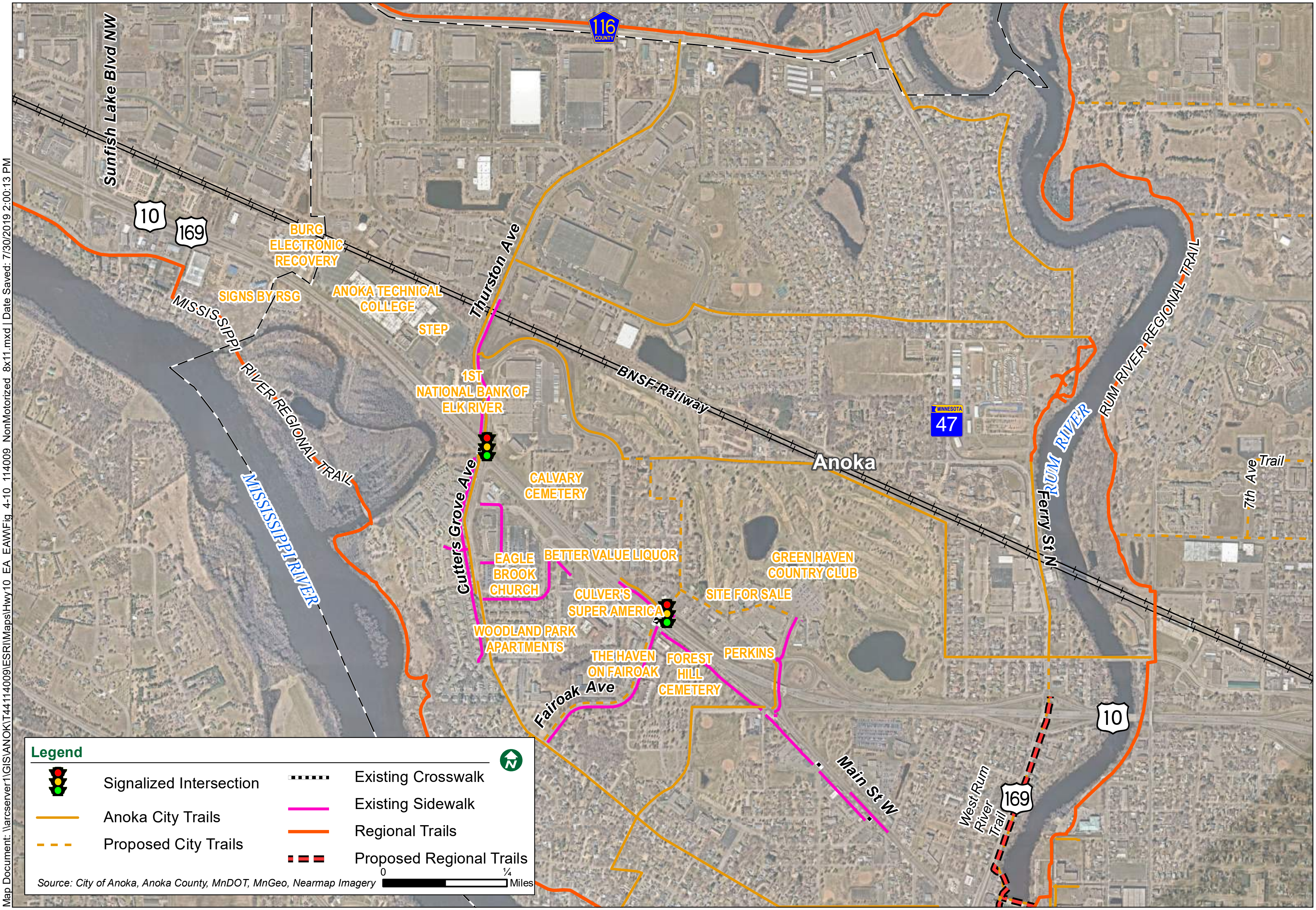


Figure 4-9 Existing Transit Routes and Facilities

August 2019



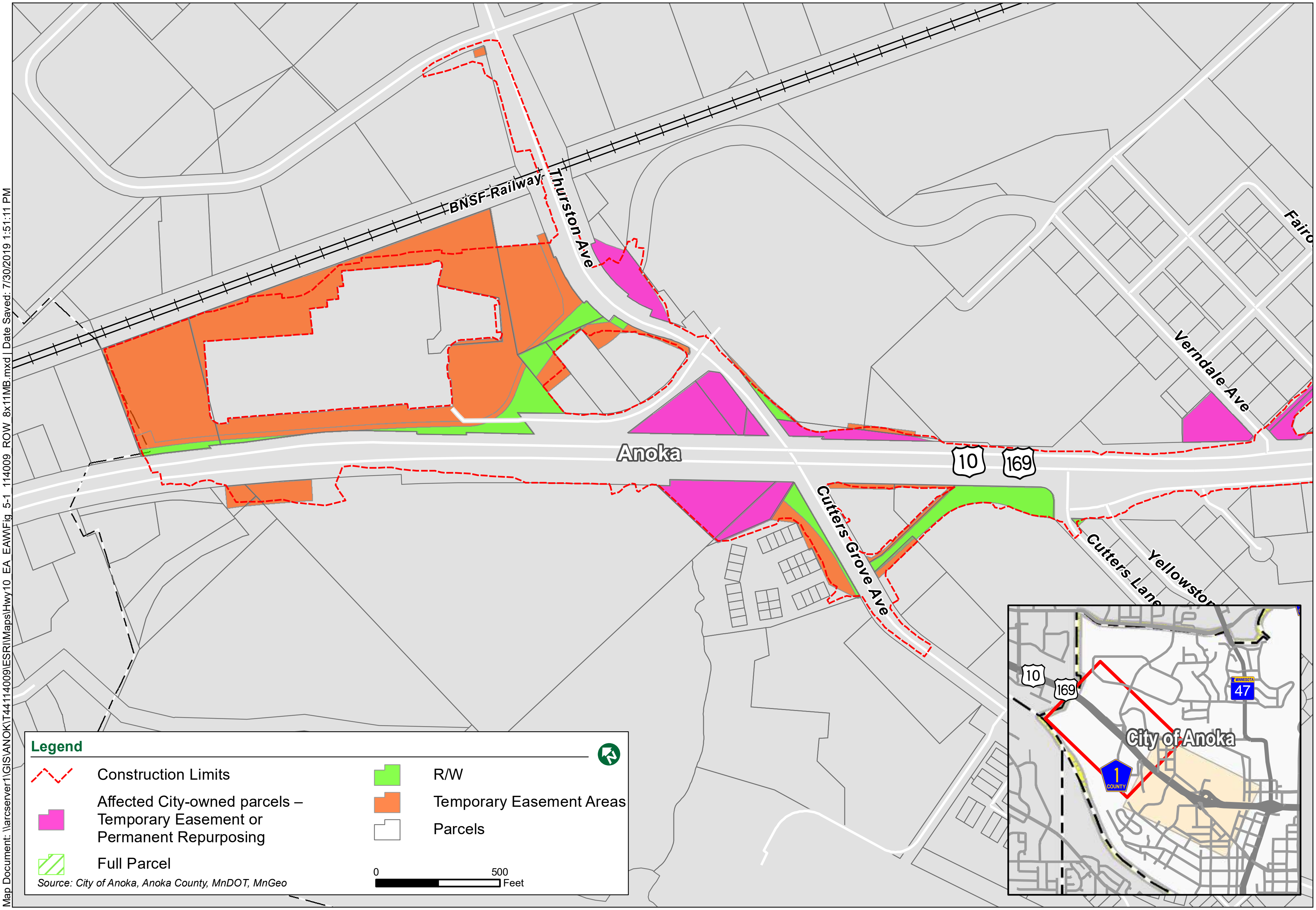

Sunfish Lake Blvd NW
10
169
116 COUNTY
BURG ELECTRONIC RECOVERY
SIGNS BY RSG
ANOKA TECHNICAL COLLEGE
STEP
Thurston Ave
MISSISSIPPI RIVER REGIONAL TRAIL
MISSISSIPPI RIVER
1ST NATIONAL BANK OF ELK RIVER
BNSF Railway
Anoka
47
RUM RIVER
RUM RIVER REGIONAL TRAIL
Ferry St N
7th Ave
Trail
CALVARY CEMETERY
Cutters Grove Ave
EAGLE BROOK CHURCH
BETTER VALUE LIQUOR
GREEN HAVEN COUNTRY CLUB
CULVER'S
SUPER AMERICA
SITE FOR SALE
WOODLAND PARK APARTMENTS
THE HAVEN ON FAIROAK
FOREST HILL CEMETERY
PERKINS
Fairoak Ave
Main St W
West Rum River Trail
Legend
Signalized Intersection
Anoka City Trails
Proposed City Trails
Existing Crosswalk
Existing Sidewalk
Regional Trails
Proposed Regional Trails
0
¼
Miles
Source: City of Anoka, Anoka County, MnDOT, MnGeo, Nearmap Imagery

Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 5-1 Right-of-Way Needs and Affected City Parcels

August 2019



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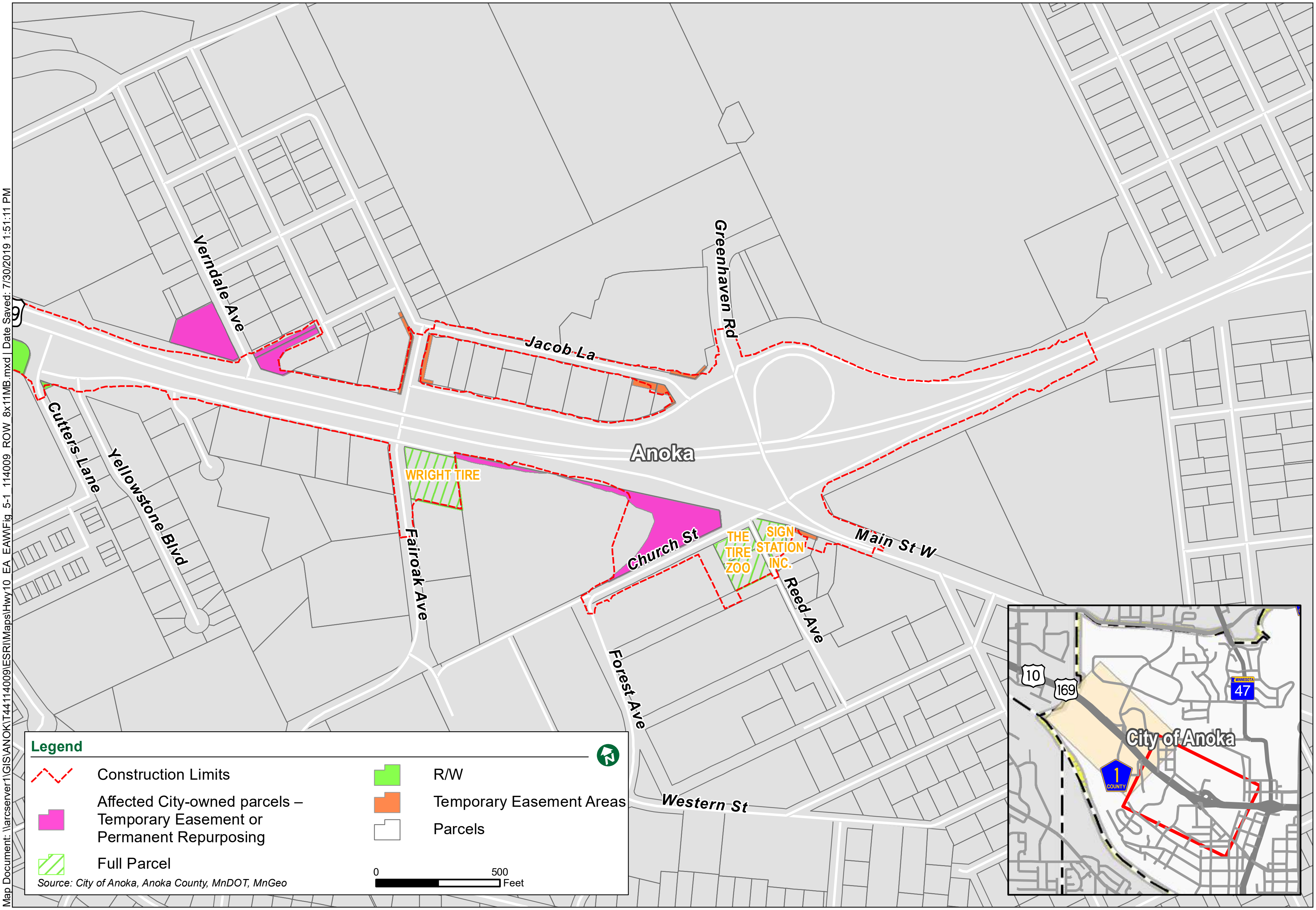
Anoka HWY 10/169 Improvement Project

Environmental Assessment

Figure 5-1 Right-of-Way Needs and Affected City Parcels

August 2019



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APPENDIX B

TH 10 Improvements: Existing Conditions and Traffic Forecasts

BOLTON & MENK
Real People. Real Solutions.

12224 Nicollet Avenue
Burnsville, MN 55337-1649

Ph: (952) 890-0509
Fax: (952) 890-8065
Bolton-Menk.com

MEMORANDUM

Date: December 4, 2017

To: Paul Jung, P.E.

From: Ross B. Tillman, P.E.

Kelsey E. Retherford, E.I.T.

Subject: TH 10 Improvements: Existing Conditions and Traffic Forecasts
City of Anoka
Project No.: T44.114009

Introduction

This memorandum provides the existing and future no build operational analysis for the TH 10 Improvements project. The traffic forecasts are also included and were determined from the Twin Cities Regional Model and historical data.

Data Collection

Existing traffic volumes for the area were collected in May of 2017. The AM and PM peak periods were found to be 7-8 AM and 4:15-5:15 PM respectively. **Figure 1** in the **Appendix** shows the existing peak hour turning movement counts.

Existing Operations

A level of service (LOS) analysis of the peak hours was completed using the existing turning movement counts in VISSIM. The LOS results are based on average delay per vehicle as calculated by the 2010 Highway Capacity Manual (HCM), which defines the level of service, based on control delay. Control delay is the delay experienced by vehicles slowing down as they are approaching the intersection, the wait time at the intersection, and the time for the vehicle to speed up through the intersection and enter into the traffic stream. The average intersection control delay is a volume weighted average of delay experienced by all motorists entering the intersection on all intersection approaches. Intersections and each intersection approach are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS A through D is generally perceived to be acceptable to drivers. LOS E indicates that an intersection is operating at, or very near, its capacity and that drivers experience considerable delays. LOS F indicates an intersection where demand exceeds capacity and drivers experience substantial delays.

Existing 2017 Analysis

The existing AM and PM peak traffic volumes were analyzed with the current geometry along TH 10. Operational results for the major intersections in the project area along TH 10 are shown in **Table 1** below. **Tables A1 and A2** in the **Appendix** show the demand and modeled volumes, percentage error, GEH statistic, delay and queues of each movement for all of the intersections that were analyzed. The

GEH statistic is a measure to compare volume demand versus actual volume modeled. The formula for the GEH statistic is shown below.

$$GEH = \sqrt{\frac{2(M-C)^2}{M+C}}$$

M = Output traffic volume from the simulation model measured in vehicles per hour (VPH)
C = Input traffic volume (VPH)

This measure is able to compare large ranges in volume. Using a ten percent tolerance, which may be adequate for large volume movements, would only allow for a movement with 40 cars to vary by four vehicles. A GEH statistic below five shows the volume modeled is acceptable, from five to ten there may be errors in the model and over ten is considered unacceptable.

Table 1. Existing (2017) No Build Operational Analysis

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd	AM	31	C	96	F	SBL	EBT	175	1400
Signalized Intersection	PM	38	D	126	F	WBL	WBT	300	2225
TH 10 at Thurston Ave	AM	31	C	212	F	SBL	EBT	150	1625
Signalized Intersection	PM	62	E	379	F	SBL	SBL	1175	2175
TH 10 at Fairoak Ave	AM	21	C	225	F	NBT	EBT	275	1775
Signalized Intersection	PM	93	F	419	F	SBT	WBT	1925	5350
Main St at Church St/EB TH 10 Ramps	AM	4	A	56	E	EBL	SBL (Ramp)	25	150
Stop Controlled	PM	5	A	341	F	EBL	SBT (Ramp)	50	550
Main St at WB TH 10 Ramps	AM	7	A	24	C	WBT	WBL/T/R	50	225
Stop Controlled	PM	12	B	69	E	WBL	WBL/T/R	275	1025
EB TH 10 Ramps at Ferry St	AM	15	B	64	E	WBL	NBT/R	100	425
Signalized Intersection	PM	19	B	65	E	WBR	NBT/R	225	850
WB TH 10 Ramps at Ferry St	AM	28	C	47	D	WBL/R	WBL/T	250	2275
Signalized Intersection	PM	26	C	57	E	WBT	WBL/T	250	1850
EB TH 10 Ramps at 7th Ave	AM	8	A	51	D	EBL	SBL	125	475
Signalized Intersection	PM	11	B	49	D	EBL	NBT/R	100	500
WB TH 10 Ramps at 7th Ave	AM	15	B	65	E	WBL	WBL/T	675	3450
Signalized Intersection	PM	7	A	52	D	WBT	NBL	50	350

*Delay in seconds per vehicle
**Maximum delay and LOS on any approach and/or movement
***Limiting Movement is the highest delay approach.

Delay

- Currently all intersections operate acceptably with LOS C or better during the AM peak hour.
- During the PM peak hour the intersection of Fairoak Avenue at TH 10 operates with LOS F and Thurston Avenue at TH 10 operates with LOS E. All other intersections operate with LOS D or better during the PM peak hour.
- The following intersections operate with a failing limiting movement delay during both peak hours:
    - Sunfish Lake Boulevard at TH 10
    - Thurston Avenue at TH 10

    - Fairoak Avenue at TH 10
- The intersection of Main St at Church St/EB TH 10 Ramps operates with a failing limiting movement delay during the PM peak hour.

Queues

- Sunfish Lake Boulevard at TH 10
    - The maximum queues block the turn lanes on all approaches during the AM peak hour.
    - The maximum westbound and southbound queues block turn lanes during the PM peak hour.
- Thurston Avenue at TH 10
    - The maximum eastbound, northbound and southbound queues block turn lanes during the AM peak hour.
    - The maximum queues block the turn lanes on all approaches during both the PM peak hour.
- Fairoak Avenue at TH 10
    - The maximum eastbound and westbound through queues and southbound movement queues block turn lanes during the AM peak hour. The westbound queue extends to Main Street.
    - The average westbound through, maximum eastbound through, and maximum southbound queues block turn lanes during the PM peak hour. The westbound queue extends past TH 47.
- Main St at Church St/EB TH 10 Ramps
    - Queues are acceptable during both peak hours.
- Main St at WB TH 10 Ramps
    - Queues are acceptable during both peak hours.
- TH 47 at EB TH 10 Ramps
    - Queues are acceptable during both peak hours.
- TH 47 at WB TH 10 Ramps
    - The maximum westbound queue extends onto WB TH 10 during both peak hours.
- 7th Avenue at EB TH 10 Ramps
    - The maximum southbound left queue extends beyond the channelized turn lane both peak hours.
    - The maximum northbound thru-right queue extends past Tyler Street during the PM peak hour.
- 7th Avenue at WB TH 10 Ramps
    - The maximum westbound queue extends onto WB TH 10 during the AM peak hour.
    - The maximum northbound queue blocks the turn lane during both peak hours.

Forecast Methodology

Traffic forecasts were determined under both No Build and Build scenarios. The forecasts were determined based on historical Annual Average Daily Traffic (AADT) counts available from the Minnesota Department of Transportation (MnDOT), current year traffic count data collected in May 2017, and the Twin Cities Regional Model. For the Twin Cities Regional Model the existing model for year 2000 was used along with a future model for year 2030 with updates to 2040 trip tables. The regional model provides a systematic procedure for forecasting volumes, taking into account the projected changes in regional land use/socioeconomic data and the regional transportation network. The regional model was obtained from Metropolitan Council for 2000 and 2030 conditions and modified for use in forecasting volumes.

The general approach to forecasting the traffic volumes consisted of the following:

- Utilize the Twin Cities Regional Travel Demand Model and model parameters, maintained by the Metropolitan Council, as the primary instrument for forecasting the daily volumes.
- Collect year 1995 to 2015 traffic count data from MnDOT and existing (2017) traffic counts throughout the study area for the purpose of validating the regional model, run for the base year.
- Add additional county and other major local roadways to the roadway network in the regional model.
- Apply the regional model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation.
- Apply the regional model for the forecast year (2040), taking into account the adjustments made to the 2000 model run and the anticipated changes to the roadway network by 2040, to generate the projected volumes.
- For the Build model the capacity of TH 10 was increased from Fairoak Avenue to Thurston Avenue to accurately model the lengthening of the freeway.
- Analyze traffic patterns that ultimately comprise the elements themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary.
- Prepare the final set of forecast volumes.

Peak Hour Volumes
Once daily traffic volumes were determined, the peak hour turning movement counts collected as part of this study were adjusted. Existing turning movement counts were grown and reallocated at each count location based on the forecasted AADTs for each leg of the intersection using TurnsW32. In the build scenario, certain turning movements were then rerouted throughout the network based on access closures or relocations (removal of access to Fairoak Ave from TH 10 for example).

No Build
For the No Build forecast the growth rate along TH 10 from Ramsey to Round Lake Boulevard ranges from 0.5% to 1.41%. The growth rates along the side streets range from 0.3% to 1.95%. The No Build forecast re-routes trips that are anticipated to use the new intersection at Green Haven Parkway and Thurston Ave, just north of Cornelius Place, which is currently being built. **Figures 2 and 3** in the **Appendix** shows the forecasted No Build 2021 and 2041 peak hour turning movement counts. **Figure 4** in the **Appendix** shows the forecasted No Build 2021 and 2041 AADTs compared to existing traffic volumes.

Build
For the Build forecast the growth rate along TH 10 from Ramsey to Round Lake Boulevard ranges from 0.53% to 1.65%. The growth rates along the side streets are the same or very close to the No Build growth rates except along Main Street south of TH 10 and TH 47 north of TH 10. Along Main Street south of TH 10 the No Build growth rate is 1.24% and the Build growth rate is 1.72%. At TH 47 north of TH 10 the No Build growth rate is .4% and the Build growth rate is .74% as more traffic is anticipated to remain on TH 10 until TH 47 with congestion reduced instead of taking alternative routes. The Build forecast accounts for rerouted traffic from the grade separation of TH 10 at Fairoak Avenue and the grade separation and conversion of Thurston Avenue to an interchange at TH 10. **Figure 5** in the **Appendix** shows the forecasted Build 2021 and 2041 AADTs compared to existing traffic volumes. **Figures 6 and 7** in the **Appendix** shows the forecasted Build 2021 and 2041 peak hour turning movement counts.

2021 No Build Operations

The 2021 No Build AM and PM peak traffic volumes were analyzed with the current geometry along TH 10. Operational results for the major intersections in the project area along TH 10 are shown in **Table 2** below. **Tables A3 and A4** in the **Appendix** show the demand and modeled volumes, percentage error, GEH statistic, delay and queues of each movement for all of the intersections that were analyzed.

Table 2. 2021 No Build Operational Analysis

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd	AM	35	C	122	F	WBL	EBT	225	1500
Signalized Intersection	PM	45	D	164	F	EBL	WBT	725	2775
TH 10 at Thurston Ave	AM	64	E	227	F	SBL	EBT	1450	4825
Signalized Intersection	PM	98	F	616	F	SBL	SBL	2950	5100
TH 10 at Fairoak Ave	AM	21	C	200	F	NBT	EBT	950	2625
Signalized Intersection	PM	64	E	418	F	SBL	WBT	750	2675
Main St at Church St/EB TH 10 Ramps	AM	7	A	70	E	EBL	SBL (Ramp)	25	150
Stop Controlled	PM	9	A	914	F	SBL (Ramp)	SBL (Main)	50	375
Main St at WB TH 10 Ramps	AM	7	A	24	C	WBT	WBL/T/R	25	225
Stop Controlled	PM	10	A	77	E	WBL	WBL/T/R	225	800
EB TH 10 Ramps at TH 47	AM	161	F	586	F	NBR	NBT/R	1725	2100
Signalized Intersection	PM	28	C	86	F	WBR	NBT/R	300	1200
WB TH 10 Ramps at TH 47	AM	34	C	95	F	NBL	WBL/T	200	1375
Signalized Intersection	PM	31	C	77	E	NBL	WBR	125	875
EB TH 10 Ramps at 7th Ave	AM	9	A	51	D	EBL	SBL	25	450
Signalized Intersection	PM	15	B	66	E	EBL	NBT/R	125	675
WB TH 10 Ramps at 7th Ave	AM	16	B	72	E	NBL	SBT/R	150	700
Signalized Intersection	PM	9	A	43	D	WBL	NBR	75	400

*Delay in seconds per vehicle
**Maximum delay and LOS on any approach and/or movement
***Limiting Movement is the highest delay approach.

Delay

- The intersection of Thurston Avenue at TH 10 operates with LOS E during the AM peak hour and LOS F during the PM peak hour.
- The intersection of Fairoak Avenue at TH 10 operates with LOS E during the PM peak hour and LOS C during the AM peak hour.
- The intersection of TH 47 at EB TH 10 Ramps operates with LOS F during the AM peak hour and LOS C during the PM peak hour.
- All other intersections are anticipated to operate with LOS D or better during both peak hours.
- The following intersections operate with a failing limiting movement delay during both peak hours:
    - Sunfish Lake Boulevard at TH 10
    - Thurston Avenue at TH 10
    - Fairoak Avenue at TH 10
    - TH 47 at EB TH 10 Ramps
- The limiting movement at the intersection of Main St at Church St/EB TH 10 Ramps operates with LOS E during the AM peak hour and LOS F during the PM peak hour.
- The limiting movement at the intersection of TH 47 at WB TH 10 Ramps operates with LOS F during the AM peak hour and LOS E during the PM peak hour.

- The limiting movement at the intersection of Main St at WB TH 10 Ramps and both 7th Avenue Ramps operate with LOS E or better during both peak hours.

Queues

- Sunfish Lake Boulevard at TH 10
  - The maximum queues block the turn lanes on all approaches during the AM peak hour.
  - The maximum queues block the turn lanes on the eastbound, westbound and southbound approaches during the PM peak hour.
- Thurston Avenue at TH 10
  - The maximum queues block the turn lanes on all approaches during both peak hours with the eastbound through queue extending past Sunfish Lake Boulevard in the AM peak hour and the southbound left queue extending over 5000 feet during the PM peak hour.
- Fairoak Avenue at TH 10
  - The maximum westbound and eastbound through queues block turn lanes during both peak hours. The maximum eastbound queue extends past Thurston Avenue during both peak hours. The maximum westbound queue extends to Main Street during the AM peak hour over 1000 feet past Main Street during the PM peak hour.
- Main St at Church St/EB TH 10 Ramps
  - Queues are acceptable during both peak hours.
- Main St at WB TH 10 Ramps
  - Queues are acceptable during both peak hours.
- TH 47 at EB TH 10 Ramps
  - The maximum northbound queue extends past Main Street during the AM peak hour.
  - The maximum northbound queue extends past Calhoun Street during the PM peak hour.
- TH 47 at WB TH 10 Ramps
  - The maximum westbound queue extends onto WB TH 10 during both peak hours.
- 7th Avenue at EB TH 10 Ramps
  - The maximum southbound left queue extends beyond the channelized turn lane both peak hours.
  - The maximum northbound thru-right queue extends past Bob Ehlen Drive during the PM peak hour.
- 7th Avenue at WB TH 10 Ramps
  - The maximum westbound right queue extends past the turn lane during the PM peak hour.
  - The maximum northbound queue blocks the turn lane during both peak hours.
  - The average southbound queue extends past Buchanan Street during the AM peak hour.

As shown in **Tables A3 and A4** in the **Appendix**, the GEH statistic is above five for a few approaches during both peak hours which indicates that not enough traffic is being modeled when compared to the input volumes. This is because with the increasing traffic the backups are worsening therefore less traffic is able to traverse the network.

2041 No Build Operations

The 2041 No Build AM and PM peak traffic volumes were analyzed with the current geometry along TH 10. Operational results for the major intersections in the project area along TH 10 are shown in **Table 3** below. **Tables A5 and A6** in the **Appendix** show the delay, average and maximum queue of each movement for all of the intersections that were analyzed.

Table 3. 2041 No Build Operational Analysis

Location	Peak Hour	Intersection Delay*- LOS		Maximum Delay-LOS**		Limiting Movement ***	Max Approach Queue		
							Direction	Average Queue (ft)	Max Queue (ft)
TH 10 at Sunfish Lake Blvd	AM	129	F	203	F	EBL	EBT	5275	5725
Signalized Intersection	PM	41	D	302	F	EBL	EBT	3225	5700
TH 10 at Thurston Ave	AM	136	F	410	F	SBL	EBT	10375	10850
Signalized Intersection	PM	186	F	1258	F	SBL	EBT	6875	10000
TH 10 at Fairoak Ave	AM	33	C	350	F	NBL	EBT	975	2625
Signalized Intersection	PM	339	F	540	F	WBL	WBT	11950	12550
Main St at Church St/EB TH 10 Ramps	AM	7	A	99	F	EBL	SBL (Ramp)	25	175
Stop Controlled	PM	14	B	1556	F	SBL (Ramp)	EBT	675	900
Main St at WB TH 10 Ramps	AM	9	A	41	D	WBL	WBL/T/R	50	275
Stop Controlled	PM	35	C	265	F	WBL	WBL/T/R	950	2475
EB TH 10 Ramps at TH 47	AM	45	D	143	F	EBL	NBT/R	375	1575
Signalized Intersection	PM	119	F	218	F	NBR	NBT/R	1825	2075
WB TH 10 Ramps at TH 47	AM	119	F	261	F	WBL	WBL/T	2625	3050
Signalized Intersection	PM	102	F	355	F	WB	WBR	2600	3050
EB TH 10 Ramps at 7th Ave	AM	11	B	57	E	EBL	SBL	50	475
Signalized Intersection	PM	19	B	58	E	EBL	NBT/R	300	1175
WB TH 10 Ramps at 7th Ave	AM	168	F	212	F	WBL	SBT/R	975	2100
Signalized Intersection	PM	215	F	319	F	SBR	SBT	725	1425

*Delay in seconds per vehicle
**Maximum delay and LOS on any approach and/or movement
***Limiting Movement is the highest delay approach.

Delay

- The following intersections operate with a failing LOS during the AM peak hour:
  - Sunfish Lake Boulevard at TH 10
  - Thurston Avenue at TH 10
  - WB TH 10 Ramps at TH 47
  - WB TH 10 Ramps at 7th Avenue
- The following intersections operate with a failing LOS during the PM peak hour:
  - Thurston Avenue at TH 10
  - Fairoak Avenue at TH 10
  - EB TH 10 Ramps at TH 47
  - WB TH 10 Ramps at TH 47
  - WB TH 10 Ramps at 7th Avenue
- The following intersections operate with a failing limiting movement delay during both peak hours:
  - Sunfish Lake Boulevard at TH 10
  - Thurston Avenue at TH 10
  - Fairoak Avenue at TH 10
  - Main St at Church St/EB TH 10 Ramps
  - EB TH 10 Ramps at TH 47
  - WB TH 10 Ramps at TH 47
  - WB TH 10 Ramps at 7th Avenue
- The intersection of Main St at WB TH 10 Ramps operates with a failing limiting movement delay during the PM peak hour.

Queues

- Sunfish Lake Boulevard at TH 10
  - The maximum queues block the turn lanes on all approaches during both peak hours. The maximum eastbound through queue extends past Ramsey Boulevard during both peak hours.
- Thurston Avenue at TH 10
  - The maximum queues block the turn lanes on all approaches during both peak hours with the maximum eastbound through queue extending past Ramsey Boulevard during both peak hours.
- Fairoak Avenue at TH 10
  - The maximum eastbound and westbound queues block turn lanes during both peak hours. The maximum eastbound queue extends past Thurston Avenue and the maximum westbound queue extends to Main Street during the AM peak hour and past Round Lake Boulevard.
- Main St at Church St/EB TH 10 Ramps
  - Queues are acceptable during the AM peak hour.
  - The maximum queue on the Exit Ramp extends onto EB TH 10 and the maximum southbound queue extends past the turn lane during the PM peak hour.
- Main St at WB TH 10 Ramps
  - Queues are acceptable during the AM peak hour.
  - The maximum queue on the Exit Ramp extends onto WB TH 10 during the PM peak hour.
- TH 47 at EB TH 10 Ramps
  - The maximum northbound queue extends to Main Street during the PM peak hour and over 1500 feet during the AM peak hour.
- TH 47 at WB TH 10 Ramps
  - The average westbound queue extends onto WB TH 10 during both peak hours.
- 7th Avenue at EB TH 10 Ramps
  - The average southbound left queue extends beyond the channelized turn lane both peak hours.
  - The maximum northbound queue extends past Bob Ehlen Drive during the PM peak hour.
- 7th Avenue at WB TH 10 Ramps
  - The maximum westbound right queue extends past the turn lane during the PM peak hour.
  - The maximum northbound queue blocks the turn lane during both peak hours.
  - The average southbound queue extends past Buchanan Street during both peak hours.

As shown in **Tables A5** in the **Appendix**, the GEH statistic is above five for many approaches and above ten for some approaches in the AM peak hour. **Tables A6** in the **Appendix,** shows that the GEH statistic is above ten for half of the approaches in the PM peak hour. This indicates that not enough traffic is being modeled when compared to the input volumes. This is because with the increasing traffic the backups are worsening to the point that the network is gridlocking and the queues are extending beyond Ramsey Boulevard to the east and Round Lake Boulevard to the west. When comparing 2021 and 2041 you can see that some queues are shown to decrease however this is due to other queues increasing and gridlocking the network so that vehicles are not able to reach their desired route. For example in the 2021 PM peak hour the maximum westbound queue was found to be 800 feet however in 2041 the maximum queue was found to be 425 feet due to backups on TH 10 that block traffic from getting onto the exit ramp.

Appendix

Figure 1. Existing (2017) Turning Movement Counts

August 2017

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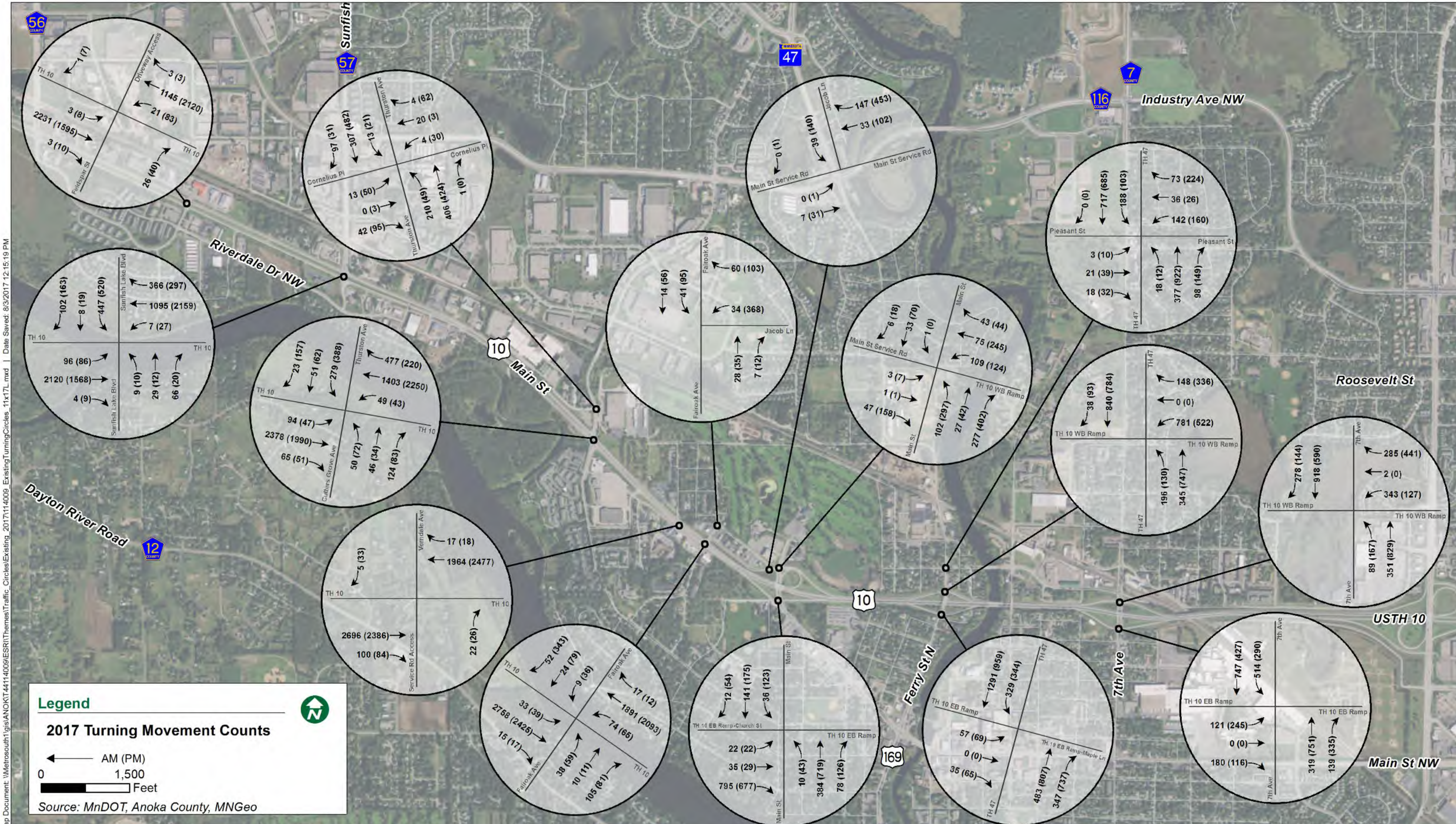


Table A1. Existing (2017) AM
7:00-8:00am

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Through Queue			Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	96	2120	4	2220	97	2182	4	2283	1	62	0	63	3%	1	84	18	4	F	B	A	21	C	31	C	750	50	300		175	1400	250	25	25
Signalized Intersection	WB	7	1095	366	1468	7	1075	368	1450	0	-20	2	-18	-1%	0	86	29	6	F	C	A	24	C			700	25	75		125	900	675	25	300
	NB	9	29	66	104	9	29	66	104	0	0	0	0	0%	0	90	95	90	F	F	F	92	F			120	25	75		25	125	150	50	250
	SB	447	8	102	557	444	9	101	554	-3	1	-1	-3	-1%	0	96	65	16	F	E	B	81	F			650	150	550		25	75	200	150	550
TH 10 at Thurston Ave	EB	94	2378	65	2537	94	2374	65	2533	0	-4	0	-4	0%	0	122	15	11	F	B	B	19	B	31	C	250	75	275		150	1625	350	25	50
Signalized Intersection	WB	49	1403	477	1929	49	1393	477	1919	0	-10	0	-10	-1%	0	179	9	8	F	A	A	13	B			650	75	250		25	325	350	25	175
	NB	50	46	124	220	49	49	127	225	-1	3	3	5	2%	0	103	103	85	F	F	F	93	F			175	50	150		25	150	175	75	350
	SB	279	51	23	353	254	43	24	321	-25	-8	1	-32	-9%	2	212	118	24	F	F	C	186	F			425	325	850		50	625		150	625
TH 10 at Fairoak Ave	EB	33	2758	15	2806	32	2654	15	2701	-1	-104	0	-105	-4%	2	67	10	4	E	B	A	11	B	21	C	875	25	125		275	1775	175	25	25
Signalized Intersection	WB	74	1891	17	1982	67	1851	18	1936	-7	-40	1	-46	-2%	1	113	17	149	F	B	F	20	C			315	50	225		150	1175	350	25	25
	NB	38	10	105	153	36	9	106	151	-2	-1	1	-2	-1%	0	205	225	149	F	F	F	167	F				125	375		125	375		175	400
	SB	9	24	52	85	7	22	47	76	-2	-2	-5	-9	-11%	1	173	144	55	F	F	E	92	F			60	50	175		50	175	60	25	150
Main St at Church St/EB TH 10 Ramps	SEB	11	795	0	806	12	778	2	792	1	-17	2	-14	-2%	0	27	3	3	D	A	A	3	A	4	A		25	150	250	0	0	250	0	0
Stop Controlled	EB	11	35	0	46	11	34	0	45	0	-1	0	-1	-2%	0	56	55	0	F	F	A	55	F				25	100		25	100		25	100
	NB	10	384	78	472	11	385	75	471	1	1	-3	-1	0%	0	16	0	1	C	A	A	1	A			150	25	50		0	0	150	0	0
	SB	36	141	12	189	16	156	10	182	-20	15	-2	-7	-4%	1	7	0	13	A	A	B	1	A			375	25	50		25	75		25	50
Main St at WB TH 10 Ramps	EB	3	1	47	51	2	1	43	46	-1	0	-4	-5	-10%	1	5	11	5	A	B	A	5	A	7	A		25	50		25	50		25	50
Stop Controlled	WB	109	75	43	227	105	75	43	223	-4	0	0	-4	-2%	0	22	24	18	C	C	C	22	C				50	225		50	225		50	225
	NB	102	27	277	406	106	28	273	407	4	1	-4	1	0%	0	1	0	0	A	A	A	0	A			475	25	50		0	0		0	0
	SB	1	33	6	40	0	34	6	40	-1	1	0	0	0%	0	1	0	1	A	A	A	0	A				0	0		0	0		0	0
EB TH 10 Ramps at TH 47	EB	57	0	35	92	57	0	33	90	0	0	-2	-2	-2%	0	53	0	49	D	-	D	51	D	15	B		25	150		25	150	225	25	100
Signalized Intersection	WB	5	-	3	8	5	-	3	8	0	-	0	0	0%	0	64	-	52	E	-	D	59	E				25	50					25	50
	NB	0	483	349	832	-	476	352	828	-	-7	3	-4	0%	0	-	28	28	-	C	C	28	C							100	425		100	425
	SB	329	1291	-	1620	310	1260	-	1570	-19	-31	-	-50	-3%	1	6	7	-	A	A	-	7	A				50	400		50	400			
WB TH 10 Ramps at TH 47	WB	781	0	148	929	761	0	139	900	-20	0	-9	-29	-3%	1	47	0	47	D	A	D	43	D	28	C	250	250	2275		250	2275	200	25	150
Signalized Intersection	NB	196	345	-	541	199	332	-	531	3	-13	-	-10	-2%	0	38	8	-	D	A	-	43	D				75	400		75	400			
	SB	-	840	38	878	-	808	39	847	-	-32	1	-31	-4%	1	-	19	18	-	B	B	19	B							75	375		75	375
EB TH 10 Ramps at 7th Ave	EB	121	0	180	301	123	0	177	300	2	0	-3	-1	0%	0	51	0	11	D	A	B	27	C	8	A	900	50	250	900	50	250	225	25	150
Signalized Intersection	NB	-	319	139	458	-	315	136	451	-	-4	-3	-7	-2%	0	-	17	20	-	B	B	18	B							50	225		50	225
	SB	514	747	-	1261	510	730	-	1240	-4	-17	-	-21	-2%	1	29	6	-	C	A	-	15	B			100	125	475		25	350		0	0
WB TH 10 Ramps at 7th Ave	WB	343	2	285	630	331	2	278	611	-12	0	-7	-19	-3%	1	65	60	18	E	E	B	44	D	15	B	925	675	3450	925	675	3450	325	25	250
Signalized Intersection	NB	89	351	-	440	84	353	-	437	-5	2	-	-3	-1%	0	63	9	-	E	A	-	19	B			75	50	225		25	200			
	SB	-	918	278	1196	-	909	279	1188	-	-9	1	-8	-1%	0	-	28	24	-	C	C	27	C							175	525		175	525
Thurston Ave at Cornelius Pl	EB	13	0	42	55	13	0	42	55	0	0	0	0	0%	0	11	0	9	B	A	A	9	A	18	C		0	0		0	0		0	0
Stop Controlled	WB	4	20	4	28	3	19	5	27	-1	-1	1	-1	-4%	0	18	14	13	C	B	B	14	B				25	100		25	100		25	100
	NB	210	406	1	617	207	412	0	619	-3	6	-1	2	0%	0	16	10	12	C	B	B	12	B				25	25		25	25		25	25
	SB	13	308	97	418	11	290	93	394	-2	-18	-4	-24	-6%	1	35	31	21	E	D	C	28	D				50	325		50	325		50	325
Thurston Ave at S Service Road	EB	17	0	0	17	17	0	0	17	0	0	0	0	0%	0	16	0	0	C	A	A	16	C	3	A		25	75		25	75		25	75
Stop Controlled	WB	9	0	86	95	11	0	92	103	2	0	6	8	8%	1	12	0	9	B	A	A	9	A				25	125		25	125		25	100
	NB	0	116	18	134	0	116	17	133	0	0	-1	-1	-1%	0	0	0	1	A	A	A	0	A				0	0		0	0		0	0
	SB	126	35	4	165	121	35	3	159	-5	0	-1	-6	-4%	0	1	0	1	A	A	A	1	A				25	50		25	25		25	25
Fairoak Ave at S Service Rd	EB	28	12	23	63	29	12	20	61	1	0	-3	-2	-3%	0	169	115	90	F	F	F	132	F	65	F		75	225		50	225		75	250
Stop Controlled	WB	0	0	1	1	0	0	1	1	0	0	0	0	0%	0	0	0	136	A	A	F	136	F				25	50		25	50		25	50
	NB	20	124	4	148	18	125	3	146	-2	1	-1	-2	-1%	0	51	89	58	F	F	F	84	F				50	225		75	275		75	275
	SB	3	19	91	113	2	19	82	103	-1	0	-9	-10	-9%	1	0	1	0	A	A	A	0	A				25	50		25	50		25	50
Fairoak Ave at Main St Service Rd	EB	1	0	1	2	1	0	1	2	0	0	0	0	0%	0	6	0	5	A	A	A	5	A	9	A		25	50		25	25		25	50
Stop Controlled	WB	38	0	10	48	38	0	9	47	0	0	-1	-1	-2%	0	17	0	7	C	A	A	5	A				25	100		25	100		25	100
	NB	6	30	14	50	7	37	16	60	1	7	2	10	20%	1	0	2	0	A	A	A	1	A			175	25	50		25	50	125	25	50
	SB	8	44	0	52	8	39	0	47	0	-5	0	-5	-10%	1	3	12	0	A	B	A	16	C				25	50		25	75		25	25
Fairoak Ave at Jacob Ln	WB	34	0	60	94	31	-	62	93	-3	-	2	-1	-1%	0	8	-	7	A	-	A	8	A	4	A		25	100					25	75
Stop Controlled	NB	0	28	13	41	-	32	15	47	-	4	2	6	15%	1	-	1	0	-	A	A	16	C							25	25		25	25
	SB	41	14	0	55	40	15	-	55	-1	1	-	0	0%	0	0	0	-	A	A	-	0	A				25	25		0	0			
Main Service Road at Jacob Lane	EB	0	7	-	7	0	7	-	7	0	0	-	0	0%	0	0	1	-	A	A	-	1	A	1	A		0	0		0	0			
Stop Controlled	WB	-	33	147	180	-	32	154	186	-	-1	7	6	3%	0	-	1	0	-	A	A	0	A							0	0		0	0
	SB	39	-	0	39	39	-	0	39	0	-	0	0	0%	0	8	-	0	A	-	A	8	A				25	75					25	75
TH 10 at Feldspar St	EB	3	2231	3	2237	2	2235	4	2241	-1	4	1	4	0%	0	7	0	4	A	A	A	0	A	13	B		25	25		0	0		0	0
Stop Controlled	WB	21	1145	3	1169	22	1145	3	1170	1	0	0	1	0%	0	10	0	0	B	A	A	0	A				25	50		25	75		25	75
	NB	-	-	26	26	-	-	25	25	-	-	-1	-1	-4%	0	-	-	1818	-	-	F	1818	F										325	450
	SB	-	-	1	1	-	-	1	1	-	-	0	0	0%	0	-	-	25	-	-	C	25	C										25	50
TH 10 at McKinley St	EB	8	2204	-	2212	3	2253	-	2256	-5	49	-	44	2%	1	8	0	-	A	A	-	0	A	0	A		25	25		25	25			
Stop Controlled	WB	6	1196	3	1205	6	1161	3	1170	0	-35	0	-35	-3%	1	4	0	0	A	A	A	0	A				0	0		25	50		25	50
	SB	13	-	6	19	13	-	6	19	0	-	0	0	0%	0	18	-	9	C	-	A	16	C				25	75					25	75
TH 10 at Cutters Lane	EB	-	2775	6	2781	-	2752	5	2757	-	-23	-1	-24	-1%	0	-	2	2	-	A	A	2	A	3	A					25	350		25	350
Stop Controlled	NB	-	-	21	21	-	-	21	21	-	-	0	0	0%	0	-	-	165	-	-	F	165	F										25	125
TH 10 at SA-Culvers	EB	-	2696	100	2796	-	2650	90	2740	-	-46	-10	-56	-2%	1	-	1	2	-	A	A	1	A	2	A					25	150		25	100
Stop Controlled	NB	-	-	22	22	-	-	21	21	-	-	-1	-1	-5%	0	-	-	254	-	-	F	254	F										25	50
TH 10 at Verndale Ave	WB	-	1964	17	1981	-	1919	15	1934	-	-45	-2	-47	-2%	1	-	1	0	-	A	A	1	A	1	A					25	75		25	75
Stop Controlled	SB	-	-	5	5	-	-	5	5	-	-	0	0	0%	0	-	-	8	-	-	A	8	A										25	50

Table A2. Existing (2017) PM
4:15-5:15pm

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Traffic Queuing (feet): Through Queue			Traffic Queuing (feet): Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	91	1568	9	1668	84	1567	10	1661	-7	-1	1	-7	0%	0	116	16	8	F	B	A	21	C	38	D	750	75	250		100	650	250	25	50
Signalized Intersection	WB	36	2159	297	2492	27	2233	314	2574	-9	74	17	82	3%	2	126	30	16	F	C	B	30	C			700	25	150		300	2225	675	175	1500
	NB	10	12	20	42	8	13	22	43	-2	1	2	1	2%	0	100	103	36	F	F	D	68	E			120	25	75		25	75	150	25	75
	SB	520	19	163	702	510	17	165	692	-10	-2	2	-10	-1%	0	123	91	56	F	F	E	106	F			650	225	1025		25	75	200	225	1025
TH 10 at Thurston Ave	EB	47	1990	51	2088	55	2007	49	2111	8	17	-2	23	1%	1	158	37	25	F	D	C	39	D	62	E	250	75	250		350	1425	350	25	50
Signalized Intersection	WB	47	2250	220	2517	62	2363	257	2682	15	113	37	165	7%	3	119	19	15	F	B	B	21	C			650	50	275		250	1975	350	25	100
	NB	72	34	83	189	71	33	81	185	-1	-1	-2	-4	-2%	0	112	96	54	F	F	D	84	F			175	50	225		25	225	175	50	200
	SB	388	62	157	607	351	59	150	560	-37	-3	-7	-47	-8%	2	379	327	218	F	F	F	331	F			425	1175	2175		1025	2175		950	2125
TH 10 at Fairoak Ave	EB	39	2425	17	2481	35	2338	19	2392	-4	-87	2	-89	-4%	2	68	13	11	E	B	B	14	B	93	F	875	25	125		225	1900	175	25	50
Signalized Intersection	WB	65	2093	12	2170	65	2286	11	2362	0	193	-1	220	9%	5	215	123	179	F	F	F	125	F			315	50	200		1925	5350	350	25	50
	NB	59	11	81	151	62	11	81	154	3	0	0	3	2%	0	240	295	179	F	F	F	212	F				250	700		250	700		125	450
	SB	36	79	343	458	32	78	298	408	-4	-1	-45	-50	-11%	2	408	419	287	F	F	F	322	F			60	825	1325		825	1325	60	900	1425
Main St at Church St/EB TH 10 Ramps	SEB	12	677	0	689	10	617	3	630	-2	-60	3	-59	-9%	2	335	4	3	F	A	A	9	A	12	B		25	75	250	50	550	250	50	550
Stop Controlled	EB	10	29	0	39	8	25	0	33	-2	-4	0	-6	-15%	1	341	279	0	F	F	A	294	F				50	200		50	200		50	200
	NB	43	719	126	888	41	698	124	863	-2	-21	-2	-25	-3%	1	17	0	1	C	A	A	1	A			150	25	75		25	225	150	25	225
	SB	123	175	54	352	109	168	45	322	-14	-7	-9	-30	-9%	2	47	1	13	E	A	B	18	C			375	75	400		25	125		25	150
Main St at WB TH 10 Ramps	EB	7	1	158	166	10	0	157	167	3	-1	-1	1	1%	0	9	30	2	A	D	A	2	A	20	C		25	100		25	100		25	100
Stop Controlled	WB	124	245	44	413	112	237	48	397	-12	-8	4	-16	-4%	1	69	66	63	F	F	F	66	F				275	1025		275	1025		275	1025
	NB	297	42	402	741	298	40	374	712	1	-2	-28	-29	-4%	1	3	0	0	A	A	A	1	A			475	25	125		25	75		50	175
	SB	0	70	18	88	0	64	23	87	0	-6	5	-1	-1%	0	0	0	1	A	A	A	1	A				25	50		25	25		25	25
EB TH 10 Ramps at TH 47	EB	69	1	65	135	63	2	65	130	-6	1	0	-5	-4%	0	52	0	54	D	-	D	53	D	19	B		25	125		25	175	225	25	175
Signalized Intersection	WB	1	-	2	3	2	-	2	4	1	-	0	1	33%	1	44	-	65	D	-	E	55	D				25	50					25	50
	NB	0	807	741	1548	-	811	735	1546	-	4	-6	-2	0%	0	-	22	24	-	C	C	23	C							225	850		225	850
	SB	347	959	-	1306	332	943	-	1275	-15	-16	-	-31	-2%	1	22	6	-	C	A	-	10	B				75	425		75	425			
WB TH 10 Ramps at TH 47	WB	522	7	336	865	497	7	321	825	-25	0	-15	-40	-5%	1	55	57	55	E	E	E	52	D	26	C	250	250	1850		250	1850	200	150	1400
Signalized Intersection	NB	130	747	-	877	130	750	-	880	0	3	-	3	0%	0	48	5	-	D	A	-	52	D				50	350		50	350			
	SB	-	784	93	877	-	777	100	877	-	-7	7	0	0%	0	-	17	15	-	B	B	17	B							75	400		75	400
EB TH 10 Ramps at 7th Ave	EB	245	1	116	362	235	1	114	350	-10	0	-2	-12	-3%	1	49	42	9	D	D	A	36	D	11	B	900	75	400	900	75	400	225	25	100
Signalized Intersection	NB	-	751	335	1086	-	743	338	1081	-	-8	3	-5	0%	0	-	24	26	-	C	C	25	C							100	500		100	500
	SB	290	424	-	714	296	426	-	722	6	2	-	8	1%	0	32	4	-	C	A	-	16	B			100	75	350		25	100		0	0
WB TH 10 Ramps at 7th Ave	WB	127	1	441	569	130	1	432	563	3	0	-9	-6	-1%	0	37	52	18	D	D	B	23	C	7	A	925	50	200	925	50	200	325	50	325
Signalized Intersection	NB	167	829	-	996	166	813	-	979	-1	-16	-	-17	-2%	1	32	4	-	C	A	-	9	A			75	50	350		25	200			
	SB	-	590	144	734	-	582	150	732	-	-8	6	-2	0%	0	-	15	14	-	B	B	15	B							50	325		50	325
Thurston Ave at Cornelius Pl	EB	50	3	95	148	50	3	95	148	0	0	0	0	0%	0	10	8	21	B	A	C	17	C	78	F		0	0		0	0		0	0
Stop Controlled	WB	30	3	62	95	31	4	60	95	1	1	-2	0	0%	0	48	17	19	E	C	C	28	D				25	125		25	125		25	125
	NB	49	242	0	291	57	267	0	324	8	25	0	33	11%	2	14	10	0	B	A	A	10	B				25	25		25	25		25	25
	SB	21	482	31	534	22	453	30	505	1	-29	-1	-29	-5%	1	156	149	129	F	F	F	149	F				650	1700		650	1700		650	1700
Thurston Ave at S Service Road	EB	1	0	1	2	1	0	1	2	0	0	0	0	0%	0	12	0	11	B	A	B	12	B	4	A		25	50		25	50		25	50
Stop Controlled	WB	33	9	114	156	38	8	109	155	5	-1	-5	-1	-1%	0	13	12	9	B	B	A	10	A				25	150		25	150		25	125
	NB	0	74	9	83	0	74	8	82	0	0	-1	-1	-1%	0	0	0	1	A	A	A	0	A				0	0		0	0		0	0
	SB	92	58	5	155	100	61	6	167	8	3	1	12	8%	1	0	0	1	A	A	A	0	A				25	25		0	0		0	0
Fairoak Ave at S Service Rd	EB	30	6	18	54	28	5	18	51	-2	-1	0	-3	-6%	0	189	131	139	F	F	F	166	F	59	F		125	275		125	275		125	300
Stop Controlled	WB	1	1	2	4	1	1	2	4	0	0	0	0	0%	0	10	20	79	A	C	F	47	E				25	75		25	75		25	75
	NB	47	119	4	170	38	116	3	157	-9	-3	-1	-13	-8%	1	69	87	45	F	F	E	81	F				150	625		150	625		50	375
	SB	11	46	100	157	10	47	90	147	-1	1	-10	-10	-6%	1	0	3	0	A	A	A	1	A				25	100		25	100		25	100
Fairoak Ave at Main St Service Rd	EB	0	2	8	10	0	0	9	9	0	-2	1	-1	-10%	0	0	0	500	A	A	F	500	F	98	F		50	150		50	150		50	150
Stop Controlled	WB	28	1	0	29	24	0	1	25	-4	-1	1	-4	-14%	1	352	0	35	F	A	D	243	F				125	275		100	275		100	275
	NB	0	47	15	62	0	45	14	59	0	-2	-1	-3	-5%	0	0	1	0	A	A	A	1	A			175	25	100		25	75	125	25	75
	SB	6	417	1	424	5	324	8	337	-1	-93	7	-87	-21%	4	102	84	38	F	F	E	123	F				100	300		150	325		125	300
Fairoak Ave at Jacob Ln	WB	368	0	103	471	292	-	78	370	-76	-	-25	-101	-21%	5	115	-	108	F	-	F	114	F	80	F		875	1075					875	1075
Stop Controlled	NB	0	35	12	47	-	34	11	45	-	-1	-1	-2	-4%	0	-	0	1	-	A	A	936	F							25	25		25	50
	SB	95	56	0	151	91	52	-	143	-4	-4	-	-8	-5%	1	21	38	-	C	E	-	27	D				75	475		50	450			
Main Service Road at Jacob Lane	EB	1	31	-	32	1	31	-	32	0	0	-	0	0%	0	28	1	-	D	A	-	1	A	6	A		25	25		0	0			
Stop Controlled	WB	-	102	453	555	-	107	451	558	-	5	-2	3	1%	0	-	1	0	-	A	A	0	A							0	0		0	0
	SB	140	-	1	141	138	-	1	139	-2	-	0	-2	-1%	0	32	-	16	D	-	C	32	D				50	200					50	200
TH 10 at Feldspar St	EB	11	1595	10	1616	9	1610	11	1630	-2	15	1	14	1%	0	13	0	11	B	A	B	0	A	1	A		25	50		0	0		0	0
Stop Controlled	WB	88	2120	3	2211	82	2180	20	2282	-6	60	17	71	3%	1	5	0	0	A	A	A	0	A				25	100		25	250		25	250
	NB	-	-	40	40	-	-	38	38	-	-	-2	-2	-5%	0	-	-	91	-	-	F	91	F										25	150
	SB	-	-	7	7	-	-	7	7	-	-	0	0	0%	0	-	-	59	-	-	F	59	F										25	75
TH 10 at McKinley St	EB	9	1648	-	1657	5	1643	-	1648	-4	-5	-	-9	-1%	0	15	0	-	B	A	-	0	A	0	A		25	50		0	0			
Stop Controlled	WB	9	2323	0	2332	8	2271	0	2279	-1	-52	0	-53	-2%	1	3	1	0	A	A	A	1	A				0	0		25	100		25	100
	SB	10	-	5	15	9	-	6	15	-1	-	1	0	0%	0	28	-	18	D	-	C	24	C				25	100					25	100
TH 10 at Cutters Lane	EB	-	2447	14	2461	-	2378	15	2393	-	-69	1	-68	-3%	1	-	3	2	-	A	A	3	A	3	A					25	350		25	350
Stop Controlled	NB	-	-	23	23	-	-	22	22	-	-	-1	-1	-4%	0	-	-	73	-	-	F	73	F										25	75
TH 10 at SA-Culvers	EB	-	2386	84	2470	-	2281	22	2303	-	-105	-62	-167	-7%	3	-	1	2	-	A	A	1	A	2	A					25	125		25	300
Stop Controlled	NB	-	-	26	26	-	-	25	25	-	-	-1	-1	-4%	0	-	-	93	-	-	F	93	F										25	50
TH 10 at Verndale Ave	WB	-	2477	18	2495	-	2467	18	2485	-	-10	0	-10	0%	0	-	2	1	-	A	A	2	A	2	A					25	250		25	250
Stop Controlled	SB	-	-	33	33	-	-	33	33	-	-	0	0	0%	0	-	-	18	-	-	C	18	C										25	100

Figure 2. 2021 No Build Turning Movement Counts

August 2017

BOLTON & MENK
Real People. Real Solutions.

Figure 3. 2041 No Build Turning Movement Counts

August 2017

BOLTON & MENK
Real People. Real Solutions.

Information

Forecast volumes depicted assume a confidence level of approximately plus or minus 15 percent.

Legend

2041 Turning Movement Counts

← AM (PM)

0 1,500 Feet

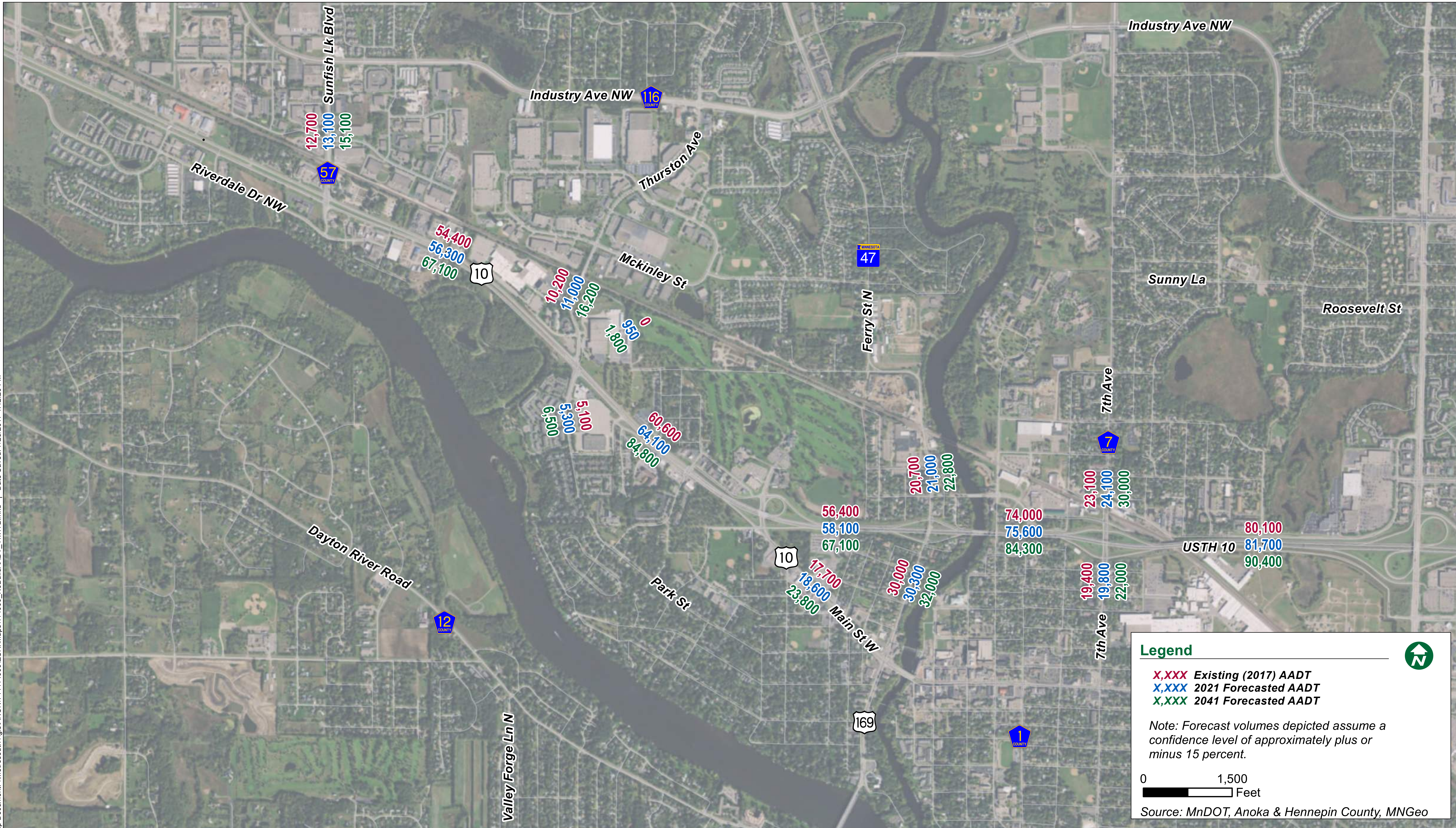
Source: MnDOT, Anoka County, MNGeo

Map Document: \\Metrosouth1\gis\ANOK\T44114009\ESRI\Themes\Traffic_Circles\2041_No_Build\114009_2041NoBuildTurningCircles_11x17L.mxd | Date Saved: 8/3/2017 1:40:09 PM

TH 10 Corridor Study
City of Anoka, Minnesota

Figure 4. No Build AADT
August 2017

Real People. Real Solutions.



Legend

X,XXX Existing (2017) AADT
X,XXX 2021 Forecasted AADT
X,XXX 2041 Forecasted AADT

Note: Forecast volumes depicted assume a confidence level of approximately plus or minus 15 percent.

0 1,500 Feet

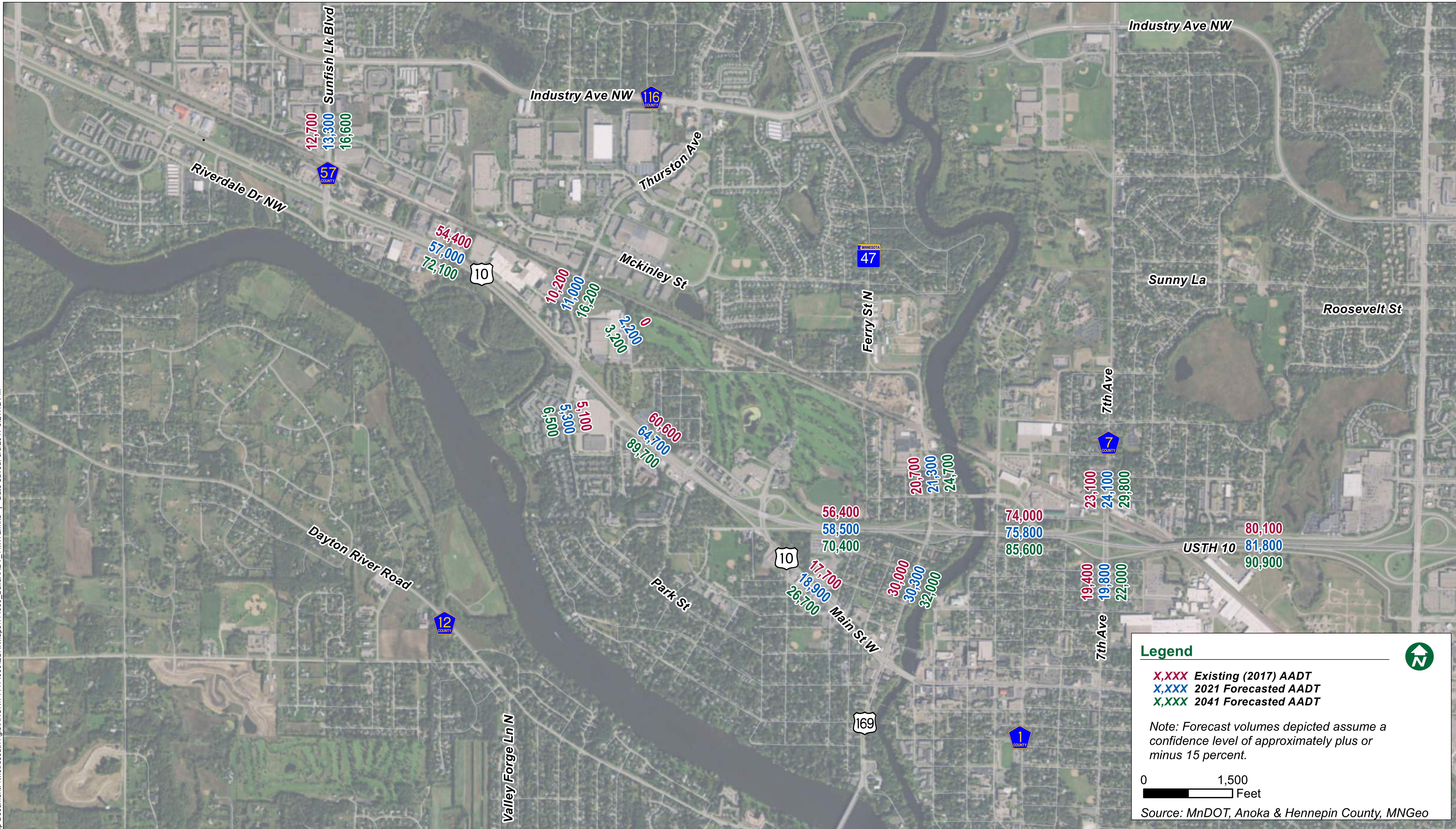
Source: MnDOT, Anoka & Hennepin County, MNGeo

Map Document: \\Metrosouth1\gis\ANOK\T44114009\ESRI\Maps\114009_NoBuildAADT_11x17L.mxd | Date Saved: 7/28/2017 1:12:26 PM

TH 10 Corridor Study
City of Anoka, Minnesota

Figure 5. Build AADT
August 2017

BOLTON & MENK
Real People. Real Solutions.

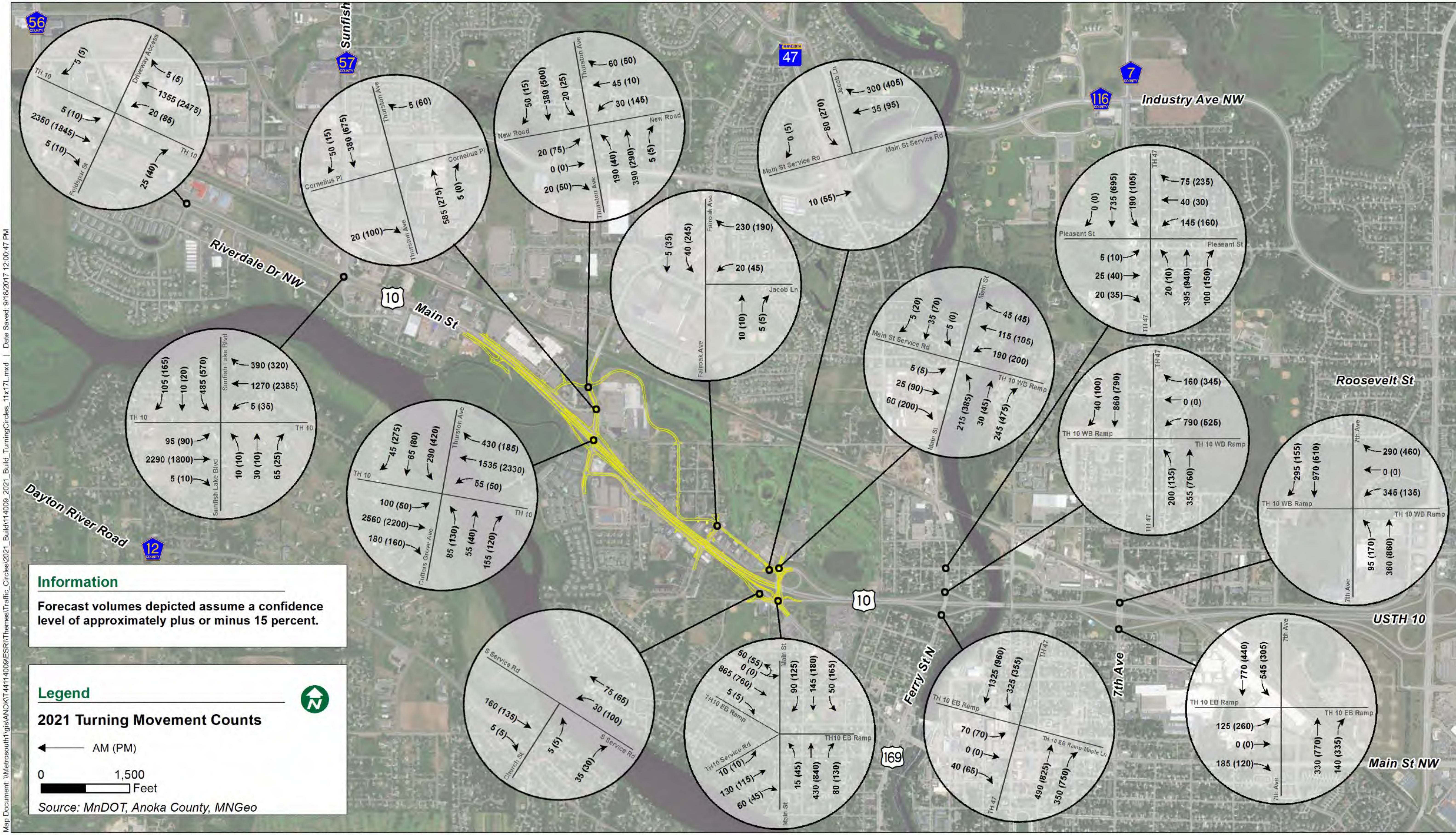


Map Document: \\Metrosouth1\gis\ANOK\T44114009\ESRI\Maps\114009_BuildAADT_11x17L.mxd | Date Saved: 8/3/2017 3:21:12 PM

Figure 6. 2021 Build Turning Movement Counts

September 2017

BOLTON & MENK
Real People. Real Solutions.



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TH 10 Corridor Study

Anoka, MN

Figure 7. 2041 Build Turning Movement Counts

September 2017

BOLTON & MENK

Real People. Real Solutions.

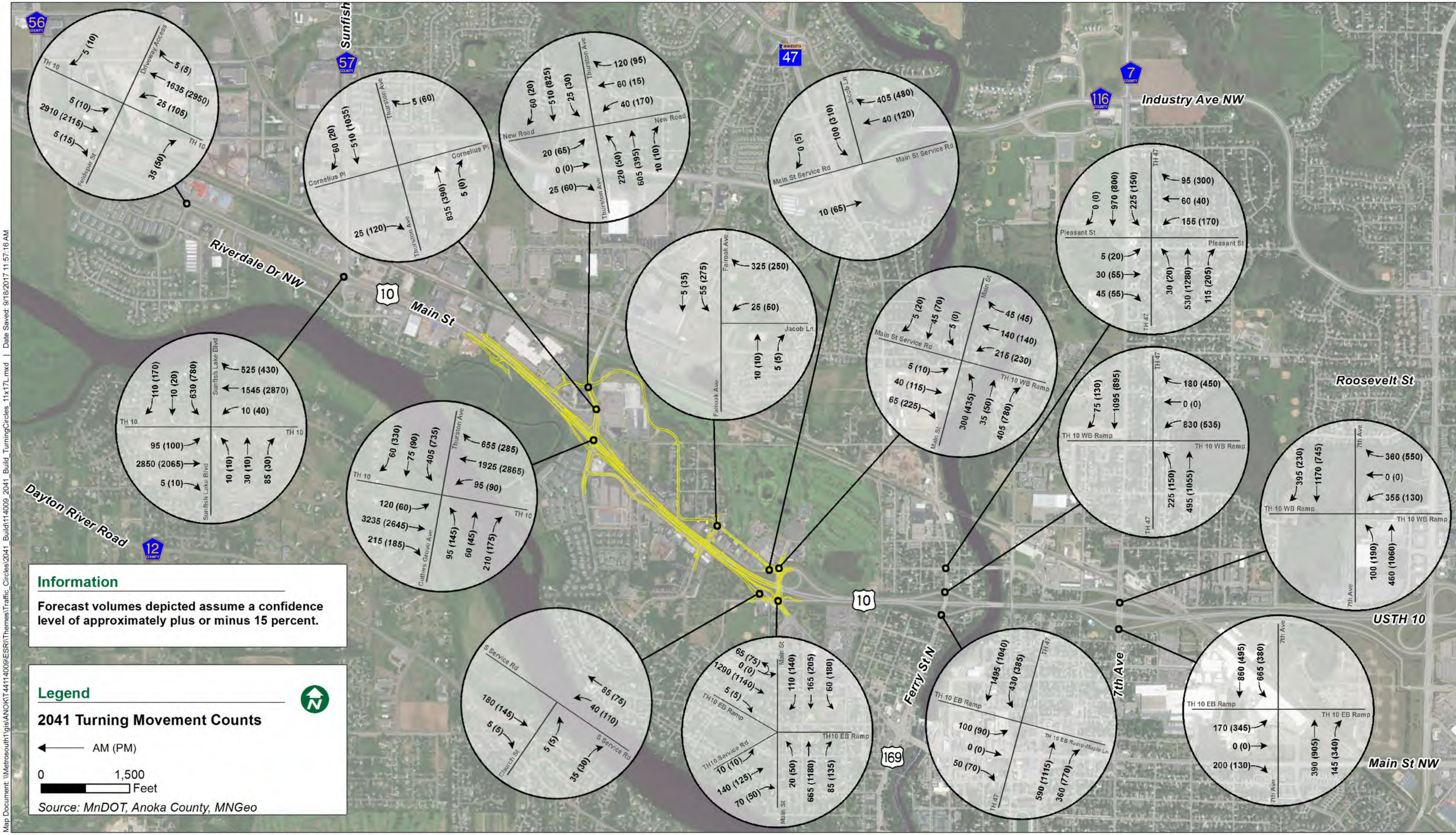

Table A3. 2021 AM - No Build
7:00-8:00am

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Through Queue			Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	98	2231	4	2333	100	2214	4	2318	2	-17	0	-15	-1%	0	93	21	12	F	C	B	24	C	35	C	750	75	250		225	1500	250	25	25
Signalized Intersection	WB	8	1200	395	1603	6	1149	378	1533	-2	-51	-17	-70	-4%	2	122	28	7	F	C	A	23	C			700	25	75		125	975	675	25	350
	NB	9	29	74	112	9	30	74	113	0	1	0	1	1%	0	104	118	99	F	F	F	105	F			120	25	75		25	125	150	50	275
	SB	482	8	103	593	494	9	104	607	12	1	1	14	2%	1	108	94	19	F	F	B	92	F			650	200	725		25	75	200	200	725
TH 10 at Thurston Ave	EB	100	2618	70	2788	92	2649	69	2810	-8	31	-1	22	1%	0	185	67	88	F	E	F	72	E	64	E	250	225	1575		1450	4825	350	25	150
Signalized Intersection	WB	55	1535	445	2035	50	1496	433	1979	-5	-39	-12	-56	-3%	1	222	12	10	F	B	B	17	B			650	100	300		50	675	350	25	175
	NB	55	46	135	236	46	40	121	207	-9	-6	-14	-29	-12%	2	142	137	168	F	F	F	156	F			175	50	250		25	125	175	150	475
	SB	300	55	25	380	276	53	41	370	-24	-2	16	-10	-3%	1	227	159	39	F	F	D	196	F			425	325	725		125	675	50	150	500
TH 10 at Fairoak Ave	EB	34	2940	15	2989	33	2914	17	2964	-1	-26	2	-25	-1%	0	87	17	11	F	B	B	18	B	21	C	875	25	125		950	2625	175	25	25
Signalized Intersection	WB	76	1964	17	2057	75	1929	17	2021	-1	-35	0	-36	-2%	1	141	18	123	F	B	F	22	C			315	75	275		150	1425	350	25	50
	NB	39	10	108	157	35	7	106	148	-4	-3	-2	-9	-6%	1	142	200	123	F	F	F	132	F				100	375		100	375		125	350
	SB	9	24	53	86	6	19	39	64	-3	-5	-14	-22	-26%	3	107	139	45	F	F	D	79	E				25	150		25	150		25	150
Main St at Church St/EB TH 10 Ramps	SEB	25	850	0	875	13	830	2	845	-12	-20	2	-30	-3%	1	27	8	9	D	A	A	8	A	7	A		25	150	250	0	0	250	0	0
Stop Controlled	EB	10	35	0	45	11	32	0	43	1	-3	0	-2	-4%	0	70	59	0	F	F	A	62	F				25	75		25	75		25	100
	NB	15	420	80	515	14	426	76	516	-1	6	-4	1	0%	0	16	0	1	C	A	A	1	A			150	25	50		0	0	150	0	0
	SB	40	145	15	200	31	148	11	190	-9	3	-4	-10	-5%	1	8	0	15	A	A	C	2	A			375	25	50		25	75		25	75
Main St at WB TH 10 Ramps	EB	3	4	50	57	3	4	51	58	0	0	1	1	2%	0	4	14	5	A	B	A	6	A	7	A		25	50		25	50		25	50
Stop Controlled	WB	115	77	45	237	105	78	41	224	-10	1	-4	-13	-5%	1	23	24	19	C	C	C	23	C				25	225		25	225		25	225
	NB	182	30	233	445	113	35	300	448	-69	5	67	3	1%	0	1	0	0	A	A	A	0	A			475	25	50		0	0		0	0
	SB	1	33	6	40	0	34	5	39	-1	1	-1	-1	-3%	0	1	0	1	A	A	A	0	A				0	0		0	0		0	0
EB TH 10 Ramps at TH 47	EB	65	0	35	100	64	0	41	105	-1	0	6	5	5%	0	45	0	42	D	-	D	44	D	161	F		25	125		25	125	225	25	100
Signalized Intersection	WB	5	-	3	8	5	-	2	7	0	-	-1	-1	-13%	0	59	-	59	E	-	E	59	E				25	50					25	50
	NB	0	485	350	835	-	343	274	617	-	-142	-76	-218	-26%	8	-	580	586	-	F	F	583	F							1725	2100		1725	2100
	SB	335	1305	-	1640	346	1292	-	1638	11	-13	-	-2	0%	0	13	9	-	B	A	-	10	A				75	425		75	425			
WB TH 10 Ramps at TH 47	WB	790	0	155	945	771	0	142	913	-19	0	-13	-32	-3%	1	54	0	54	D	A	D	50	D	34	C	250	200	1375		200	1375	200	25	125
Signalized Intersection	NB	200	350	-	550	140	271	-	411	-60	-79	-	-139	-25%	6	95	7	-	F	A	-	50	D				100	400		100	400			
	SB	-	850	40	890	-	868	35	903	-	18	-5	13	1%	0	-	17	15	-	B	B	17	B							75	400		75	400
EB TH 10 Ramps at 7th Ave	EB	125	0	185	310	132	0	186	318	7	0	1	8	3%	0	51	0	17	D	A	B	31	C	9	A	900	50	250	900	50	250	225	25	150
Signalized Intersection	NB	-	330	140	470	-	331	140	471	-	1	0	1	0%	0	-	31	33	-	C	C	32	C							75	250		75	250
	SB	555	770	-	1325	562	745	-	1307	7	-25	-	-18	-1%	0	7	2	-	A	A	-	5	A			100	25	450		25	175		0	0
WB TH 10 Ramps at 7th Ave	WB	345	0	290	635	326	0	275	601	-19	0	-15	-34	-5%	1	44	0	15	D	A	B	31	C	16	B	925	100	500	925	100	500	325	25	200
Signalized Intersection	NB	95	360	-	455	87	374	-	461	-8	14	-	6	1%	0	72	14	-	E	B	-	25	C			75	50	200		25	300			
	SB	-	980	295	1275	-	983	304	1287	-	3	9	12	1%	0	-	24	25	-	C	C	24	C							150	700		150	700
Thurston Ave at New Road	EB	7	0	22	29	8	0	21	29	1	0	-1	0	0%	0	8	0	6	A	A	A	7	A	17	C		0	0		0	0		0	0
Stop Controlled	WB	5	26	54	85	4	29	51	84	-1	3	-3	-1	-1%	0	9	11	7	A	B	A	8	A				0	0		0	0		0	0
	NB	69	403	5	477	66	413	3	482	-3	10	-2	5	1%	0	10	19	6	A	C	A	17	C				25	25		25	25		25	25
	SB	5	391	50	446	4	401	41	446	-1	10	-9	0	0%	0	8	20	7	A	C	A	18	C				25	25		25	25		25	25
Thurston Ave at Cornelius Pl	EB	7	0	22	29	9	0	21	30	2	0	-1	1	3%	0	9	0	8	A	A	A	8	A	21	C		0	0		0	0		0	0
Stop Controlled	WB	4	20	4	28	3	20	5	28	-1	0	1	0	0%	0	31	14	14	D	B	B	16	C				25	50		25	50		25	50
	NB	96	494	1	591	88	472	1	561	-8	-22	0	-30	-5%	1	12	11	10	B	B	A	11	B				25	50		25	50		25	50
	SB	13	354	50	417	15	367	45	427	2	13	-5	10	2%	0	38	35	26	E	D	D	34	D				50	350		50	350		50	350
Thurston Ave at S Service Road	EB	17	0	0	17	17	0	0	17	0	0	0	0	0%	0	17	0	0	C	A	A	17	C	30	D		25	75		25	75		25	75
Stop Controlled	WB	10	0	93	103	8	0	84	92	-2	0	-9	-11	-11%	1	40	0	62	E	A	F	60	F				75	400		75	400		75	400
	NB	0	126	18	144	0	124	19	143	0	-2	1	-1	-1%	0	0	5	18	A	A	C	8	A				0	0		25	50		25	50
	SB	132	37	4	173	109	28	2	139	-23	-9	-2	-34	-20%	3	49	5	1	E	A	A	39	E				100	400		100	350		100	350
Fairoak Ave at S Service Rd	EB	29	12	24	65	27	14	20	61	-2	2	-4	-4	-6%	1	140	103	66	F	F	F	107	F	54	F		50	250		50	250		50	250
Stop Controlled	WB	0	0	1	1	0	0	1	1	0	0	0	0	0%	0	0	0	30	A	A	D	30	D				25	50		25	50		25	50
	NB	21	126	4	151	17	124	3	144	-4	-2	-1	-7	-5%	1	55	73	58	F	F	F	70	F				25	225		50	250		50	225
	SB	3	19	93	115	4	17	83	104	1	-2	-10	-11	-10%	1	0	3	0	A	A	A	0	A				25	75		25	75		25	75
Fairoak Ave at Main St Service Rd	EB	3	0	0	3	3	0	0	3	0	0	0	0	0%	0	7	0	0	A	A	A	7	A	6	A		25	50		25	25		25	50
Stop Controlled	WB	10	0	11	21	10	0	11	21	0	0	0	0	0%	0	9	0	6	A	A	A	3	A				25	75		25	50		25	50
	NB	6	31	24	61	6	24	21	51	0	-7	-3	-10	-16%	1	0	0	0	A	A	A	0	A			175	0	0		25	25	125	25	25
	SB	12	67	7	86	10	56	5	71	-2	-11	-2	-15	-17%	2	9	11	0	A	B	A	10	A				25	75		25	100		25	50
Fairoak Ave at Jacob Ln	WB	57	0	174	231	40	-	117	157	-17	-	-57	-74	-32%		9	-	8	A	-	A	8	A	5	A		25	125					25	100
Stop Controlled	NB	0	38	7	45	-	32	5	37	-	-6	-2	-8	-18%	1	-	1	0	-	A	A	35	E							25	25		25	25
	SB	41	32	0	73	38	34	-	72	-3	2	-	-1	-1%	0	0	0	-	A	A	-	0	A				25	25		0	0			
Main Service Road at Jacob Lane	EB	0	7	-	7	0	9	-	9	0	2	-	2	29%	1	0	1	-	A	A	-	1	A	2	A		0	0		0	0			
Stop Controlled	WB	-	36	228	264	-	23	174	197	-	-13	-54	-67	-25%	4	-	1	0	-	A	A	0	A							0	0		0	0
	SB	49	-	0	49	49	-	0	49	0	-	0	0	0%	0	9	-	0	A	-	A	9	A				25	75					25	75
TH 10 at Feldspar St	EB	3	2296	3	2302	3	2298	4	2305	0	2	1	3	0%	0	7	1	4	A	A	A	1	A	16	C		25	25		0	0		0	0
Stop Controlled	WB	22	1287	3	1312	22	1250	2	1274	0	-37	-1	-38	-3%	1	9	0	1	A	A	A	0	A				25	75		25	175		25	175
	NB	-	-	27	27	-	-	20	20	-	-	-7	-7	-26%	1	-	-	2884	-	-	F	2884	F										450	525
	SB	-	-	1	1	-	-	1	1	-	-	0	0	0%	0	-	-	39	-	-	E	39	E										25	50
TH 10 at McKinley St	EB	8	2284	-	2292	3	2314	-	2317	-5	30	-	25	1%	1	12	1	-	B	A	-	1	A	1	A		25	50		25	100			
Stop Controlled	WB	6	1303	3	1312	6	1264	3	1273	0	-39	0	-39	-3%	1	10	1	0	B	A	A	1	A				25	25		25	175		25	175
	SB	12	-	6	18	12	-	7	19	0	-	1	1	6%	0	20	-	9	C	-	A	16	C				25	75					25	100
TH 10 at Cutters Lane	EB	-	3047	6	3053	-	3000	6	3006	-	-47	0	-47	-2%	1	-	12	9	-	B	A	12	B	15	C					100	800		100	800
Stop Controlled	NB	-	-	22	22	-	-	14	14	-	-	-8	-8	-36%	2	-	-	813	-	-	F	813	F										175	375
TH 10 at SA-Culvers	EB	-	2967	102	3069	-	2881	95	2976	-	-86	-7	-93	-3%	2	-	3	9	-	A	A	3	A	5	A					25	150		25	200
Stop Controlled	NB	-	-	23	23	-	-	7	7	-	-	-16	-16	-70%	4	-	-	954	-	-	F	954	F										75	225
TH 10 at Verndale Ave	WB	-	2029	18	2047	-	1981	16	1997	-	-48	-2	-50	-2%	1	-	1	0	-	A	A	1	A	1	A					25	50		25	50
Stop Controlled	SB	-	-	5	5	-	-	5	5	-	-	0	0	0%	0	-	-	8	-	-	A	8	A										25	50

Table A4. 2021 PM - No Build
4:15-5:15pm

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Traffic Queuing (feet): Through Queue			Traffic Queuing (feet): Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	88	1680	9	1777	84	1672	9	1765	-4	-8	0	-12	-1%	0	164	21	11	F	C	B	27	C	45	D	750	100	300		150	850	250	25	50
Signalized Intersection	WB	32	2335	319	2686	31	2372	325	2728	-1	37	6	42	2%	1	131	42	26	F	D	C	41	D			700	25	150		725	2775	675	325	1825
	NB	10	12	25	47	10	11	26	47	0	-1	1	0	0%	0	113	106	55	F	F	D	79	E			120	25	75		25	75	150	25	100
	SB	565	19	164	748	537	18	161	716	-28	-1	-3	-32	-4%	1	112	91	60	F	F	E	99	F			650	225	1025		25	100	200	225	1025
TH 10 at Thurston Ave	EB	50	2180	55	2285	60	2098	55	2213	10	-82	0	-72	-3%	2	219	56	37	F	E	D	60	E	98	F	250	250	1200		700	2575	350	25	50
Signalized Intersection	WB	50	2460	192	2702	78	2473	219	2770	28	13	27	68	3%	1	214	24	19	F	C	B	29	C			650	100	400		425	2425	350	25	125
	NB	72	35	95	202	81	34	89	204	9	-1	-6	2	1%	0	141	114	88	F	F	F	113	F			175	75	250		25	250	175	75	300
	SB	425	65	165	655	361	58	157	576	-64	-7	-8	-79	-12%	3	616	600	460	F	F	F	571	F			425	2950	5100		2300	4275	50	2725	4875
TH 10 at Fairoak Ave	EB	40	2593	18	2651	37	2392	16	2445	-3	-201	-2	-206	-8%	4	88	20	12	F	B	B	21	C	64	E	875	25	150		625	2450	175	25	25
Signalized Intersection	WB	68	2284	12	2364	72	2369	13	2454	4	85	1	220	4%	4	186	54	134	F	D	F	57	E			315	75	200		750	2675	350	25	25
	NB	61	11	82	154	56	13	89	158	-5	2	7	4	3%	0	184	202	134	F	F	F	158	F				175	575		175	575		100	425
	SB	36	79	341	456	30	72	289	391	-6	-7	-52	-65	-14%	3	418	400	311	F	F	F	335	F			60	950	1425		950	1425	60	1225	1450
Main St at Church St/EB TH 10 Ramps	SEB	25	730	0	755	14	614	2	630	-11	-116	2	-125	-17%	5	914	24	15	F	C	B	44	E	26	D		125	225	250	100	375	250	100	375
Stop Controlled	EB	10	30	0	40	6	25	0	31	-4	-5	0	-9	-23%	2	430	427	0	F	F	A	428	F				100	250		100	250		100	250
	NB	45	760	130	935	40	769	128	937	-5	9	-2	2	0%	0	20	0	1	C	A	A	1	A			150	25	50		25	25	150	25	25
	SB	125	180	50	355	116	173	50	339	-9	-7	0	-16	-5%	1	58	1	14	F	A	B	22	C			375	50	375		25	125		25	150
Main St at WB TH 10 Ramps	EB	10	5	165	180	7	5	164	176	-3	0	-1	-4	-2%	0	10	24	3	B	C	A	4	A	21	C		25	100		25	75		25	100
Stop Controlled	WB	130	244	45	419	115	221	46	382	-15	-23	1	-37	-9%	2	77	77	66	F	F	F	76	F			1225	225	800	1225	225	800	1225	225	800
	NB	347	45	398	790	348	45	396	789	1	0	-2	-1	0%	0	3	0	0	A	A	A	1	A			475	25	150		0	0		25	25
	SB	0	70	20	90	0	68	20	88	0	-2	0	-2	-2%	0	0	1	1	A	A	A	1	A				25	25		0	0		0	0
EB TH 10 Ramps at TH 47	EB	70	0	65	135	67	1	60	128	-3	1	-5	-7	-5%	1	55	0	50	E	-	D	53	D	28	C		25	200		25	200	225	25	150
Signalized Intersection	WB	2	-	2	4	1	-	2	3	-1	-	0	-1	-25%	1	27	-	86	C	-	F	67	E				25	50					25	50
	NB	0	825	750	1575	-	819	756	1575	-	-6	6	0	0%	0	-	33	38	-	C	D	35	D							300	1200		300	1200
	SB	355	965	-	1320	364	891	-	1255	9	-74	-	-65	-5%	2	31	8	-	C	A	-	15	B				100	450		100	450			
WB TH 10 Ramps at TH 47	WB	525	0	345	870	463	0	304	767	-62	0	-41	-103	-12%	4	60	0	60	E	A	E	56	E	31	C	250	125	725		125	725	200	125	875
Signalized Intersection	NB	135	750	-	885	137	749	-	886	2	-1	-	1	0%	0	77	9	-	E	A	-	56	E				100	400		100	400			
	SB	-	795	95	890	-	791	106	897	-	-4	11	7	1%	0	-	21	18	-	C	B	20	C							75	425		75	425
EB TH 10 Ramps at 7th Ave	EB	260	0	120	380	245	0	104	349	-15	0	-16	-31	-8%	2	66	0	18	E	A	B	52	D	15	B	900	100	500	900	100	500	225	25	100
Signalized Intersection	NB	-	770	335	1105	-	774	328	1102	-	4	-7	-3	0%	0	-	28	28	-	C	C	28	C							125	675		125	675
	SB	305	435	-	740	305	439	-	744	0	4	-	4	1%	0	50	8	-	D	A	-	25	C			100	100	425		25	150		0	0
WB TH 10 Ramps at 7th Ave	WB	130	0	460	590	130	0	460	590	0	0	0	0	0%	0	43	0	23	D	A	C	27	C	9	A	925	50	200	925	50	200	325	75	400
Signalized Intersection	NB	170	860	-	1030	170	848	-	1018	0	-12	-	-12	-1%	0	31	2	-	C	A	-	7	A			75	50	375		25	125			
	SB	-	610	155	765	-	611	153	764	-	1	-2	-1	0%	0	-	20	19	-	C	B	20	C							75	400		75	400
Thurston Ave at New Road	EB	26	3	49	78	27	3	49	79	1	0	0	1	1%	0	9	11	10	A	B	A	10	A	241	F		0	0		0	0		0	0
Stop Controlled	WB	5	9	43	57	7	8	43	58	2	-1	0	1	2%	0	10	11	7	B	B	A	8	A				0	0		0	0		0	0
	NB	21	318	5	344	24	342	3	369	-	-	-2	25	7%	1	9	14	6	A	B	A	14	B				25	100		25	100		25	100
	SB	5	559	16	580	3	457	11	471	-	-	-5	-109	-19%	5	508	490	593	F	F	F	492	F				2175	3750		2175	3750		2175	3750
Thurston Ave at Cornelius Pl	EB	26	3	49	78	28	3	48	79	2	0	-1	1	1%	0	9	9	22	A	A	C	17	C	54	F		0	0		0	0		0	0
Stop Controlled	WB	30	3	62	95	30	5	60	95	0	2	-2	0	0%	0	44	26	17	E	D	C	26	D				25	100		25	100		25	100
	NB	21	256	0	277	22	278	0	300	1	22	0	23	8%	1	17	10	0	C	B	A	11	B				0	0		0	0		0	0
	SB	21	576	16	613	16	476	10	502	-5	-100	-6	-111	-18%	5	105	93	79	F	F	F	93	F				475	825		475	825		475	825
Thurston Ave at S Service Road	EB	1	0	1	2	1	0	1	2	0	0	0	0	0%	0	9	0	8	A	A	A	9	A	6	A		25	50		25	50		25	50
Stop Controlled	WB	33	9	122	164	29	13	121	163	-4	4	-1	-1	-1%	0	13	16	14	B	C	B	14	B				25	150		25	150		25	150
	NB	0	79	9	88	0	78	9	87	0	-1	0	-1	-1%	0	0	0	1	A	A	A	2	A				0	0		25	25		25	25
	SB	101	64	5	170	114	69	4	187	13	5	-1	17	10%	1	0	0	1	A	A	A	0	A				25	50		25	25		25	25
Fairoak Ave at S Service Rd	EB	31	6	19	56	28	6	20	54	-3	0	1	-2	-4%	0	170	162	131	F	F	F	154	F	79	F		75	275		75	275		75	275
Stop Controlled	WB	1	1	2	4	0	2	2	4	-1	1	0	0	0%	0	11	26	160	B	D	F	93	F				25	75		25	75		25	75
	NB	49	121	4	174	44	123	2	169	-5	2	-2	-5	-3%	0	117	130	83	F	F	F	126	F				125	500		125	500		75	450
	SB	11	46	105	162	13	46	95	154	2	0	-10	-8	-5%	1	0	2	0	A	A	A	0	A				25	100		25	100		25	100
Fairoak Ave at Main St Service Rd	EB	0	2	8	10	0	0	10	10	0	-2	2	0	0%	0	0	0	454	A	A	F	454	F	116	F		50	125		50	125		50	125
Stop Controlled	WB	31	1	0	32	29	0	0	29	-2	-1	0	-3	-9%	1	535	0	1041	F	A	F	412	F				175	425		150	400		150	400
	NB	0	48	15	63	0	46	16	62	0	-2	1	-1	-2%	0	0	1	-1	A	A	A	1	A			175	25	50		25	25	125	25	25
	SB	6	417	1	424	6	336	7	349	0	-81	6	-75	-18%	4	115	86	44	F	F	E	138	F				75	300		150	325		125	325
Fairoak Ave at Jacob Ln	WB	362	0	141	503	278	-	109	387	-84	-	-32	-116	-23%	5	285	-	274	F	-	F	282	F	178	F		900	1075					900	1075
Stop Controlled	NB	0	35	13	48	-	37	10	47	-	2	-3	-1	-2%	0	-	0	1	-	A	A	2323	F							25	25		25	50
	SB	135	62	0	197	133	63	-	196	-2	1	-	-1	-1%	0	13	27	-	B	D	-	18	C				25	300		25	275			
Main Service Road at Jacob Lane	EB	1	33	-	34	1	30	-	31	0	-3	-	-3	-9%	1	12	1	-	B	A	-	1	A	7	A		25	25		25	25			
Stop Controlled	WB	-	107	503	610	-	107	481	588	-	0	-22	-22	-4%	1	-	2	0	-	A	A	0	A							0	0		0	0
	SB	147	-	1	148	145	-	1	146	-2	-	0	-2	-1%	0	36	-	27	E	-	D	36	E				50	275					50	275
TH 10 at Feldspar St	EB	8	1725	10	1743	8	1720	12	1740	0	-5	2	-3	0%	0	16	1	12	C	A	B	1	A	2	A		25	50		0	0		0	0
Stop Controlled	WB	86	2432	3	2521	84	2378	20	2482	-2	-54	17	-39	-2%	1	6	0	1	A	A	A	0	A				25	100		25	100		25	100
	NB	-	-	42	42	-	-	39	39	-	-	-3	-3	-7%	0	-	-	154	-	-	F	154	F										50	150
	SB	-	-	7	7	-	-	7	7	-	-	0	0	0%	0	-	-	65	-	-	F	65	F										25	50
TH 10 at McKinley St	EB	9	1767	-	1776	5	1751	-	1756	-4	-16	-	-20	-1%	0	25	3	-	D	A	-	3	A	2	A		25	75		25	300			
Stop Controlled	WB	9	2504	0	2513	10	2466	0	2476	1	-38	0	-37	-1%	1	9	1	0	A	A	A	1	A				25	25		0	0		0	0
	SB	10	-	5	15	9	-	6	15	-1	-	1	0	0%	0	54	-	19	F	-	C	40	E				25	75					25	75
TH 10 at Cutters Lane	EB	-	2685	15	2700	-	2428	16	2444	-	-257	1	-256	-9%	5	-	10	4	-	A	A	9	A	10	B					75	375		75	375
Stop Controlled	NB	-	-	24	24	-	-	23	23	-	-	-1	-1	-4%	0	-	-	116	-	-	F	116	F										25	100
TH 10 at SA-Culvers	EB	-	2624	86	2710	-	2327	30	2357	-	-297	-56	-353	-13%	7	-	3	6	-	A	A	3	A	4	A					25	150		50	425
Stop Controlled	NB	-	-	27	27	-	-	22	22	-	-	-5	-5	-19%	1	-	-	128	-	-	F	128	F										25	75
TH 10 at Verndale Ave	WB	-	2667	19	2686	-	2687	23	2710	-	20	4	24	1%	0	-	7	5	-	A	A	7	A	7	A					75	575		75	575
Stop Controlled	SB	-	-	34	34	-	-	34	34	-	-	0	0	0%	0	-	-	32	-	-	D	32	D										25	100

Table A5. 2041 AM - No Build
7:00-8:00am

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Through Queue			Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	100	2705	4	2809	71	2025	3	2099	-29	-680	-1	-710	-25%	14	203	194	172	F	F	F	194	F	129	F	750	50	275		5275	5725	250	25	25
Signalized Intersection	WB	10	1354	473	1837	8	1121	401	1530	-2	-233	-72	-307	-17%	7	149	24	8	F	C	A	20	C			700	25	75		100	925	675	25	450
	NB	9	29	85	123	10	26	85	121	1	-3	0	-2	-2%	0	149	200	171	F	F	F	175	F			120	25	100		50	200	150	125	375
	SB	482	8	103	593	546	8	106	660	64	0	3	67	11%	3	195	118	25	F	F	C	167	F			650	400	1300		25	50	200	400	1300
TH 10 at Thurston Ave	EB	120	3157	85	3362	101	2475	64	2640	-19	-682	-21	-722	-21%	13	314	170	157	F	F	F	176	F	136	F	250	8175	8725		10375	10850	350	25	75
Signalized Intersection	WB	95	1752	672	2519	76	1402	534	2012	-19	-350	-138	-507	-20%	11	210	24	18	F	C	B	29	C			650	125	350		150	1975	350	25	325
	NB	60	50	185	295	58	56	178	292	-2	6	-7	-3	-1%	0	157	145	142	F	F	F	146	F			175	75	225		50	125	175	200	625
	SB	415	65	35	515	342	58	47	447	-73	-7	12	-68	-13%	3	410	360	176	F	F	F	379	F			425	1325	2625		1025	2600	50	1100	2375
TH 10 at Fairoak Ave	EB	40	3698	16	3754	31	2879	13	2923	-9	-819	-3	-831	-22%	14	147	19	11	F	B	B	20	C	33	C	875	50	175		975	2625	175	25	25
Signalized Intersection	WB	85	2446	20	2551	69	1988	18	2075	-16	-458	-2	-476	-19%	10	234	19	287	F	B	F	26	C			315	125	475		175	1600	350	25	50
	NB	42	10	119	171	39	8	117	164	-3	-2	-2	-7	-4%	1	350	329	287	F	F	F	304	F				300	700		300	700		325	675
	SB	10	26	47	83	6	13	38	57	-4	-13	-9	-26	-31%	3	232	263	62	F	F	E	126	F				50	175		50	175	60	25	175
Main St at Church St/EB TH 10 Ramps	SEB	24	1140	0	1164	17	900	1	918	-7	-240	1	-246	-21%	8	46	8	6	E	A	A	9	A	7	A		25	175	250	0	0	250	0	0
Stop Controlled	EB	11	35	0	46	12	32	0	44	1	-3	0	-2	-4%	0	99	81	0	F	F	A	86	F				25	100		25	100		25	100
	NB	20	600	85	705	11	615	80	706	-9	15	-5	1	0%	0	15	0	1	C	A	A	0	A			150	25	50		0	0	150	0	0
	SB	45	150	20	215	33	133	12	178	-12	-17	-8	-37	-17%	3	16	0	18	C	A	C	4	A			375	25	75		25	75		25	75
Main St at WB TH 10 Ramps	EB	5	15	55	75	2	15	57	74	-3	0	2	-1	-1%	0	3	13	5	A	B	A	7	A	9	A		25	100		25	100		25	100
Stop Controlled	WB	130	94	45	269	87	79	35	201	-43	-15	-10	-68	-25%	4	41	36	34	E	E	D	38	E				50	275		50	275		50	275
	NB	259	35	341	635	245	39	360	644	-14	4	19	9	1%	0	2	0	0	A	A	A	1	A			475	25	75		0	0		0	0
	SB	1	35	6	42	0	34	6	40	-1	-1	0	-2	-5%	0	1	0	1	A	A	A	0	A				0	0		0	0		0	0
EB TH 10 Ramps at TH 47	EB	100	0	50	150	73	0	40	113	-27	0	-10	-37	-25%	3	143	0	89	F	-	F	124	F	45	D		100	375		100	375	225	25	150
Signalized Intersection	WB	5	-	3	8	5	-	3	8	0	-	0	0	0%	0	95	-	80	F	-	F	89	F				25	75					25	75
	NB	0	590	360	950	-	492	374	866	-	-98	14	-84	-9%	3	-	91	67	-	F	E	81	F							375	1575		375	1575
	SB	415	1480	-	1895	317	1165	-	1482	-98	-315	-	-413	-22%	10	62	8	-	E	A	-	20	B				200	450		200	450			
WB TH 10 Ramps at TH 47	WB	840	0	170	1010	642	0	116	758	-198	0	-54	-252	-25%	8	261	0	199	F	A	F	251	F	119	F	250	2625	3050		2625	3050	200	525	725
Signalized Intersection	NB	225	465	-	690	208	350	-	558	-17	-115	-	-132	-19%	5	86	15	-	F	B	-	251	F				150	425		150	425			
	SB	-	1055	70	1125	-	844	58	902	-	-211	-12	-223	-20%	7	-	58	49	-	E	D	58	E							250	475		250	475
EB TH 10 Ramps at 7th Ave	EB	170	0	205	375	146	0	173	319	-24	0	-32	-56	-15%	3	57	0	18	E	A	B	36	D	11	B	900	50	325	900	50	325	225	25	150
Signalized Intersection	NB	-	390	145	535	-	389	142	531	-	-1	-3	-4	-1%	0	-	39	39	-	D	D	39	D							75	325		75	325
	SB	665	865	-	1530	681	787	-	1468	16	-78	-	-62	-4%	2	11	6	-	B	A	-	8	A			100	50	475		25	175		0	0
WB TH 10 Ramps at 7th Ave	WB	345	0	365	710	252	0	272	524	-93	0	-93	-186	-26%	7	212	0	178	F	A	F	195	F	168	F	925	75	525	925	75	525	325	25	175
Signalized Intersection	NB	100	460	-	560	99	438	-	537	-1	-22	-	-23	-4%	1	119	5	-	F	A	-	26	C			75	100	325		25	200			
	SB	-	1185	395	1580	-	1219	402	1621	-	34	7	41	3%	1	-	103	102	-	F	F	103	F							975	2100		975	2100
Thurston Ave at New Road	EB	9	0	27	36	10	0	25	35	1	0	-2	-1	-3%	0	10	0	6	A	A	A	7	A	85	F		0	0		0	0		0	0
Stop Controlled	WB	10	42	115	167	11	39	116	166	1	-3	1	-1	-1%	0	11	11	7	B	B	A	8	A				0	0		0	0		0	0
	NB	112	620	10	742	87	502	7	596	-25	-118	-3	-146	-20%	6	10	25	6	B	C	A	23	C				25	50		25	50		25	50
	SB	10	523	62	595	8	495	42	545	-2	-28	-20	-50	-8%	2	172	182	183	F	F	F	182	F				675	1650		675	1650		675	1650
Thurston Ave at Cornelius Pl	EB	9	0	27	36	10	0	25	35	1	0	-2	-1	-3%	0	11	0	10	B	A	A	10	A	34	D		0	0		0	0		0	0
Stop Controlled	WB	4	20	4	28	3	19	5	27	-1	-1	1	-1	-4%	0	54	18	12	F	C	B	21	C				25	50		25	50		25	50
	NB	112	730	1	843	87	593	1	681	-25	-137	0	-162	-19%	6	13	12	9	B	B	A	12	B				25	25		25	25		25	25
	SB	13	484	62	559	8	422	89	519	-5	-62	27	-40	-7%	2	73	68	50	F	F	E	65	F				375	700		375	700		375	700
Thurston Ave at S Service Road	EB	17	0	0	17	17	0	0	17	0	0	0	0	0%	0	21	0	0	C	A	A	21	C	7	A		25	75		25	75		25	75
Stop Controlled	WB	13	0	120	133	12	0	118	130	-1	0	-2	-3	-2%	0	25	0	22	D	A	C	22	C				25	200		25	200		25	200
	NB	0	160	18	178	0	156	20	176	0	-4	2	-2	-1%	0	0	0	1	A	A	A	2	A				0	0		25	25		25	25
	SB	188	52	4	244	153	40	4	197	-35	-12	0	-47	-19%	3	1	0	1	A	A	A	1	A				25	100		25	75		25	75
Fairoak Ave at S Service Rd	EB	31	12	29	72	30	14	25	69	-1	2	-4	-3	-4%	0	234	196	145	F	F	F	194	F	91	F		125	350		100	350		125	350
Stop Controlled	WB	0	0	1	1	0	0	1	1	0	0	0	0	0%	0	0	0	127	A	A	F	127	F				25	50		25	50		25	50
	NB	25	138	4	167	23	143	3	169	-2	5	-1	2	1%	0	65	105	105	F	F	F	100	F				50	350		100	375		100	375
	SB	3	33	106	142	3	17	76	96	0	-16	-30	-46	-32%	4	0	1	0	A	A	A	0	A				25	50		25	50		25	50
Fairoak Ave at Main St Service Rd	EB	3	0	0	3	3	0	0	3	0	0	0	0	0%	0	8	0	0	A	A	A	8	A	5	A		25	50		25	25		25	50
Stop Controlled	WB	10	0	11	21	10	0	11	21	0	0	0	0	0%	0	5	0	6	A	A	A	4	A				25	75		25	50		25	50
	NB	6	38	24	68	5	35	19	59	-1	-3	-5	-9	-13%	1	0	0	0	A	A	A	0	A			175	0	0		25	25	125	25	25
	SB	12	72	7	91	7	49	4	60	-5	-23	-3	-31	-34%	4	7	12	0	A	B	A	12	B				25	50		25	75		25	75
Fairoak Ave at Jacob Ln	WB	59	0	259	318	30	-	143	173	-29	-	-116	-145	-46%		10	-	8	A	-	A	8	A	5	A		25	125					25	100
Stop Controlled	NB	0	45	7	52	-	43	7	50	-	-2	0	-2	-4%	0	-	0	0	-	A	A	29	D							0	0		0	0
	SB	56	32	0	88	64	32	-	96	8	0	-	8	9%	1	0	0	-	A	A	-	0	A				25	25		0	0			
Main Service Road at Jacob Lane	EB	0	11	-	11	0	12	-	12	0	1	-	1	9%	0	0	1	-	A	A	-	1	A	2	A		0	0		0	0			
Stop Controlled	WB	-	41	318	359	-	35	295	330	-	-6	-23	-29	-8%	2	-	1	0	-	A	A	0	A							0	0		0	0
	SB	63	-	0	63	63	-	0	63	0	-	0	0	0%	0	11	-	0	B	-	A	11	B				25	100					25	100
TH 10 at Feldspar St	EB	4	2766	4	2774	1	2010	4	2015	-3	-756	0	-759	-27%	16	234	215	4	F	F	A	215	F	133	F		25	25		1925	2375		1925	2375
Stop Controlled	WB	27	1441	4	1472	23	1228	4	1255	-4	-213	0	-217	-15%	6	27	0	3	D	A	A	1	A				25	75		25	150		25	150
	NB	-	-	33	33	-	-	0	0	-	-	-33	-33	-100%	8	-	-	4615	-	-	F	4615	F										500	525
	SB	-	-	1	1	-	-	1	1	-	-	0	0	0%	0	-	-	38	-	-	E	38	E										25	50
TH 10 at McKinley St	EB	8	2693	-	2701	3	2037	-	2040	-5	-656	-	-661	-24%	14	293	98	-	F	F	-	98	F	62	F		25	25		1100	1600			
Stop Controlled	WB	6	1462	3	1471	5	1232	2	1239	-1	-230	-1	-232	-16%	6	92	1	1	F	A	A	1	A				25	50		25	125		25	125
	SB	12	-	6	18	12	-	6	18	0	-	0	0	0%	0	139	-	9	F	-	A	96	F				25	100					25	100
TH 10 at Cutters Lane	EB	-	3750	8	3758	-	2953	5	2958	-	-797	-3	-800	-21%	14	-	8	4	-	A	A	8	A	12	B					50	775		50	775
Stop Controlled	NB	-	-	27	27	-	-	13	13	-	-	-14	-14	-52%	3	-	-	726	-	-	F	726	F										200	475
TH 10 at SA-Culvers	EB	-	3663	113	3776	-	2852	77	2929	-	-811	-36	-847	-22%	15	-	2	3	-	A	A	2	A	4	A					25	150		25	375
Stop Controlled	NB	-	-	28	28	-	-	10	10	-	-	-18	-18	-64%	4	-	-	817	-	-	F	817	F										100	275
TH 10 at Verndale Ave	WB	-	2513	22	2535	-	2055	19	2074	-	-458	-3	-461	-18%	10	-	2	1	-	A	A	2	A	2	A					25	425		25	425
Stop Controlled	SB	-	-	6	6	-	-	6	6	-	-	0	0	0%	0	-	-	19	-	-	C	19	C										25	50

Table A6. 2041 PM - No Build
4:15-5:15pm

Location	Aprch	Demand volumes				Modeled Volumes				Model - Demand					GEH	Total Delay by Movement (sec/veh)			Level of Service by Movement			LOS by Approach		LOS		Traffic Queuing (feet): Left Turn			Through Queue			Right Turn		
		L	T	R	Total	L	T	R	total	L	T	R	Total	%		L	T	R	L	T	R	Delay	LOS	Delay	LOS	Storage	Avg	Max	Link Length	Avg	Max	Storage	Avg	Max
TH 10 at Sunfish Lake Blvd	EB	97	1997	10	2104	36	622	4	662	-61	-1375	-6	-1442	-69%	39	302	47	52	F	D	D	61	E	41	D	750	225	350		3225	5700	250	25	25
Signalized Intersection	WB	40	2573	375	2988	10	1302	189	1501	-30	-1271	-186	-1487	-50%	31	175	16	7	F	B	A	16	B			700	100	225		600	2100	675	400	1300
	NB	12	14	27	53	4	5	13	22	-8	-9	-14	-31	-58%	5	142	171	123	F	F	F	138	F			120	25	75		50	100	150	200	550
	SB	676	20	170	866	190	9	63	262	-486	-11	-107	-604	-70%	25	142	140	80	F	F	F	127	F			650	800	1625		25	100	200	800	1625
TH 10 at Thurston Ave	EB	60	2594	65	2719	37	482	16	535	-23	-2112	-49	-2184	-80%	54	340	121	99	F	F	F	134	F	186	F	250	1400	2400		6875	10000	350	25	50
Signalized Intersection	WB	90	2771	298	3159	45	1525	183	1753	-45	-1246	-115	-1406	-45%	28	1068	106	96	F	F	F	130	F			650	1525	2475		1475	2600	350	25	125
	NB	75	45	145	265	21	8	26	55	-54	-37	-119	-210	-79%	17	184	167	174	F	F	F	177	F			175	225	425		50	425	175	875	1300
	SB	725	75	200	1000	97	9	36	142	-628	-66	-164	-858	-86%	36	1258	1135	786	F	F	F	1131	F			425	5150	5200		3850	4175	50	4925	4975
TH 10 at Fairoak Ave	EB	45	3348	21	3414	5	424	4	433	-40	-2924	-17	-2981	-87%	68	216	61	109	F	E	F	63	E	339	F	875	25	100		2225	2600	175	25	25
Signalized Intersection	WB	77	2692	13	2782	32	1675	6	1713	-45	-1017	-7	220	-38%	5	540	401	226	F	F	F	403	F			315	5000	8300		11950	12550	350	25	50
	NB	70	11	88	169	17	2	12	31	-53	-9	-76	-138	-82%	14	432	387	226	F	F	F	349	F				1100	1575		1100	1575		775	1125
	SB	40	83	378	501	6	19	78	103	-34	-64	-300	-398	-79%	23	499	504	404	F	F	F	428	F			60	1325	1400		1325	1400	60	1375	1425
Main St at Church St/EB TH 10 Ramps	SEB	40	995	0	1035	2	150	1	153	-38	-845	1	-882	-85%	36	1556	20	15	F	C	C	40	E	14	B		250	300	250	675	900	250	675	900
Stop Controlled	EB	10	30	0	40	3	11	0	14	-7	-19	0	-26	-65%	5	1414	1407	0	F	F	A	1408	F				400	625		400	625		400	625
	NB	50	950	135	1135	43	899	126	1068	-7	-51	-9	-67	-6%	2	13	0	1	B	A	A	1	A			150	25	50		50	375	150	50	375
	SB	140	205	60	405	99	128	36	263	-41	-77	-24	-142	-35%	8	188	8	15	F	A	B	77	F			375	225	625		50	175		25	150
Main St at WB TH 10 Ramps	EB	10	15	185	210	7	13	158	178	-3	-2	-27	-32	-15%	2	15	27	14	B	D	B	15	B	35	D		50	225		50	225		50	225
Stop Controlled	WB	150	292	45	487	59	123	22	204	-91	-169	-23	-283	-58%	15	256	265	246	F	F	F	261	F			1225	950	2475	1225	950	2475	1225	950	2475
	NB	392	50	558	1000	353	15	511	879	-39	-35	-47	-121	-12%	4	8	1	1	A	A	A	3	A			475	100	550		100	300		50	300
	SB	0	70	20	90	0	62	17	79	0	-8	-3	-11	-12%	1	0	8	4	A	A	A	7	A				25	225		25	175		25	175
EB TH 10 Ramps at TH 47	EB	90	2	75	167	26	1	16	43	-64	-1	-59	-124	-74%	12	119	0	69	F	A	E	99	F	119	F		50	275		50	275	225	25	100
Signalized Intersection	WB	1	-	2	3	1	-	2	3	0	-	0	0	0%	0	61	-	93	E	-	F	82	F				25	50					25	50
	NB	0	1125	770	1895	-	877	585	1462	-	-248	-185	-433	-23%	11	-	191	218	-	F	F	202	F							1825	2075		1825	2075
	SB	385	1045	-	1430	313	623	-	936	-72	-422	-	-494	-35%	14	44	6	-	D	A	-	19	B				100	400		100	400			
WB TH 10 Ramps at TH 47	WB	540	0	425	965	224	0	180	404	-316	0	-245	-561	-58%	21	355	0	355	F	A	F	373	F	102	F	250	1500	2475		1500	2475	200	2600	3050
Signalized Intersection	NB	150	1070	-	1220	119	789	-	908	-31	-281	-	-312	-26%	10	118	47	-	F	D	-	373	F				275	450		275	450			
	SB	-	895	110	1005	-	702	88	790	-	-193	-22	-215	-21%	7	-	19	21	-	B	C	20	B							125	450		125	450
EB TH 10 Ramps at 7th Ave	EB	345	0	120	465	126	0	36	162	-219	0	-84	-303	-65%	17	58	0	17	E	A	B	49	D	19	B	900	75	525	900	75	525	225	25	75
Signalized Intersection	NB	-	905	340	1245	-	826	310	1136	-	-79	-30	-109	-9%	3	-	31	32	-	C	C	31	C							300	1175		300	1175
	SB	380	495	-	875	365	410	-	775	-15	-85	-	-100	-11%	3	54	6	-	D	A	-	28	C			100	150	475		25	250		0	0
WB TH 10 Ramps at 7th Ave	WB	130	0	565	695	67	0	290	357	-63	0	-275	-338	-49%	15	319	0	286	F	A	F	292	F	215	F	925	25	150	925	25	150	325	50	375
Signalized Intersection	NB	190	1060	-	1250	163	781	-	944	-27	-279	-	-306	-24%	9	33	2	-	C	A	-	7	A			75	75	400		25	150			
	SB	-	745	230	975	-	710	220	930	-	-35	-10	-45	-5%	1	-	122	125	-	F	F	123	F							725	1425		725	1425
Thurston Ave at New Road	EB	32	3	60	95	18	2	18	38	-14	-1	-42	-57	-60%	7	9	11	28	A	B	D	18	C	312	F		100	225		100	225		100	225
Stop Controlled	WB	10	12	87	109	4	7	79	90	-6	-5	-8	-19	-17%	2	61	10	7	F	A	A	10	A				50	200		50	200		50	200
	NB	25	378	10	413	18	276	5	299	-7	-102	-5	-114	-28%	6	9	17	6	A	C	A	16	C				25	100		25	100		25	100
	SB	10	881	20	911	1	167	2	170	-9	-714	-18	-741	-81%	32	1062	1109	1050	F	F	F	1108	F				3850	3900		3850	3900		3850	3900
Thurston Ave at Cornelius Pl	EB	32	3	60	95	17	3	22	42	-15	0	-38	-53	-56%	6	9	15	30	A	C	D	21	C	58	F		150	500		150	500		150	500
Stop Controlled	WB	30	3	62	95	11	2	26	39	-19	-1	-36	-56	-59%	7	76	20	34	F	C	D	45	E				50	100		50	100		50	100
	NB	25	378	0	403	13	254	0	267	-12	-124	0	-136	-34%	7	17	10	0	C	B	A	11	B				25	25		25	25		25	25
	SB	21	911	20	952	4	184	1	189	-17	-727	-19	-763	-80%	32	149	140	82	F	F	F	140	F				775	825		775	825		775	825
Thurston Ave at S Service Road	EB	1	0	1	2	1	0	1	2	0	0	0	0	0%	0	88	0	10	F	A	B	49	E	7	A		25	50		25	50		25	50
Stop Controlled	WB	47	9	160	216	22	4	64	90	-25	-5	-96	-126	-58%	10	19	13	13	C	B	B	14	B				400	825		400	825		400	825
	NB	0	104	11	115	0	47	8	55	0	-57	-3	-60	-52%	7	0	0	8	A	A	A	6	A				0	0		250	700		250	700
	SB	138	87	5	230	70	42	3	115	-68	-45	-2	-115	-50%	9	1	0	1	A	A	A	0	A				25	75		25	50		25	50
Fairoak Ave at S Service Rd	EB	34	6	23	63	14	1	10	25	-20	-5	-13	-38	-60%	6	244	334	264	F	F	F	256	F	79	F		250	350		250	325		250	350
Stop Controlled	WB	1	1	2	4	1	2	2	5	0	1	0	1	25%	0	10	9	37	B	A	E	21	C				25	50		25	50		25	50
	NB	60	133	4	197	15	42	1	58	-45	-91	-3	-139	-71%	12	91	125	178	F	F	F	117	F				1050	1500		1050	1500		725	1375
	SB	11	53	116	180	5	24	48	77	-6	-29	-68	-103	-57%	9	4	2	0	A	A	A	1	A				25	25		25	25		25	25
Fairoak Ave at Main St Service Rd	EB	0	2	8	10	0	0	5	5	0	-2	-3	-5	-50%	2	0	0	236	A	A	F	236	F	92	F		125	175		125	175		125	175
Stop Controlled	WB	16	1	9	26	10	0	3	13	-6	-1	-6	-13	-50%	3	217	0	178	F	A	F	177	F				300	700		300	700		300	700
	NB	0	54	15	69	0	17	4	21	0	-37	-11	-48	-70%	7	0	1	0	A	A	A	1	A			175	25	25		25	25	125	25	25
	SB	6	477	1	484	3	122	0	125	-3	-355	-1	-359	-74%	21	147	87	0	F	F	A	120	F				175	275		175	325		100	325
Fairoak Ave at Jacob Ln	WB	398	0	188	586	93	-	45	138	-305	-	-143	-448	-76%	24	456	-	451	F	-	F	454	F	230	F		1025	1075					1025	1075
Stop Controlled	NB	0	44	19	63	-	14	6	20	-	-30	-13	-43	-68%	7	-	0	1	-	A	A	3134	F							25	25		25	25
	SB	154	86	0	240	67	40	-	107	-87	-46	-	-133	-55%	10	30	42	-	D	E	-	34	D				525	925		525	925			
Main Service Road at Jacob Lane	EB	1	38	-	39	1	34	-	35	0	-4	-	-4	-10%	1	6	5	-	A	A	-	5	A	16	C		25	50		25	25			
Stop Controlled	WB	-	120	585	705	-	82	412	494	-	-38	-173	-211	-30%	9	-	2	0	-	A	A	0	A							0	0		0	0
	SB	172	-	1	173	156	-	1	157	-16	-	0	-16	-9%	1	66	-	21	F	-	C	66	F				100	525					100	525
TH 10 at Feldspar St	EB	8	2043	13	2064	4	1089	6	1099	-4	-954	-7	-965	-47%	24	8	2	6	A	A	A	2	A	5	A		25	25		925	2200		925	2200
Stop Controlled	WB	105	2661	4	2770	44	1543	18	1605	-61	-1118	14	-1165	-42%	25	6	0	1	A	A	A	0	A				50	225		25	125		25	125
	NB	-	-	51	51	-	-	19	19	-	-	-32	-32	-63%	5	-	-	486	-	-	F	486	F										250	500
	SB	-	-	9	9	-	-	8	8	-	-	-1	-1	-11%	0	-	-	51	-	-	F	51	F										25	75
TH 10 at McKinley St	EB	9	2085	-	2094	2	997	-	999	-7	-1088	-	-1095	-52%	28	14	5	-	B	A	-	6	A	4	A		25	50		750	1575			
Stop Controlled	WB	9	2753	0	2762	3	1597	0	1600	-6	-1156	0	-1162	-42%	25	7	2	0	A	A	A	2	A				25	25		25	100		25	100
	SB	10	-	5	15	3	-	2	5	-7	-	-3	-10	-67%	3	32	-	9	D	-	A	22	C				50	150					50	150
TH 10 at Cutters Lane	EB	-	3446	18	3464	-	818	4	822	-	-2628	-14	-2642	-76%	57	-	17	4	-	C	A	17	C	18	C					525	775		525	775
Stop Controlled	NB	-	-	33	33	-	-	11	11	-	-	-22	-22	-67%	5	-	-	90	-	-	F	90	F										225	475
TH 10 at SA-Culvers	EB	-	3381	95	3476	-	764	8	772	-	-2617	-87	-2704	-78%	59	-	6	2	-	A	A	6	A	13	B					100	150		150	425
Stop Controlled	NB	-	-	33	33	-	-	6	6	-	-	-27	-27	-82%	6	-	-	1253	-	-	F	1253	F										250	325
TH 10 at Verndale Ave	WB	-	3117	23	3140	-	1986	15	2001	-	-1131	-8	-1139	-36%	22	-	19	13	-	C	B	19	C	21	C					200	600		200	600
Stop Controlled	SB	-	-	42	42	-	-	34	34	-	-	-8	-8	-19%	1	-	-	132	-	-	F	132	F										75	225

APPENDIX C

TH 10 Improvements: Safety Analysis

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MEMORANDUM

Date: August 2, 2018

To: Gayle Gedstad, P.E.

From: Ross B. Tillman, P.E.
Kelsey E. Retherford, E.I.T.

Subject: TH 10 Improvements: Safety Analysis
City of Anoka
Project No.: T44.114009

Introduction

This memorandum provides the safety analysis completed for the TH 10 Improvements project. An overview of the crashes and estimated crash forecasts are summarized below.

Data Collection

Overall Project Crashes:
A crash review was completed using the Minnesota Crash Mapping Analysis Tool (MnCMAT) to analyze the past ten years (2006-2015). Crash data was analyzed both within the current project limits and also within the effected project area due to queueing issues caused by intersections within the project limits that extend past the project limits.

Project limits crash data was collected at the following locations:

- All crashes along EB TH 10 and WB TH 10 from the west Anoka city limits to Main Street
- Intersection related crashes at Thurston Avenue, Fairoak Avenue and the Main Street ramp terminals.
- Crashes along SB Thurston Avenue from McKinley Street to Cornelius Place and all crashes related to the Thurston Avenue at Cornelius Place intersection
- Crashes at Cutters Grove and the S Frontage Road

For the effected project area, data was collected in the same locations as listed above for the project limits, but additional crashes along TH 10 from Main Street to Rum River were analyzed as currently the peak hour queues extend to Rum River.

Figure 1 shows the project limits in yellow and the additional crashes collected for the effected project area in blue.

Figure 1. Project Limits and Effected Project Area

Segment Crashes:
Segment crash data was analyzed for the past ten years (2006-2015) using MnCMAT along TH 10 within both the project limits and in the effected project area.

Intersection Crashes:
Intersection crash data was analyzed for the past ten years (2006-2015) using MnCMAT at the intersection of TH 10 at Thurston Avenue, TH 10 at Fairoak Avenue, the Main Street ramp terminals and Thurston Avenue at Cornelius Place.

Crashes in the Project Limits

Over the past ten years there have been 694 crashes that have occurred within the project limits described above. **Table 1** summarizes the segment crash and **Figure 2** shows the crash type by percentage of total crashes.

Table 1. Crash Types within Project Limits

Crash Type	Frequency
Rear End	417
Sideswipe Passing	74
Right Angle	70
Other/Unknown	36
Ran off Road	46
Left Turn	22
Head On	12
Right Turn into Traffic	7
Pedestrian	4
Bicycle	4
Sideswipe Opposing	2

Figure 2. Project Limits Crash Type Percentages

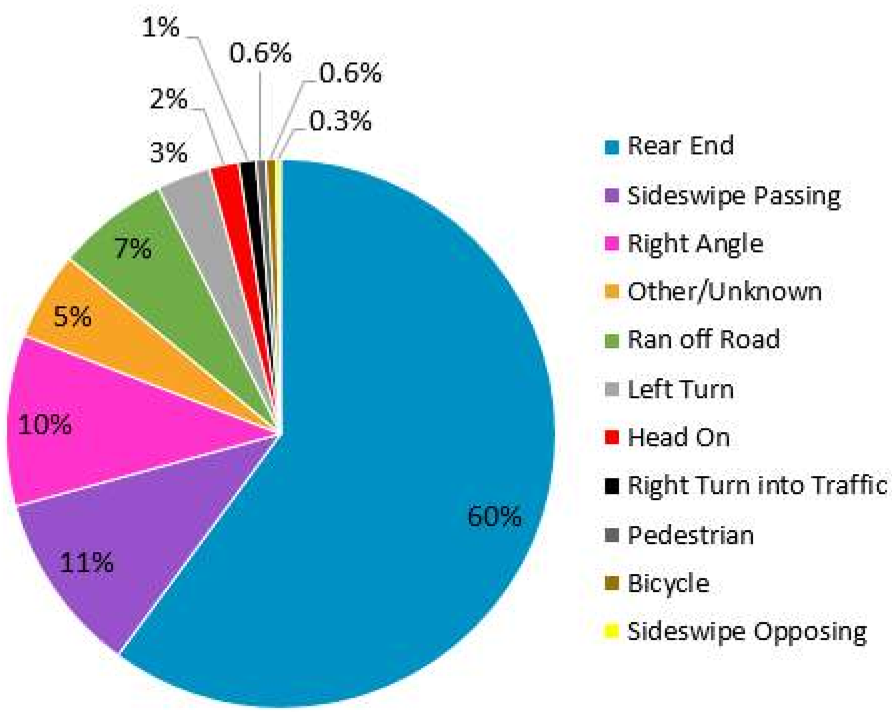


Table 1 and **Figure 2** show that rear end crashes were the most common. 417 of the 694 total crashes were rear end crashes which accounts for 60% of all the crashes. The next most common was sideswipe passing crashes which account for 74 of the crashes. There were 70 right angle crashes in the project area. **Table 2** shows the crash severity of the crashes within the project limits.

Table 2. Crash Severity within Project Limits

Crash Severity	Frequency
Fatal	1
Incapacitating Injury	5
Non-Incapacitating Injury	42
Possible Injury	144
Property Damage Only	502

Table 2 shows that most of the crashes resulted in property damage only however there was one fatality and four incapacitating injury crashes in the most recent ten years. The fatality involved a pedestrian at the intersection of TH 10 and Verndale Avenue.

Segment Crashes in the Project Limits

MnDOT uses a comparison of the crash rate and the critical rate when determining whether or not there is a safety issue at an intersection. The crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected, normal range. The critical index reports the magnitude of this difference and a critical index of less than one indicates that the intersection is operating within the normal range.

The crashes along TH 10 within the project limits including intersections were analyzed to determine how this portion of TH 10 compares to other segments statewide. Of the 694 total crashes within the project limits 578 crashes were along the TH 10 segment. The total segment crash rate was found to be 1.74 where the average crash rate for a similar roadway type is 1.09. This shows that the segment crash rate was found to be 1.6 times higher than average. The critical index was found to be 1.40 which shows that the segment is operating outside the normal range.

The fatal and serious injury crash rate for TH 10 was found to be 1.51 where the statewide average is 0.69; therefore, the segment fatal and serious injury rate is 2.19 times higher than average. The fatal and serious injury critical index was found to be 1.06 which shows that this segment is operating outside the normal range. The project limit segment crash rate worksheet can be found in the **Appendix**.

Crashes in the Effected Project Area

Over the past ten years there have been 1064 crashes that have occurred in the effected project area. **Table 3** summarizes the segment crash and **Figure 3** shows the crash type by percentage of total crashes.

Table 3. Crash Types within Effected Project Area

Crash Type	Frequency
Rear End	643
Sideswipe Passing	143
Ran off Road	87
Right Angle	83
Other/Unknown	54
Left Turn	25
Head On	12
Right Turn into Traffic	7
Pedestrian	4
Bicycle	4
Sideswipe Opposing	2

Figure 3. Effected Project Area Crash Type Percentages

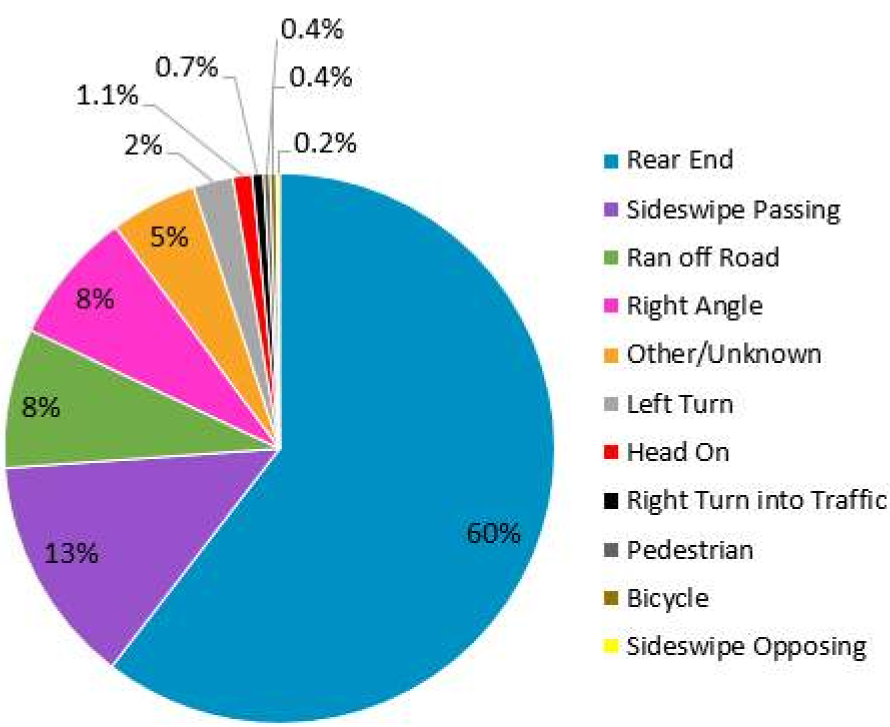


Table 3 and **Figure 3** show that rear end crashes were the most common. 643 of the 1,064 total crashes were rear end crashes which accounts for 60% of all the crashes. The next most common was sideswipe passing crashes which account for 143 (13%) of the crashes. Ran off Road crashes account for 87 (8%) of all crashes and right angle crashes account for 83 (8%). The other seven crash types recorded combined make up the other 10%. **Table 4** shows the crash severity of the crashes within the effected project area.

Table 4. Crash Severity within Effected Project Area

Crash Severity	Frequency
Fatal	2
Incapacitating Injury	6
Non-Incapacitating Injury	70
Possible Injury	209
Property Damage Only	777

Table 4 shows that most of the crashes resulted in property damage only however there were two fatalities and six incapacitating injury crashes in the most recent ten years. One of the two fatalities was previously mentioned as it was located within the project limits, but the other was a rear end crash along WB TH 10 near TH 47.

Segment Crashes in the Effected Project Area

The crashes along TH 10 within the effected project area including intersections were analyzed to determine how this portion of TH 10 compares to other segments statewide. Of the 1,064 total crashes in the effected project area 928 were along the TH 10 segment from the west city limit of Anoka to the Rum River. The total segment crash rate was found to be 2.08 where the average crash rate for a similar roadway type is 1.09. This shows that the segment crash rate was found to be 1.9 times higher than average. The critical index was found to be 1.70 which shows that the segment is operating outside the normal range.

The fatal and serious injury crash rate for TH 10 was found to be 1.57 where the average is 0.69 so this segments crash rate is 2.28 times higher than average. The fatal and serious injury critical index was found to be 1.20 which shows that this segment is operating outside the normal range. The effected project area segment crash worksheet can be found in the **Appendix**.

TH 10 at Thurston Avenue

Over the past ten years there have been 225 crashes that have occurred at the intersection of TH 10 and Thurston Avenue. **Table 5** summarizes the crash types that occurred at the intersection.

Table 5. TH 10 at Thurston Avenue Crash Type

Crash Type	Frequency
Rear End	153
Right Angle	20
Sideswipe Passing	20
Other/Unknown	14
Ran off Road	9
Head On	4
Left Turn	2
Pedestrian	1
Bicycle	1
Sideswipe Opposing	1

Table 5 shows that rear end crashes were the most common at the intersection. 153 of the 225 total crashes were rear ends which accounts for 68% of the crashes at this intersection. There were 20 right angle and 20 sideswipe passing crashes. There was one reported bicycle and one pedestrian crash at the intersection between 2006 and 2015. All other types had less than 15 occur in the past ten years. This shows that rear end crashes are the biggest concern at this intersection. They are likely caused by the long queues which occur during the PM peak hour due to the signal. The crash severity of the crashes reported at TH 10 and Thurston Avenue are shown in **Table 6**.

Table 6. TH 10 at Thurston Avenue Crash Severity

Crash Severity	Frequency
Fatal	0
Incapacitating Injury	1
Non-Incapacitating Injury	16
Possible Injury	42
Property Damage Only	166

The observed crash rate at TH 10 and Thurston Avenue was found to be 0.94. The statewide average for similar intersections is 0.46 which indicated that TH 10 at Thurston Avenue crash rate is over two times higher than the average. The critical index was found to be 1.62 which shows that the segment is operating outside the normal range. With one incapacitating injury crash reported in the past ten years this intersection is operating within the normal range for fatal and serious injury crashes. The TH 10 at Thurston Avenue intersection crash worksheet can be found in the **Appendix**.

TH 10 at Fairoak Avenue

Over the past ten years there have been 561 crashes that have occurred at the intersection of TH 10 and Fairoak Avenue. **Table 7** below summarizes the crash types that occurred at the intersection and **Figure 4** shows the crash type by percentage of total crashes.

Table 7. TH 10 at Fairoak Avenue Crash Type

Crash Type	Frequency
Rear End	392
Sideswipe Passing	62
Right Angle	33
Ran off Road	27
Left Turn	21
Other/Unknown	19
Right Turn into Traffic	4
Bicycle	2
Head On	1

Figure 4. TH 10 at Fairoak Avenue Crash Type Percentages

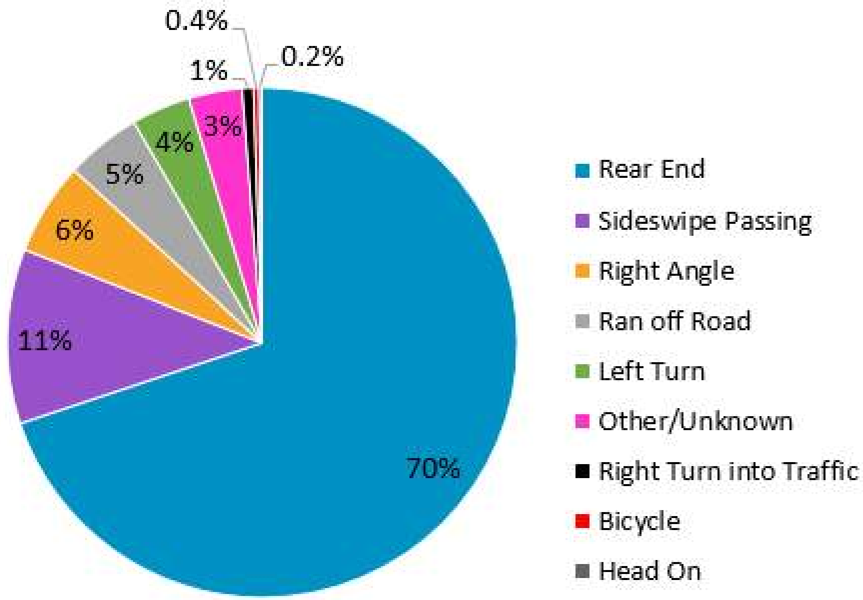


Table 7 and **Figure 3** show that rear end crashes again were the most common. 392 of the 561 total crashes were rear ends which accounts for 70% of the crashes at this intersection. 62 of the crashes were reported as sideswipe passing which accounts for 11% of the crashes. Both rear end crashes and sideswipe passing crashes are likely from the large queuing in the PM peak hour with vehicles experiencing frequent stop and go traffic with the signal at Fairoak Avenue. The other six crash types recorded combined make up the other 19% of the crashes. The crash severity of the crashes reported at TH 10 and Fairoak Avenue are shown in **Table 8**.

Table 8. TH 10 at Fairoak Avenue Crash Severity

Crash Severity	Frequency
Fatal	1
Incapacitating Injury	4
Non-Incapacitating Injury	37
Possible Injury	114
Property Damage Only	405

The observed crash rate at TH 10 and Fairoak Avenue was found to be 2.37. The statewide average for similar intersections is 0.46 which indicated that TH 10 at Fairoak Avenue crash rate is over **five** times higher than the average. The critical index was found to be 4.09 which shows that the segment is operating outside the normal range. The number of crashes at this intersection would need to be reduced by 423 crashes over a ten-year period to operate within the normal range. With one reported fatality and four reported incapacitating injury crashes in the past ten years this intersection is operating outside the normal range for fatal and serious injury crashes. The fatal and serious injury critical index is 1.60. The TH 10 at Fairoak Avenue intersection crash worksheet can be found in the **Appendix**.

EB TH 10 Ramp at Main Street

Over the past ten years there have been 42 crashes that have occurred at the EB TH 10 Ramp and Main Street intersection. **Table 9** below summarizes the crash types that occurred at the intersection.

Table 9. EB TH 10 Ramp at Main Street Crash Type

Crash Type	Frequency
Right Angle	16
Rear End	7
Sideswipe Passing	7
Left Turn	5
Right Turn into Traffic	3
Other/Unknown	1
Ran off Road	1
Sideswipe Opposing	1
Pedestrian	1

Table 9 shows that right angle crashes were the most common at the intersection. The next most common were sideswipe passing and rear end crashes. The crash severity of the crashes reported at the intersection are shown in **Table 10**.

Table 10. EB TH 10 Ramp at Main Street Crash Severity

Crash Severity	Frequency
Fatal	0
Incapacitating Injury	0
Non-Incapacitating Injury	4
Possible Injury	8
Property Damage Only	30

The observed crash rate at EB TH 10 Ramp and Main Street was found to be 0.58. The statewide average for similar intersections is 0.19 which indicates that the crash rate at EB TH 10 Ramp and Main Street is over two times higher than the average. The critical index was found to be 1.76 which shows that the segment is operating outside the normal range. The number of crashes at this intersection would need to be reduced by 16 crashes over a ten-year period to operate within the normal range. The EB TH 10 Ramp and Main Street intersection crash worksheet can be found in the **Appendix**.

WB TH 10 Ramp at Main Street

Over the past ten years there have been 20 crashes that have occurred at the WB TH 10 Ramp and Main Street intersection. **Table 11** summarizes the crash types that occurred at the intersection.

Table 11. WB TH 10 Ramp at Main Street Crash Type

Crash Type	Frequency
Right Angle	7
Rear End	6
Ran off Road	3
Other/Uknown	2
Sideswipe Passing	1
Right Turn into Traffic	1

Table 11 shows that right angle crashes were the most common at the intersection. The next most common were rear end crashes. The crash severity of the crashes reported at the intersection are shown in **Table 12**.

Table 12. WB TH 10 Ramp at Main Street Crash Severity

Crash Severity	Frequency
Fatal	0
Incapacitating Injury	0
Non-Incapacitating Injury	0
Possible Injury	6
Property Damage Only	14

The observed crash rate at WB TH 10 Ramp and Main Street was found to be 0.46. The statewide average for similar intersections is 0.19 which indicates that the crash rate at WB TH 10 Ramp and Main Street is over two times higher than the average. The critical index was found to be 1.24 which shows that the segment is operating outside the normal range. The WB TH 10 Ramp and Main Street intersection crash worksheet can be found in the **Appendix**.

Thurston Avenue at Vista Way

Over the past ten years there have been 18 crashes that have occurred at Thurston Avenue and Cornelius Place. **Table 13** summarizes the crash types that occurred at the intersection.

Table 13. Thurston Avenue at Vista Way Crash Type

Crash Type	Frequency
Right Angle	6
Rear End	4
Left Turn	4
Bicycle	1
Sideswipe Passing	1
Ran off Road	1
Other/Unknown	1

The observed crash rate at Thurston Avenue and Cornelius Place was found to be 0.46. The statewide average for similar intersections is 0.35. The critical index was found to be 0.75 which shows that the segment is operating within the normal range. The Thurston Avenue and Cornelius Place intersection crash worksheet can be found in the **Appendix**.

Forecasted Crashes

Crashes within the project limits and within the effected project area were estimated in the base year under build and no build scenarios as well as in the forecasted year under build and no build scenarios. **Tables 14** and **15** below show the estimated total crashes per year within the project limits and effected project area respectively.

Table 14. Forecasted Crashes per Year within the Project Limits

Crash Severity	Total Crashes Per Year					
	2015		2021		2041	
	No Build	Build	No Build	Build	No Build	Build
K	0.100	0.021	0.109	0.023	0.144	0.032
A	0.500	0.137	0.544	0.151	0.720	0.210
B	4.200	2.856	4.568	3.151	6.044	4.371
C	14.400	8.245	15.662	9.096	20.723	12.618
PDO	50.200	39.026	54.599	43.053	72.244	59.724
Total	**69.400**	**50.286**	**75.482**	**55.474**	**99.876**	**76.956**

Table 15. Forecasted Crashes per Year within the Effected Project Area

Crash Severity	Total Crashes Per Year					
	2015		2021		2041	
	No Build	Build	No Build	Build	No Build	Build
K	0.200	0.021	0.218	0.023	0.288	0.032
A	0.600	0.137	0.653	0.151	0.863	0.210
B	6.900	4.525	7.505	4.992	9.930	6.926
C	20.600	9.581	22.405	10.569	29.646	14.662
PDO	76.400	44.972	83.096	49.612	109.950	68.824
Total	**104.700**	**59.237**	**113.876**	**65.349**	**150.677**	**90.653**

The no build 2015 crashes per year represents the yearly average number of crashes reported from 2005-2016 in each respective area. The forecasted 2021 and 2041 no build crashes were calculated by assuming the same growth rate in crashes as in traffic volumes found along the corridor. To determine a reduction for the build scenarios, state averages were used for similar intersection and segments. The build scenario assumes roundabouts at the following locations:

- TH 10 at Thurston Avenue Interchange
- Thurston Avenue at Greenhaven Parkway (new intersection)
- Main Street at WB TH 10 Ramps
- Main Street at EB TH 10 Ramps

The build scenario also assumes Thurston Avenue at Vista Way is converted from an all way stop to side street stop and grade separation of TH 10 at Fairoak Avenue eliminating this existing intersection and all other access points onto TH 10 between Thurston Avenue and Fairoak Avenue.

Appendix

Trunk Highway Section Summary

Section: Project Limits: TH 10

Crash Data, 2006-2015. Includes crashes at junctions.

Crashes by Crash Severity	
Fatal	1
Incapacitating Injury	4
Non-incapacitating Injury	38
Possible Injury	119
Property Damage	416
Total Crashes	578

Section Characteristics	
Length	1.500 miles
Volume (ADT)	60,600
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Freeway

Annual crash cost per mile = *$1,527,907*

Statewide Comparison *Urban Freeway*

Total Crash Rate	
Observed	1.74
Statewide Average	1.09
Critical Rate	1.24
Critical Index	**1.40**

Fatal & Serious Injury Crash Rate	
Observed	1.51
Statewide Average	0.69
Critical Rate	1.43
Critical Index	**1.06**

Trunk Highway Section Summary

Section: Effected Project Area: TH 10

Crash Data, 2006-2015. Includes crashes at junctions.

Crashes by Crash Severity	
Fatal	2
Incapacitating Injury	5
Non-incapacitating Injury	66
Possible Injury	180
Property Damage	676
Total Crashes	929

Section Characteristics	
Length	2.020 miles
Volume (ADT)	60,600
Environment	Suburban
Median Type	Divided / depressed
Number of Lanes	4
Roadway Design	Freeway

Annual crash cost per mile = $1,803,347

Statewide Comparison *Urban Freeway*

Total Crash Rate	
Observed	2.08
Statewide Average	1.09
Critical Rate	1.22
Critical Index	**1.70**

Fatal & Serious Injury Crash Rate	
Observed	1.57
Statewide Average	0.69
Critical Rate	1.31
Critical Index	**1.20**

Intersection Safety Screening

Intersection: TH 10 at Thurston Avenue

Crash Data, 2006-2015.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	16
Possible Injury	42
Property Damage	166
Total Crashes	225

Intersection Characteristics	
Entering Volume	65,200
Traffic Control	Signals
Environment	Suburban
Speed Limit	60 mph

Annual crash cost = $803,760

Statewide Comparison

Signals: high volume, high speed

Total Crash Rate	
Observed	0.94
Statewide Average	0.46
Critical Rate	0.58
Critical Index	**1.62**

Fatal & Serious Injury Crash Rate	
Observed	0.42
Statewide Average	0.51
Critical Rate	1.32
Critical Index	**0.32**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.94 per MEV; this is 1.6 times the critical rate. If crashes were reduced by 86 over ten years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.42 per 100 MEV; this is 68% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: TH 10 at Fairoak Avenue

Crash Data, 2006-2015.

Crashes by Crash Severity	
Fatal	1
Incapacitating Injury	4
Non-incapacitating Injury	37
Possible Injury	114
Property Damage	405
Total Crashes	561

Intersection Characteristics	
Entering Volume	64,800
Traffic Control	Signals
Environment	Suburban
Speed Limit	60 mph

Annual crash cost = $2,225,000

Statewide Comparison

Signals: high volume, high speed

Total Crash Rate	
Observed	2.37
Statewide Average	0.46
Critical Rate	0.58
Critical Index	**4.09**

Fatal & Serious Injury Crash Rate	
Observed	2.11
Statewide Average	0.51
Critical Rate	1.32
Critical Index	**1.60**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 2.37 per MEV; this is 4.1 times the critical rate. If crashes were reduced by 423 over ten years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 2.11 per 100 MEV; this is 1.6 times the critical rate.

Intersection Safety Screening

Intersection: Main St at EB TH 10 Ramps

Crash Data, 2006-2015.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	4
Possible Injury	8
Property Damage	30
Total Crashes	42

Intersection Characteristics	
Entering Volume	20,000
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	40 mph

Annual crash cost = $157,200

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.58
Statewide Average	0.19
Critical Rate	0.33
Critical Index	**1.76**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.35
Critical Rate	1.92
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.58 per MEV; this is 1.8 times the critical rate. If crashes were reduced by 17 over ten years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Main St at WB TH 10 Ramps

Crash Data, 2006-2015.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	0
Non-incapacitating Injury	0
Possible Injury	4
Property Damage	16
Total Crashes	20

Intersection Characteristics	
Entering Volume	12,000
Traffic Control	Thru / stop
Environment	Suburban
Speed Limit	35 mph

Annual crash cost = $45,360

Statewide Comparison *Urban Thru / Stop*

Total Crash Rate	
Observed	0.46
Statewide Average	0.19
Critical Rate	0.37
Critical Index	**1.24**

Fatal & Serious Injury Crash Rate	
Observed	0.00
Statewide Average	0.35
Critical Rate	2.64
Critical Index	**0.00**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.46 per MEV; this is 1.2 times the critical rate. If crashes were reduced by 3 over ten years, this intersection would perform within normal range.

The observed fatal and serious injury crash rate for this period is 0.00 per 100 MEV; this is 100% below the critical rate. The intersection operates within the normal range.

Intersection Safety Screening

Intersection: Thurston Avenue at Vista Way

Crash Data, 2006-2015.

Crashes by Crash Severity	
Fatal	0
Incapacitating Injury	1
Non-incapacitating Injury	0
Possible Injury	4
Property Damage	13
Total Crashes	18

Intersection Characteristics	
Entering Volume	10,600
Traffic Control	All stop
Environment	Suburban
Speed Limit	30 mph

Annual crash cost = $100,080

Statewide Comparison *All Way Stop*

Total Crash Rate	
Observed	0.46
Statewide Average	0.35
Critical Rate	0.61
Critical Index	**0.75**

Fatal & Serious Injury Crash Rate	
Observed	2.58
Statewide Average	0.60
Critical Rate	3.49
Critical Index	**0.74**

The observed crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside the expected, normal range. The critical index reports the magnitude of this difference.

The observed total crash rate for this period is 0.46 per MEV; this is 25% below the critical rate. Based on similar statewide intersections, an additional 6 crashes over the ten years would indicate this intersection operaters outside the normal range.

The observed fatal and serious injury crash rate for this period is 2.58 per 100 MEV; this is 26% below the critical rate. The intersection operates within the normal range.

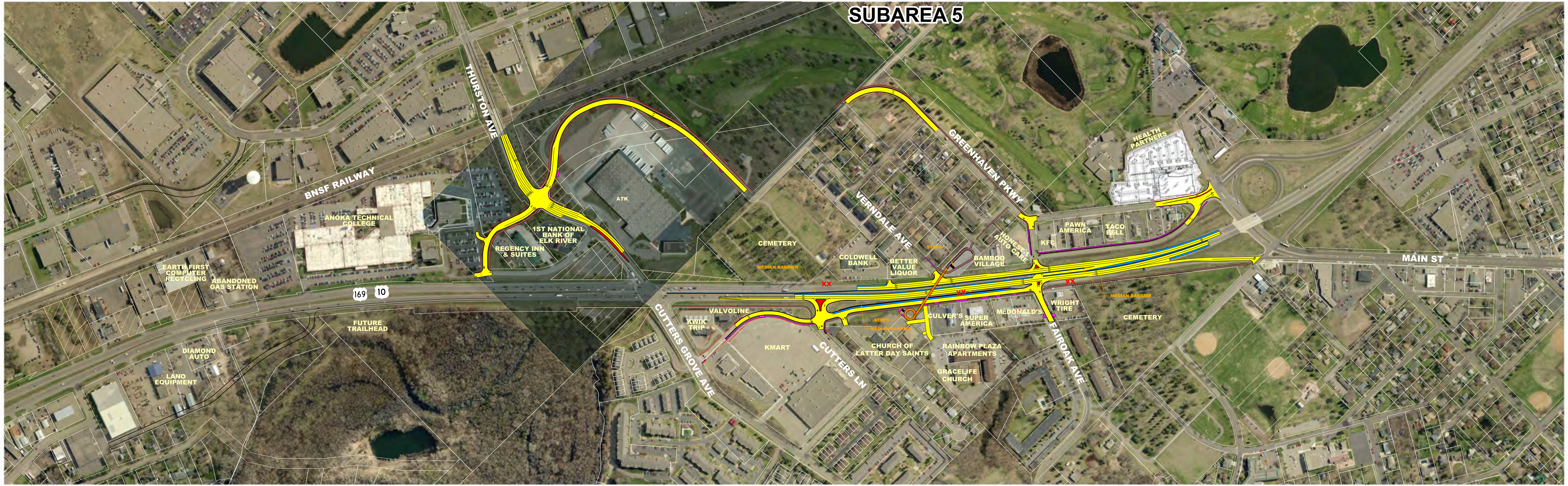
APPENDIX D

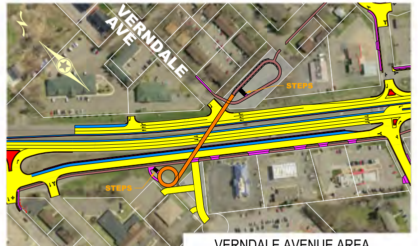
Alternatives Considered

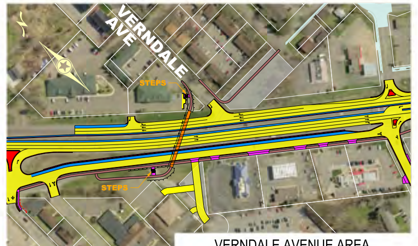
1. Excerpts from *Highway 10 Access Planning Study*
2. Anoka Solution Plan, 2015
3. Green Haven Parkway Concept Development
    a. Greens of Anoka Redevelopment Master Plan Map
    b. Revised alignment for Green Haven Parkway
4. Hwy 10/169 and Thurston Ave/Cutters Grove Ave Interchange Planning Documentation
5. Hwy 10/169 and Fairoak Ave Interchange Planning Documentation
6. City of Anoka Council Work Session Memo, March 16, 2015
7. Anoka City Council Resolutions Supporting Highway 10 Improvements

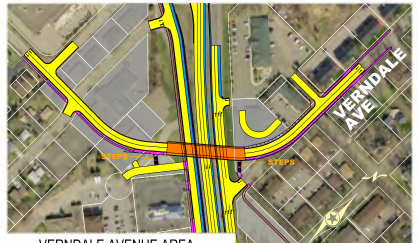
Appendix D

Attachment 1: Excerpts from Highway 10 Access Planning Study




VERNDALE AVENUE AREA
OPTION A - PEDESTRIAN OVERPASS


VERNDALE AVENUE AREA
OPTION B - PEDESTRIAN UNDERPASS


VERNDALE AVENUE AREA
OPTION C - LOCAL STREET BRIDGE

CONCEPT MAP
HIGHWAY 10 BETWEEN THURSTON AVE. AND W. MAIN ST.
CONCEPT 1

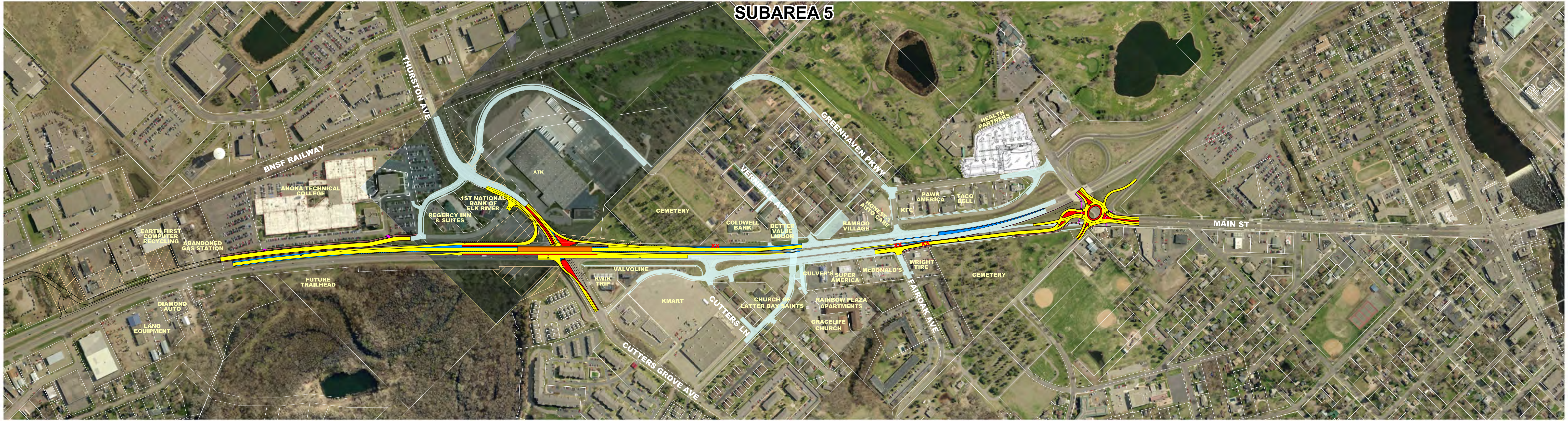
PROJECT 1 ($3.8 M)
- GREENHAVEN PARKWAY FROM THURSTON AVE TO MAIN STREET
- NEW INTERSECTION ON THURSTON AVE (SIGNAL OR ROUNDABOUT)
- REMOVE ALL-WAY STOP ON THURSTON AVE

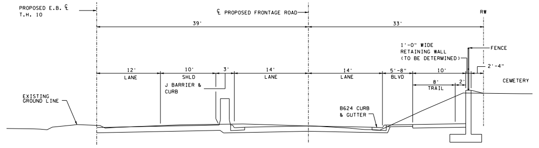
PROJECT 2 ($7.0 M - $15.6 M)
- REMOVE SIGNAL AT FAIROAK AVENUE
- REDUCED CONFLICT INTERSECTION AT FAIROAK AVENUE
- PEDESTRIAN OVERPASS, PEDESTRIAN UNDERPASS, OR LOCAL STREET OVERPASS OPTIONS
- TRAIL CONNECTION BETWEEN THURSTON AVENUE AND MAIN STREET

PROPOSED ROADWAY	PROPERTY ACQUISITION
PROPOSED DRIVEWAY OR SIDEWALK	RALF PROPERTIES (PREVIOUSLY PURCHASED)
PROPOSED C&G / MEDIAN / MEDIAN BARRIER	PROPOSED RIGHT-OF-WAY
PROPOSED SHOULDER	PROPOSED ACCESS CLOSURE XX
PROPOSED TRAIL	
PROPOSED OVERPASS/UNDERPASS	
PREVIOUS PROJECTS	

DRAFT 2/26/14
FOR EVALUATION PURPOSES

TH 10 ACCESS PLANNING STUDY
Anoka County, Minnesota





CONCEPT MAP
HIGHWAY 10 BETWEEN THURSTON AVE. AND W. MAIN ST.
CONCEPT 2

SUBAREA 1

PROJECT 1 (16.0 M)
- WESTBOUND FLY-OVER AT THURSTON AVENUE
- EB T.H. 10 AND THURSTON AVENUE INTERSECTION REMAINS SIGNALIZED
- FRONTAGE ROAD CONNECTION TO SUNFISH BLVD

PROJECT 2 ($1.5 M)
- CONVERT THURSTON AVENUE TO HIGH "T" WITH RI/RO EASTBOUND AT CUTTERS LN

PROJECT 3 ($2.3 M)
- EXTENSION OF SOUTH FRONTAGE ROAD FROM FAIROAK AVENUE TO MAIN STREET
- ROUNDABOUT AT MAIN STREET INTERCHANGE
- REMOVAL OF T.H. 10 ACCESS AT SOUTH FAIROAK AVENUE

PROPOSED ROADWAY	PROPERTY ACQUISITION
PROPOSED DRIVEWAY OR SIDEWALK	RALF PROPERTIES (PREVIOUSLY PURCHASED)
PROPOSED C&G / MEDIAN / MEDIAN BARRIER	PROPOSED RIGHT-OF-WAY
PROPOSED SHOULDER	PROPOSED ACCESS CLOSURE XX
PROPOSED TRAIL	
PROPOSED OVERPASS/UNDERPASS	
PREVIOUS PROJECTS	

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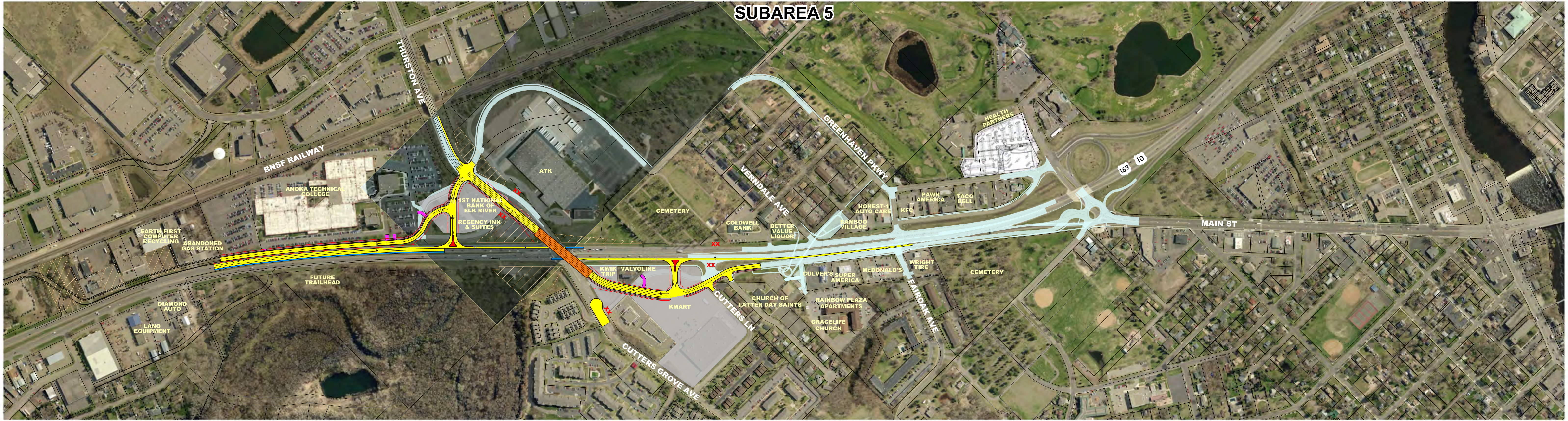
FOR EVALUATION PURPOSES

TH 10 ACCESS PLANNING STUDY
Anoka County, Minnesota

SUBAREA 5



CONCEPT MAP
HIGHWAY 10 BETWEEN THURSTON AVE. AND W. MAIN ST.
CONCEPT 3

PROJECT 1 ($26.2 M)
- NORTH FRONTAGE RD FROM THURSTON AVE TO SUNFISH LAKE BLVD
- CONNECTION OF SOUTH FRONTAGE RD TO NEW THURSTON AVE BRIDGE
- RIGHT-IN/RIGHT-OUT ACCESS TO THURSTON AVE WITH ACCELERATION AND DECELERATION LANES ON T.H. 10
- THURSTON AVE BRIDGE OVER T.H. 10
- REDEVELOP KMART SITE

BOLTON & MENK

100
SCALE IN FEET

PROPOSED ROADWAY	PROPERTY ACQUISITION
PROPOSED DRIVEWAY OR SIDEWALK	RALF PROPERTIES (PREVIOUSLY PURCHASED)
PROPOSED C&G / MEDIAN / MEDIAN BARRIER	PROPOSED RIGHT-OF-WAY
PROPOSED SHOULDER	PROPOSED ACCESS CLOSURE XX
PROPOSED TRAIL	
PROPOSED OVERPASS/UNDERPASS	
PREVIOUS PROJECTS	

DRAFT 2/26/14
FOR EVALUATION PURPOSES

TH 10 ACCESS PLANNING STUDY
Anoka County, Minnesota

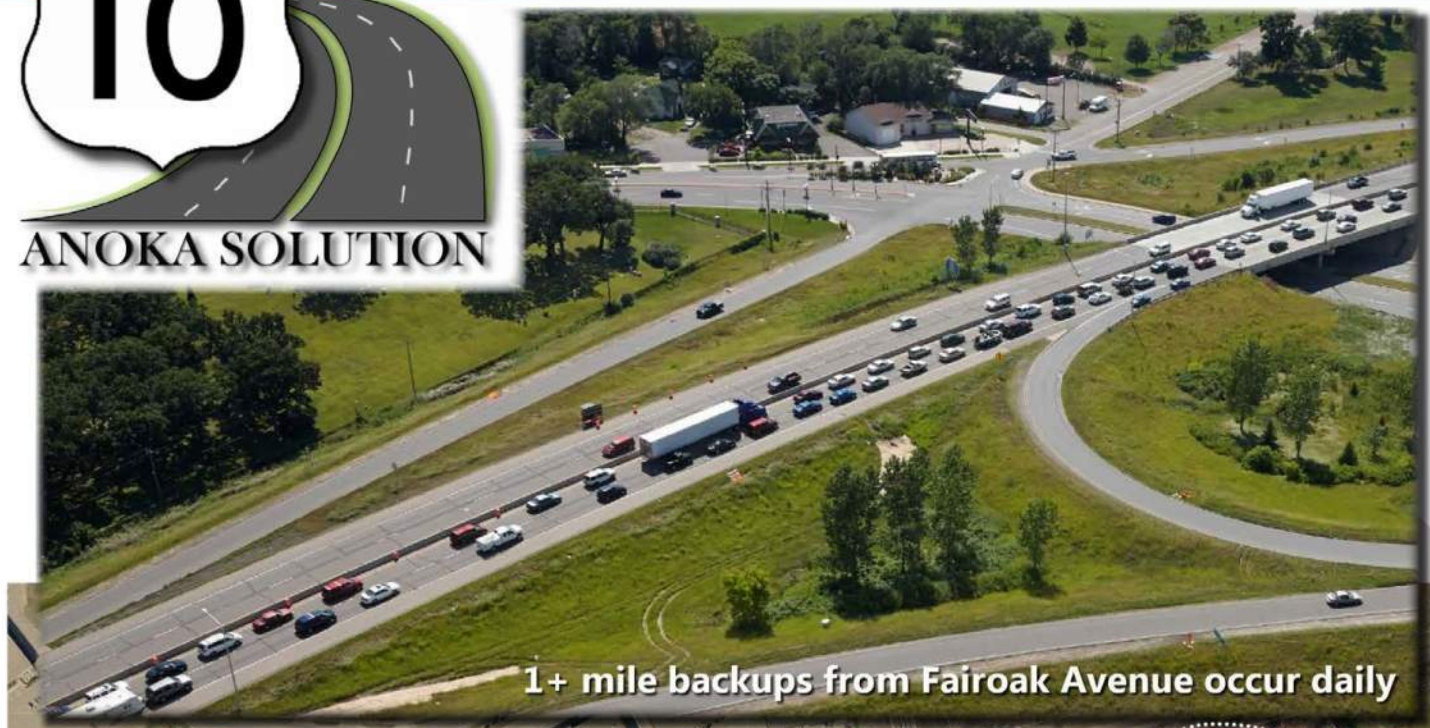
Appendix D

Attachment 2: Anoka Solution Plan

Anoka Solution

ANOKA SOLUTION

ANOKA REAL. CLASSIC.



1+ mile backups from Fairoak Avenue occur daily

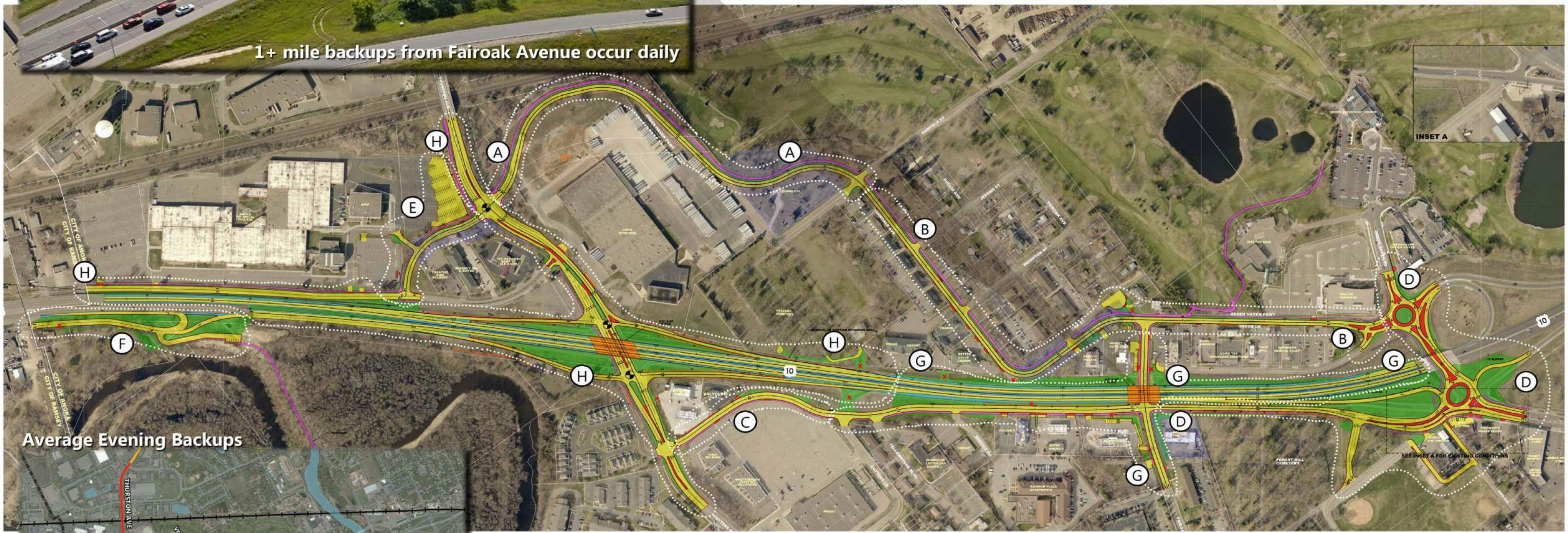
To reduce crashes and improve mobility issues, it is reasonable and responsible to implement lower cost, high benefit measures that incrementally improve safety and operations for all users of the Highway 10 corridor.

Existing Issues

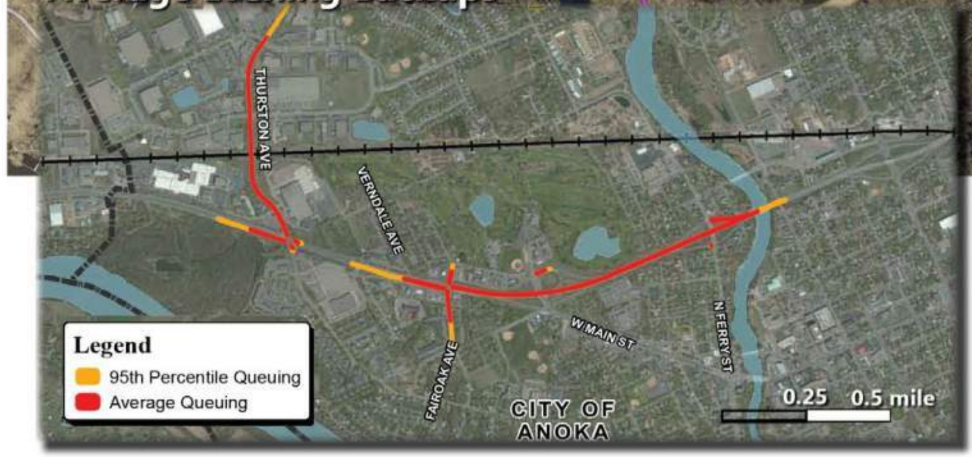
- 50,000-60,000 vehicles per day
- Principal Arterial moves regional freight
- 1+ mile back-ups during peak hour
- 19 mph avg. peak hour speed (60 mph posted)
- 785 crashes in past ten years (4 fatal)
- Crash Rate 3x, Severity Rate 4x (state average)
- Segmented local network forces local highway trips

Investment Results

- **> 75% delay reduction**
- **> 67% crash reduction**
- Local trips on local network
- Safe and efficient movement of goods and services



Average Evening Backups



ROW Acquisition - $5.5M
Project Development - $12.8M
Construction - $60.3M

Total Funding Needed: $78.8M

The City of Anoka is continuing to work closely with MnDOT, Metropolitan Council, Anoka County, and the City of Ramsey to plan, design, and implement <u>fiscally responsible</u> safety and operation improvements to benefit all Highway 10 corridor users.

Anoka Solution

These are high benefit projects that are fiscally responsible

10

ANOKA SOLUTION

Each project is identified as a standalone project which has independent vitality. The City of Anoka is actively furthering the study and outreach for all components of this vision. The city is actively pursuing the necessary right-of-way. Numerous parcels are already in city possession. The City of Anoka is also considering and seeking all potential funding sources. The city looks forward to the continued partnership with MnDOT, Metropolitan Council, Anoka County, and the City of Ramsey to further plan, obtain funding, design, and implement the Anoka Solution.

A. Green Haven Parkway Phase I

- Local trips are forced onto Highway 10 to circulate this area of the community
- Introduces a public connection between Thurston Avenue and Garfield Street
- Allows local trips to circulate between Thurston Avenue and Main Street on the local street network
- The City is in process of reaching agreements on the needed right-of-way

$3.1M / 2016 Estimated Construction

FUNDED

B. Green Haven Parkway Phase II

- Provides a new connection between Verndale Avenue and Fairoak Avenue
- Closes Verndale Avenue access on Highway 10
- Provides bike and pedestrian accommodations
- City is in process of acquiring needed right-of-way

$3.7M / 2017 Estimated Construction

C. South Frontage Road Phase I

- Many travelers cut through the existing private parking lot to circulate
- Provides a public connection from Cutters Grove to the existing frontage road
- Allows public circulation south of Highway 10 between access points

$1.4M

D. South Frontage Road Phase II

- Today, there is no local connection between Fairoak and Main Street to the south of Highway 10
- Provides a new local connection from Fairoak to Main Street
- Reconfigures the Main Avenue interchange intersections to roundabouts
- Ties Highway 10 commercial properties to Downtown Anoka

$8.0M

E. Green Haven Parkway Phase III

- Provides a new local street connection tying into existing frontage road
- Removal of All-Way-Stop near Highway 10 signal causing operational issues
- Pulls primary intersection away from Highway 10
- Provides significant improvements for mobility along Thurston Avenue, a major collector roadway within the city

$3.6M

F. Riverdale Drive Extension

- Provides south side frontage to Highway 10
- Ties in with City of Ramsey's plans
- Eliminates numerous access points from Highway 10
- Provides an auxiliary lane to Thurston Avenue

$1.8M

G. Fairoak Avenue Signal Removal

- This intersection causes the most delay/safety issues in the region
- Removes the signal at the root of many of the problems in this segment
- Closes the Fairoak Access on Highway 10
- Provides local street underpass / community connectivity
- Elevates Highway 10 fourteen feet and lowers Fairoak Avenue eight feet
- Safe bike/pedestrian crossings of Highway 10

$25.3M

H. Thurston Avenue Signal Removal

- This intersection causes the 2nd most delay/safety issues in the region
- Removes the signal at the root of many of the problems in this segment
- Provides grade separation with access
- Includes shifting Highway 10 south to allow for frontage road extension into Ramsey
- Elevates Highway 10 twenty feet and lowers Thurston Avenue two feet

$31.9M

Appendix D

Attachment 3: Green Haven Parkway Concept Development

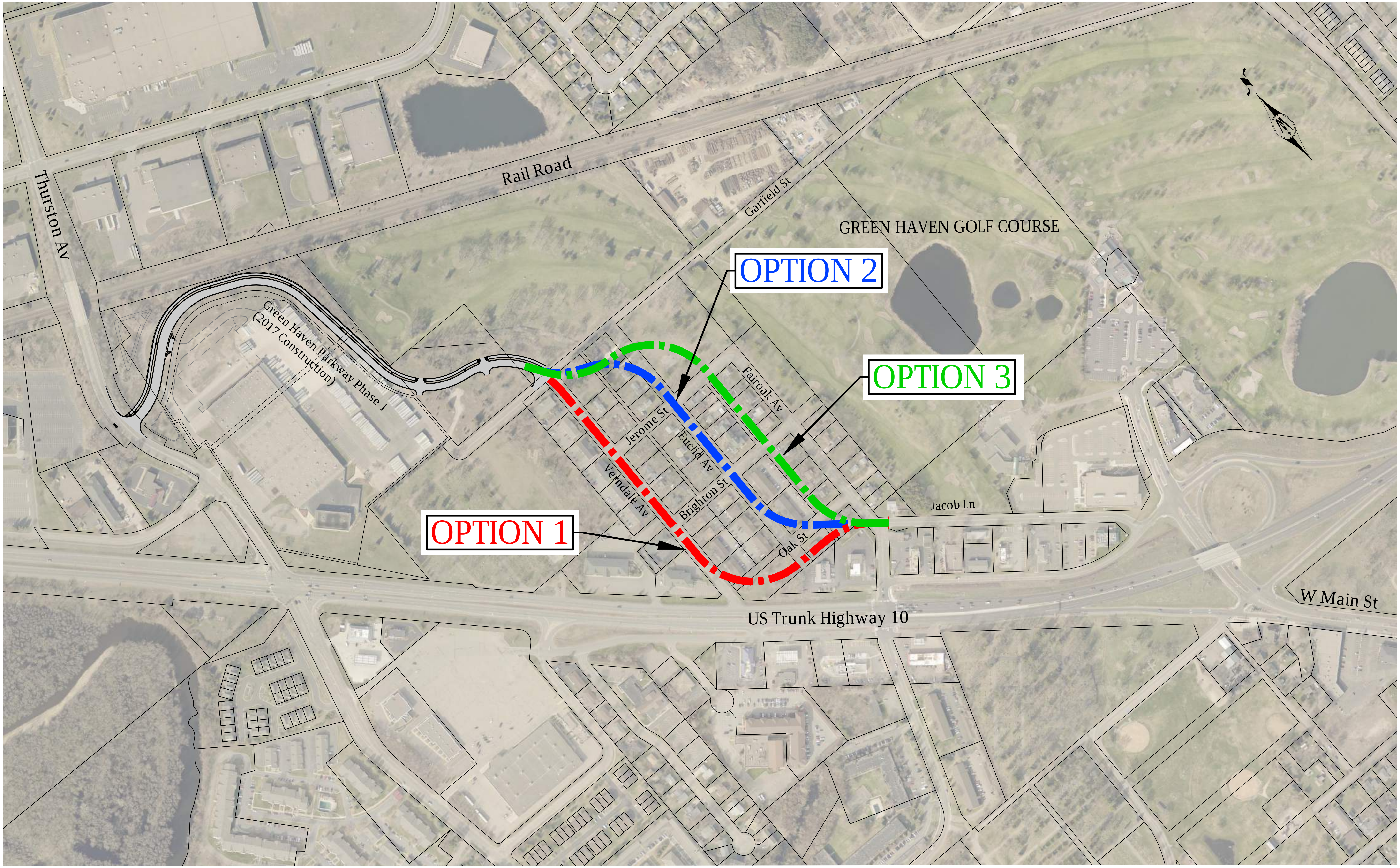
a. Greens of Anoka Redevelopment Master Plan Map

b. Revised alignment for Green Haven Parkway

Redevelopment Master Plan Summary:

Villas	8	
Twin Homes	34	
Townhomes	125	
Apartment / Condominium	96	
Senior Housing	226	
TOTAL:	489	Units +/-
Commercial / Retail	52,500	
Medical Office	50,000	
TOTAL:	102,500	Sq. Ft. +/-

Redevelopment Master Plan - Figure 6.1



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ANOKA
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2035 COUNTY ROAD D EAST
MAPLEWOOD, MINNESOTA 55109
Phone: (651) 704-9970
Email: Maplewood@bolton-menk.com
www.bolton-menk.com

ANOKA, MINNESOTA

GREEN HAVEN PARKWAY PHASE 2

OPTION SUMMARY

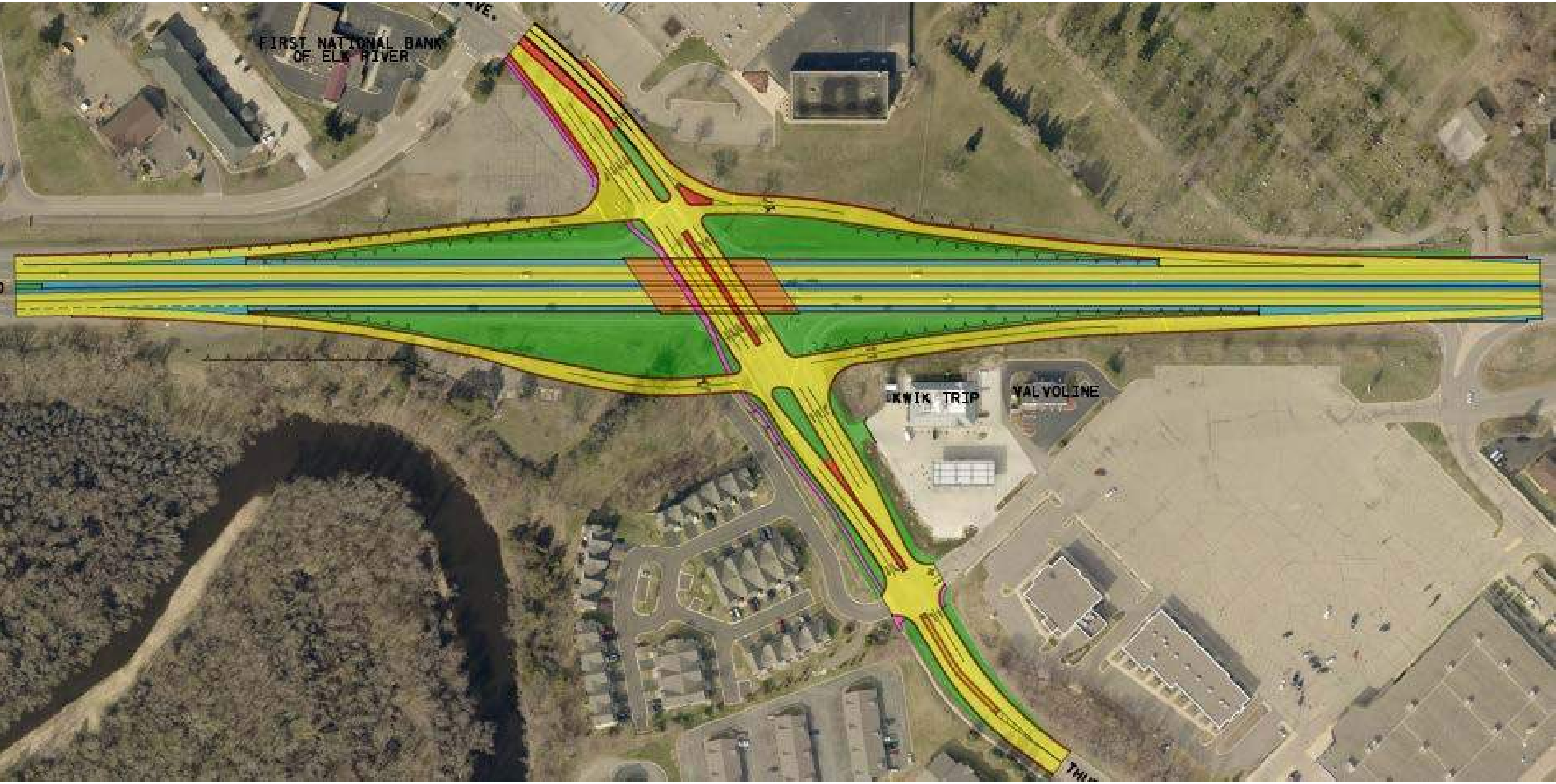
SHEET
OPT SUM

Appendix D

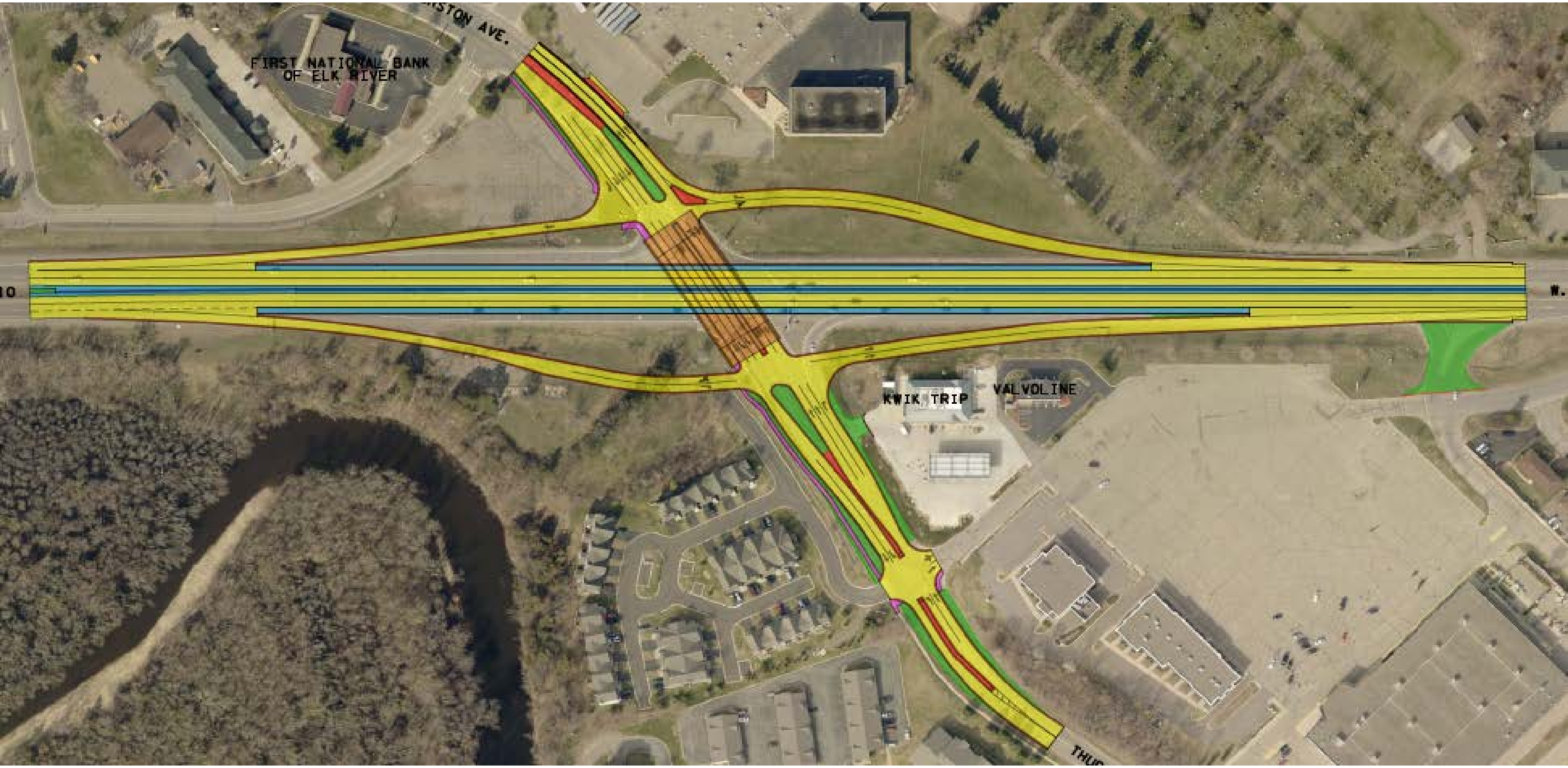
Attachment 4: Hwy 10/169 and Thurston Ave/Cutters Grove Ave Interchange Planning Documentation

Thurston Interchange Concepts

Concept A – Tight Diamond

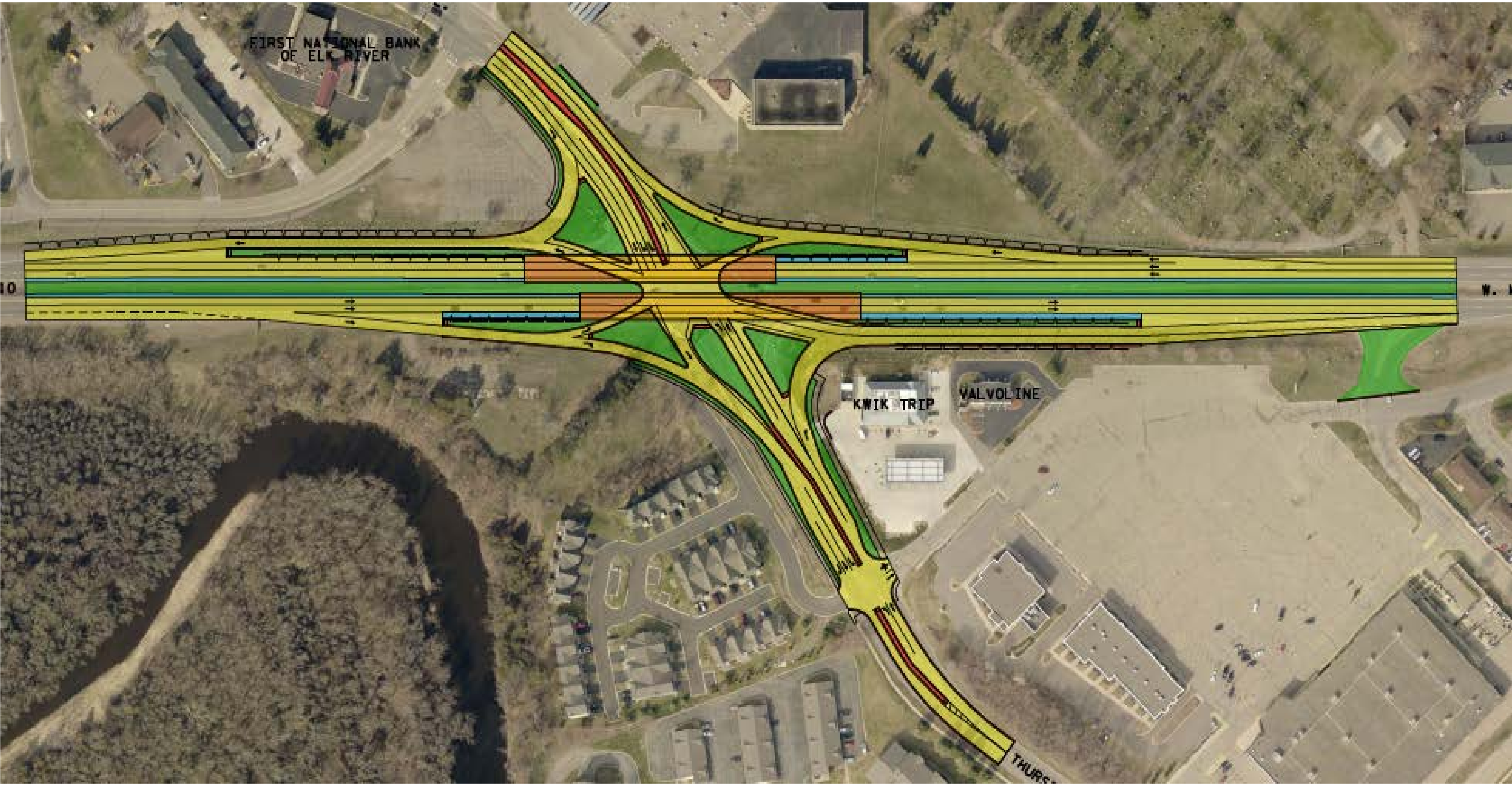


Thurston Interchange Concepts
Concept B – Tight Diamond



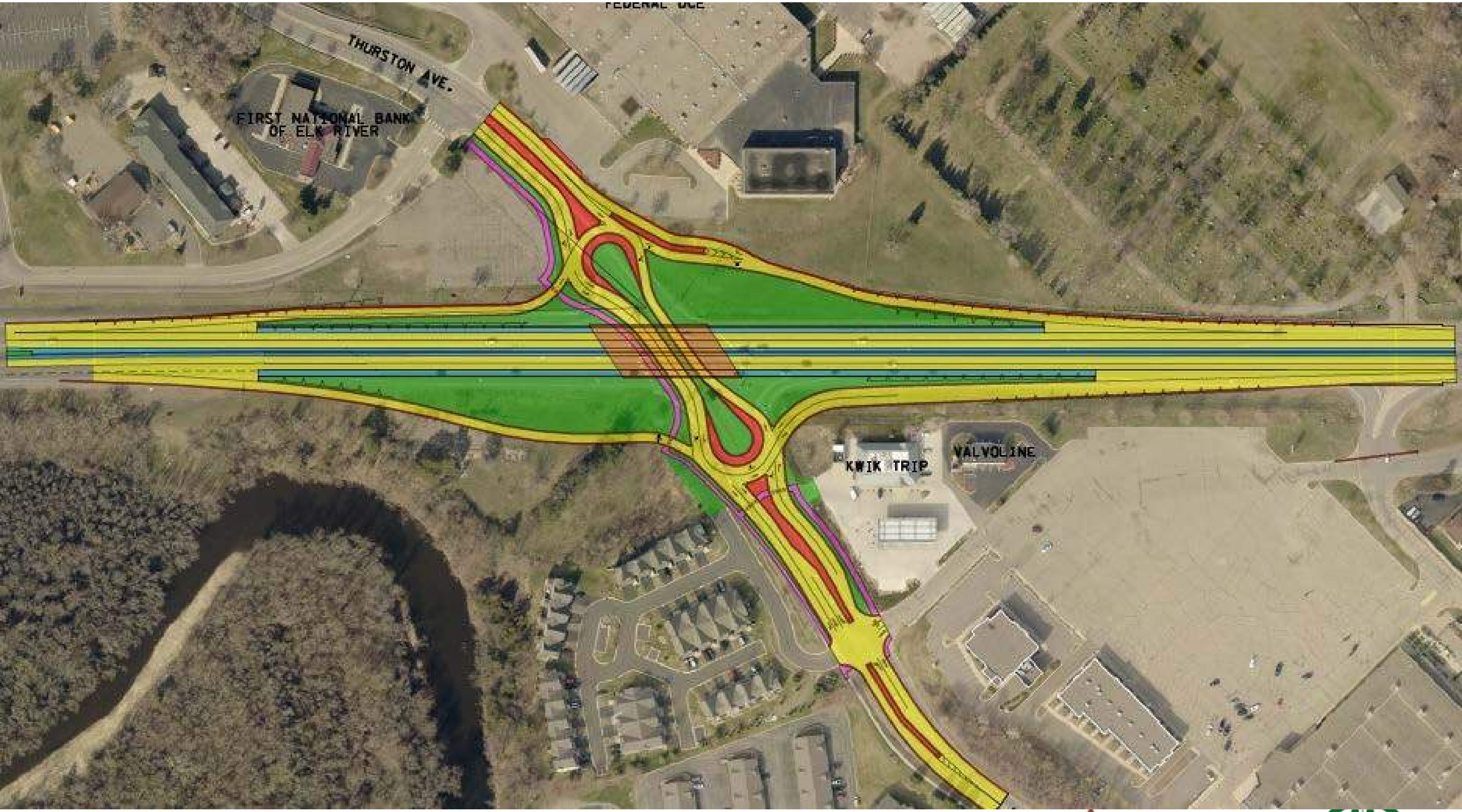
Thurston Interchange Concepts

Concept C – SPUI



Thurston Interchange Concepts

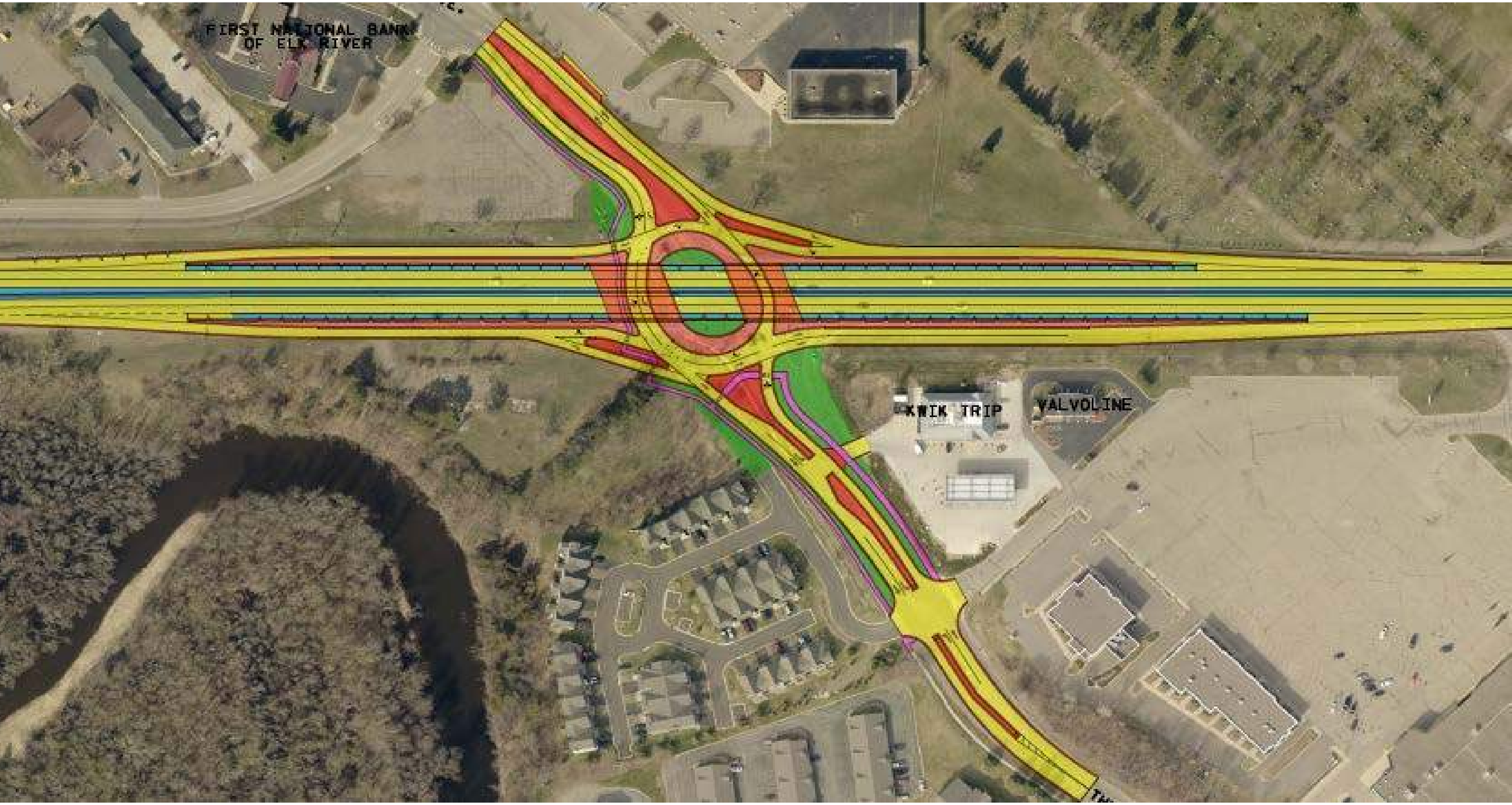
Concept D – Bow Tie / Snake Eyes



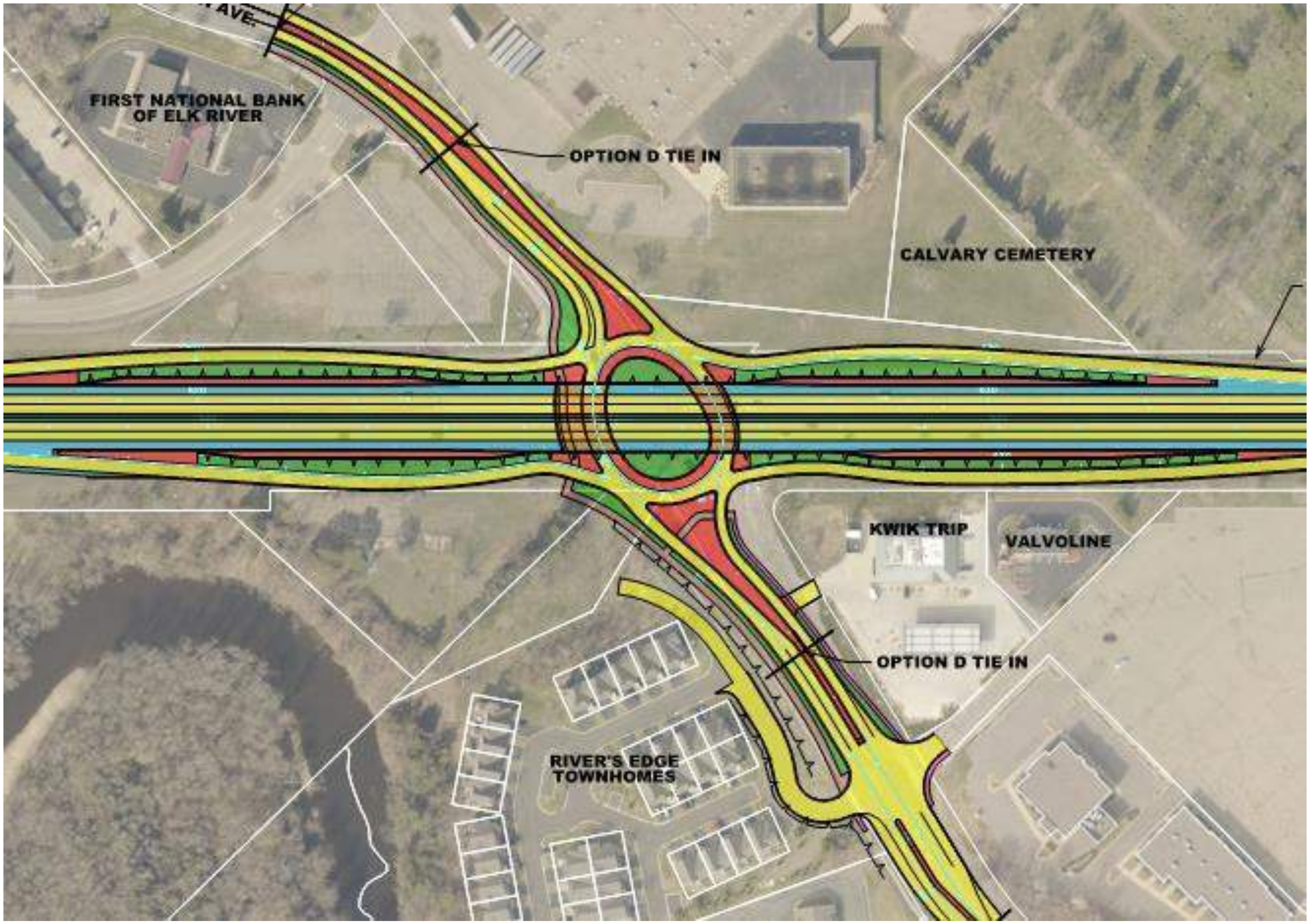
ANOKA REAL. CLASSIC.

mn DEPARTMENT OF TRANSPORTATION

Thurston Interchange Concepts
Concept E – Grade Separated Roundabout



Thurston Interchange Concepts
Concept F – Grade Separated Roundabout
(Thurston over Highway 10)



Thurston Concept Evaluation

Evaluation Matrix

TH 10 Reconstruction

DRAFT - December 2017

TH 10 at Thurston Ave											
Performance Measure		Grade Separated Roundabout		Bow-Tie Roundabout		SPUI		Tight Diamond (TH 10 Over)**		Tight Diamond (Thurston Over)**	
Vehicle Delay at WB Ramps (sec/veh)	AM	1	A	1	A	5	A	5	A	5	A
	PM	1	A	1	A	6	A	6	A	6	A
Vehicle Delay at EB Ramps (sec/veh)	AM	8	A	9	A	7	A	7	A	7	A
	PM	9	A	9	A	8	A	8	A	8	A
Total Interchange Delay (veh-min)	AM	398		455		386		455		455	
	PM	430		514		592		845		845	
Conflict Points	Total	20		22		20		37		37	
	Diverge	7		8		4		9		9	
	Merge	6		7		5		7		7	
	Crossing	7		7		11		21		21	
Warrant Met?		Signal & AWS*		No		Signal*		No		No	
R/W Acreage Needed		0.451		0.833		-		1.289		0.683	
Temporary Easement Acreage Needed		0.348		0.510		-		1.032		0.515	
Total Cost		$17.5-$19.5M		$18.5-$20.5M		-		$19-$21M		$21.5-$23.5M	

* Major movement assumed to be SB and WB

** Results shown as signalized intersections. Modeling as two-way stop controlled showed significant delay for left turns off ramp in PM peak period.

Appendix D

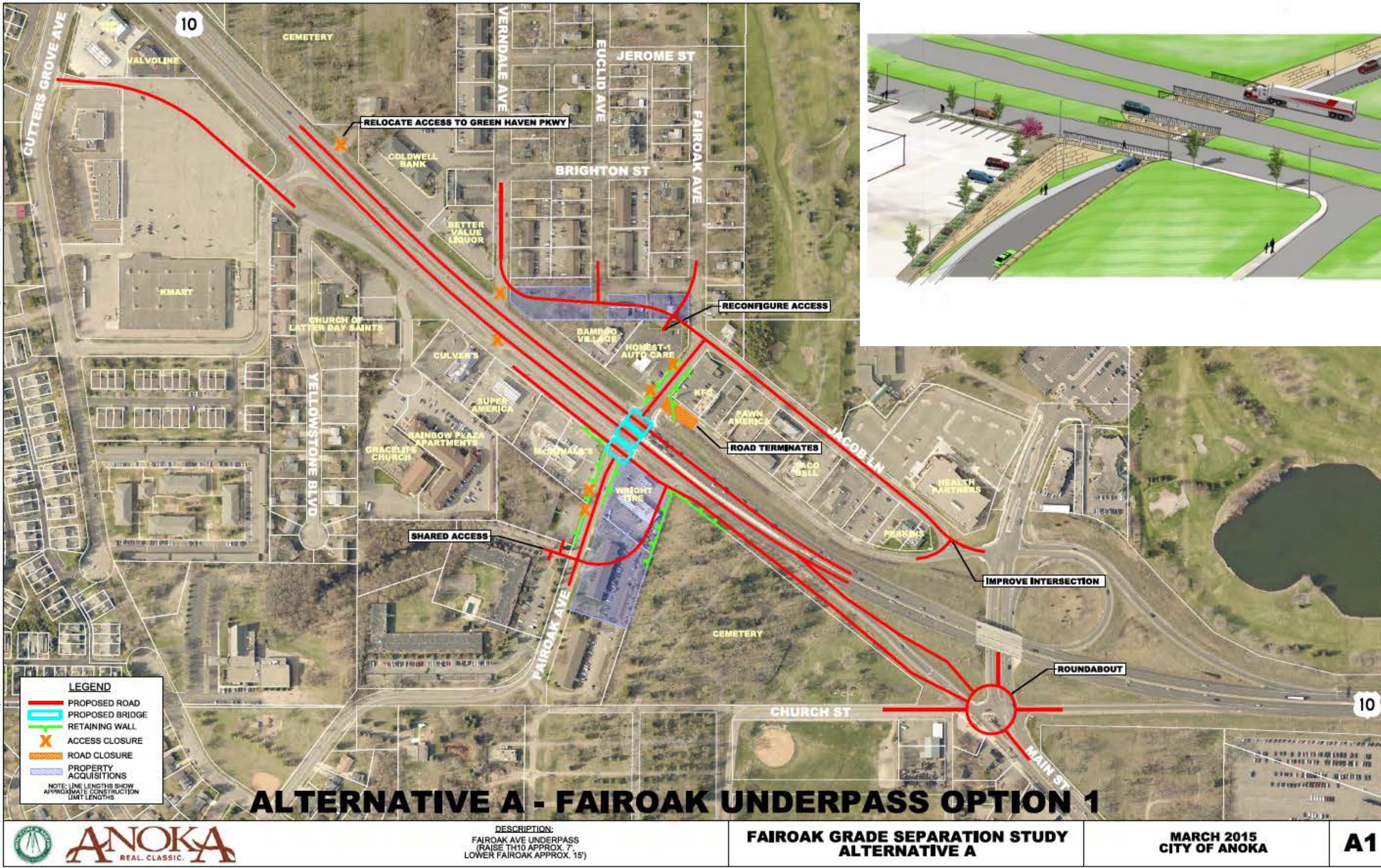
Attachment 5 Hwy 10/169 and Fairoak Ave Interchange Planning Documentation

Fairoak Avenue Grade Separation

2015 Study

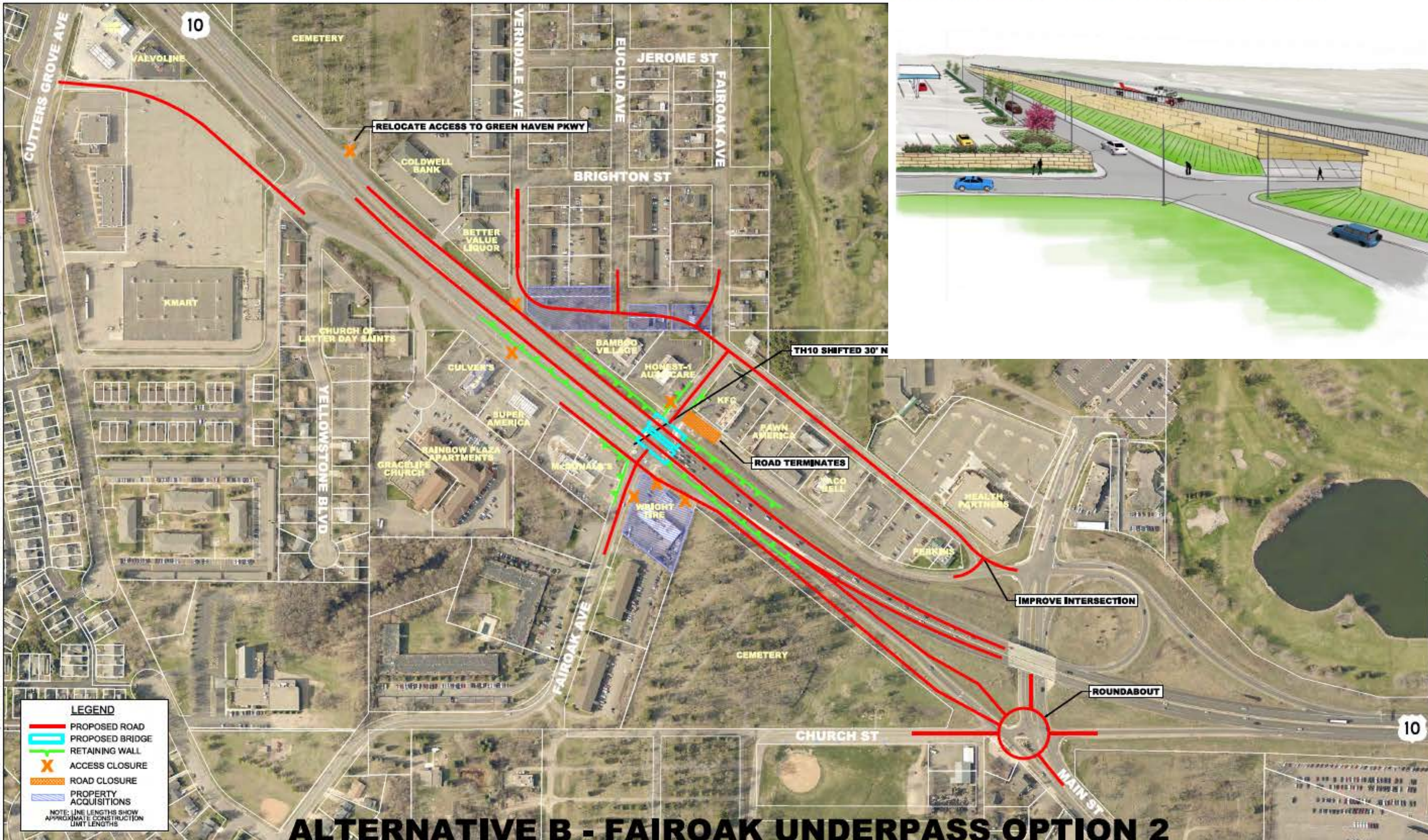
Fairoak Grade Separation Study

Alternative A



Fairoak Grade Separation Study

Alternative B



ANOKA REAL. CLASSIC.

DESCRIPTION:
FAIROAK AVE UNDERPASS
(RAISE TH10 APPROX. 15',
LOWER FAIROAK APPROX. 7',
REALIGN TH10 30' NE)

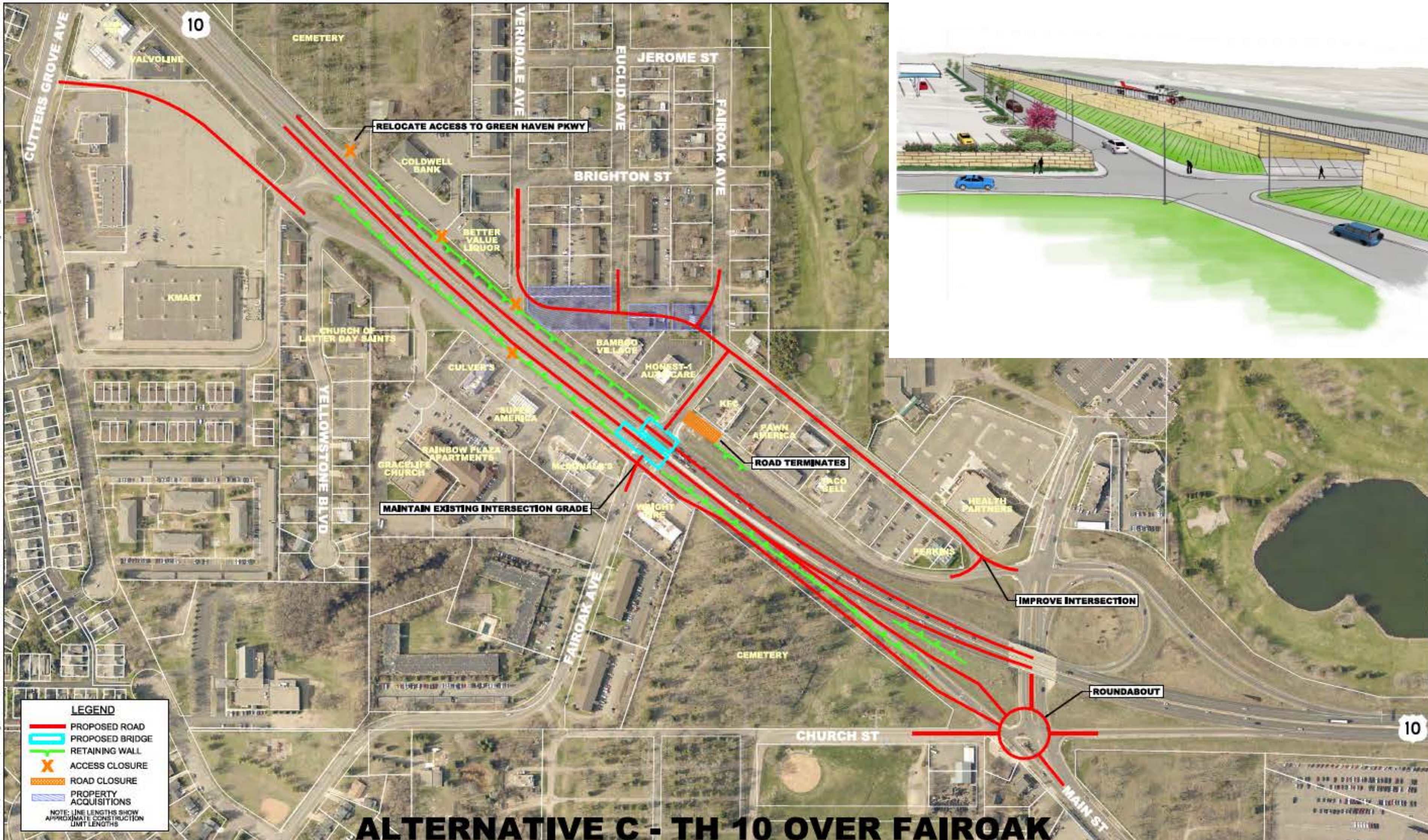
FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE B

MARCH 2015
CITY OF ANOKA

B1

Fairoak Grade Separation Study

Alternative C



ANOKA REAL. CLASSIC.

DESCRIPTION:
FAIROAK AVE UNDERPASS (RAISE TH10 APPROX. 22')

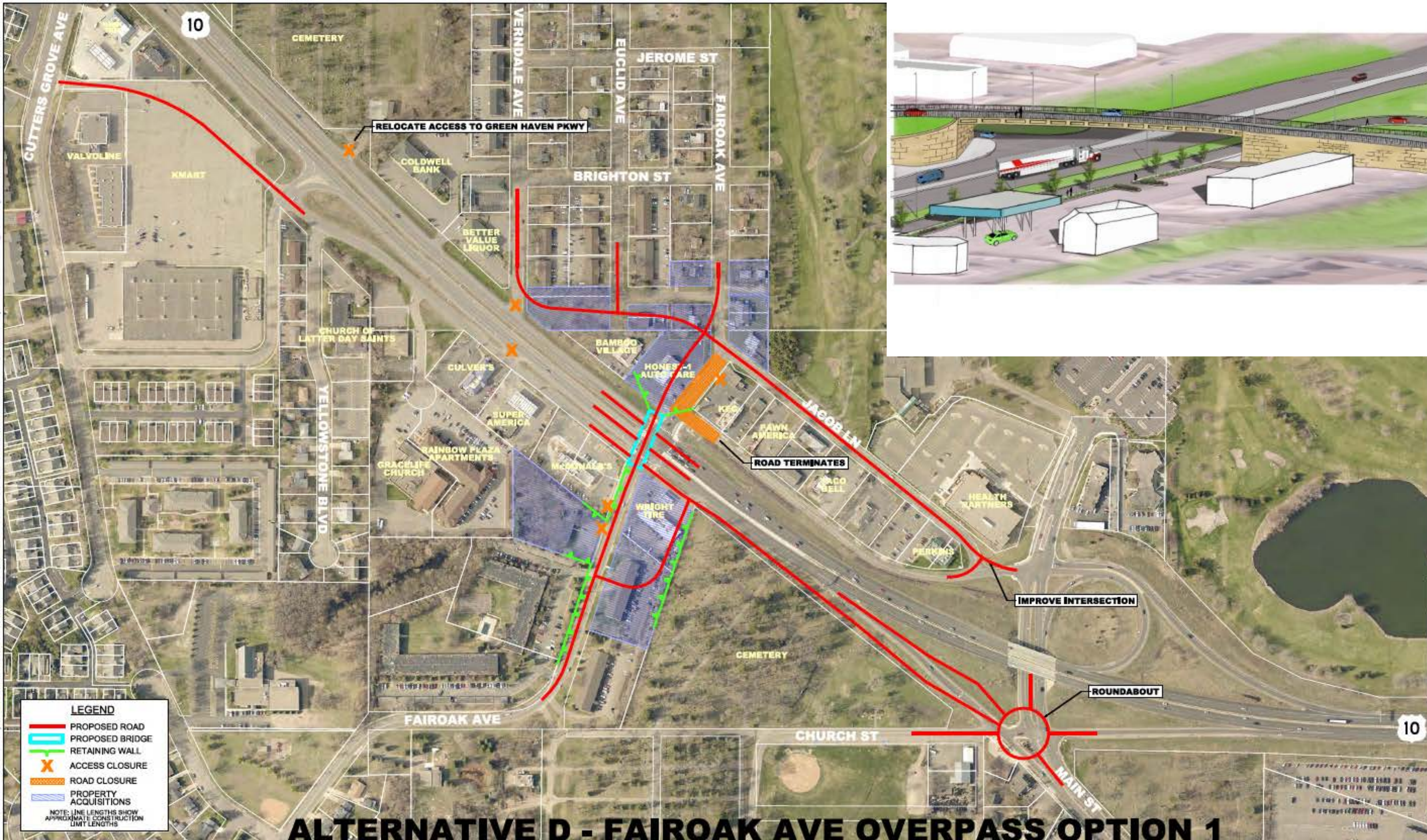
FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE C

MARCH 2015
CITY OF ANOKA

C1

Fairoak Grade Separation Study

Alternative D

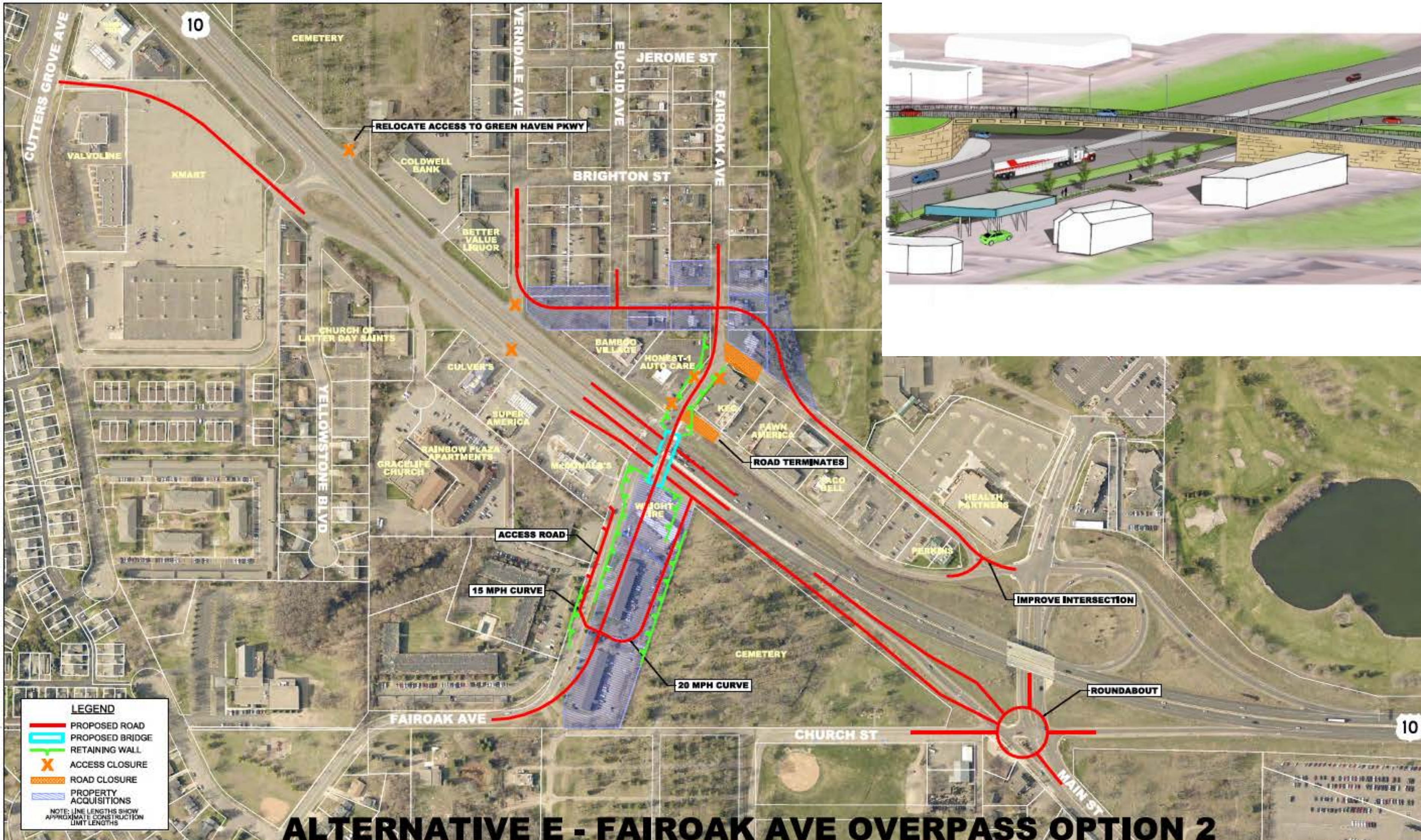


ANOKA REAL. CLASSIC.

DESCRIPTION: FAIROAK AVE OVERPASS (RAISE FAIROAK AVE APPROX. 22')	FAIROAK GRADE SEPARATION STUDY ALTERNATIVE D	MARCH 2015 CITY OF ANOKA	D1

Fairoak Grade Separation Study

Alternative E



ANOKA REAL. CLASSIC.

DESCRIPTION:
FAIROAK AVE OVERPASS
(RAISE FAIROAK AVE APPROX. 22')
★ REFERENCE ALTERNATIVE D PROFILES

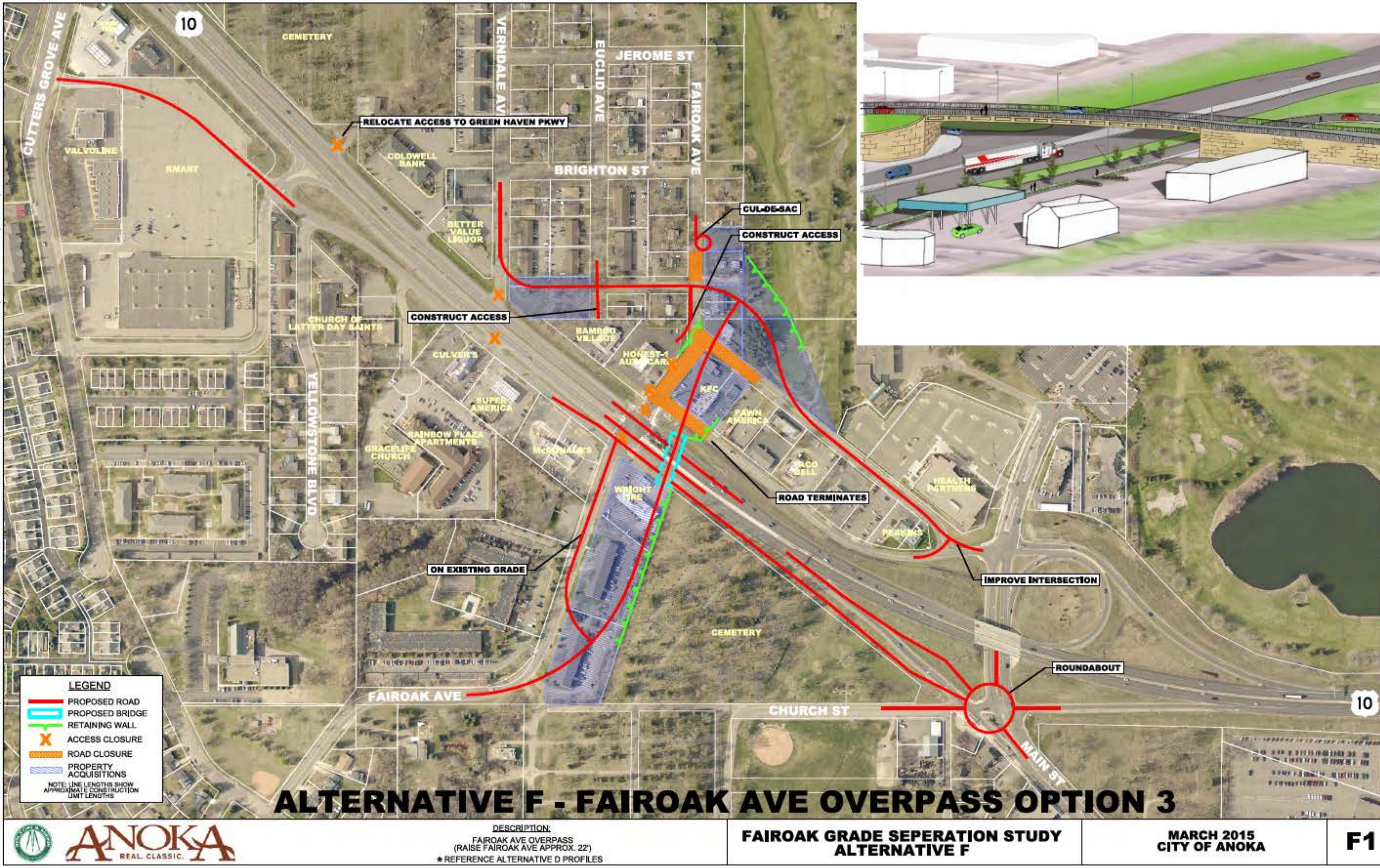
FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE E

MARCH 2015
CITY OF ANOKA

E1

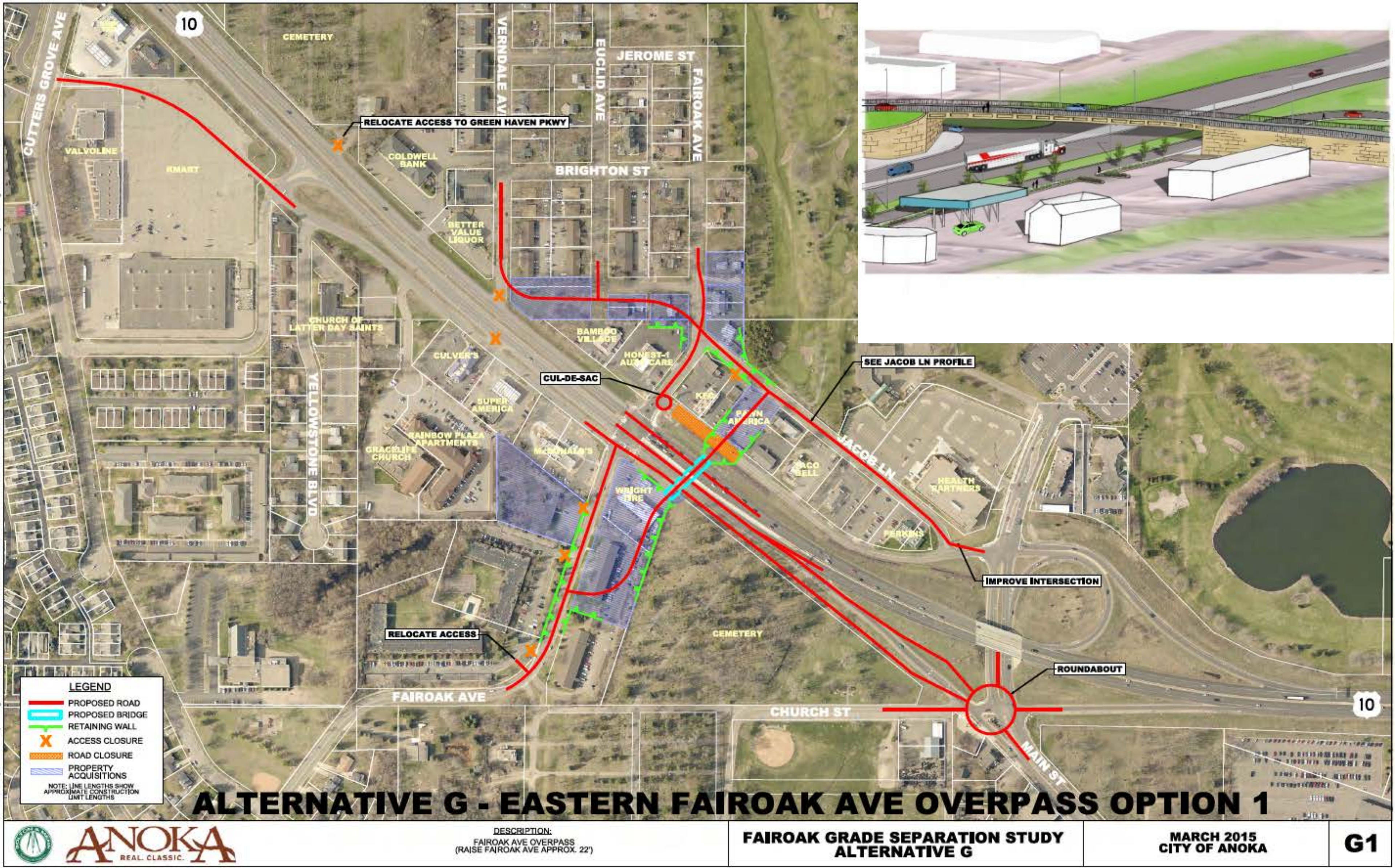
Fairoak Grade Separation Study

Alternative F



Fairoak Grade Separation Study

Alternative G

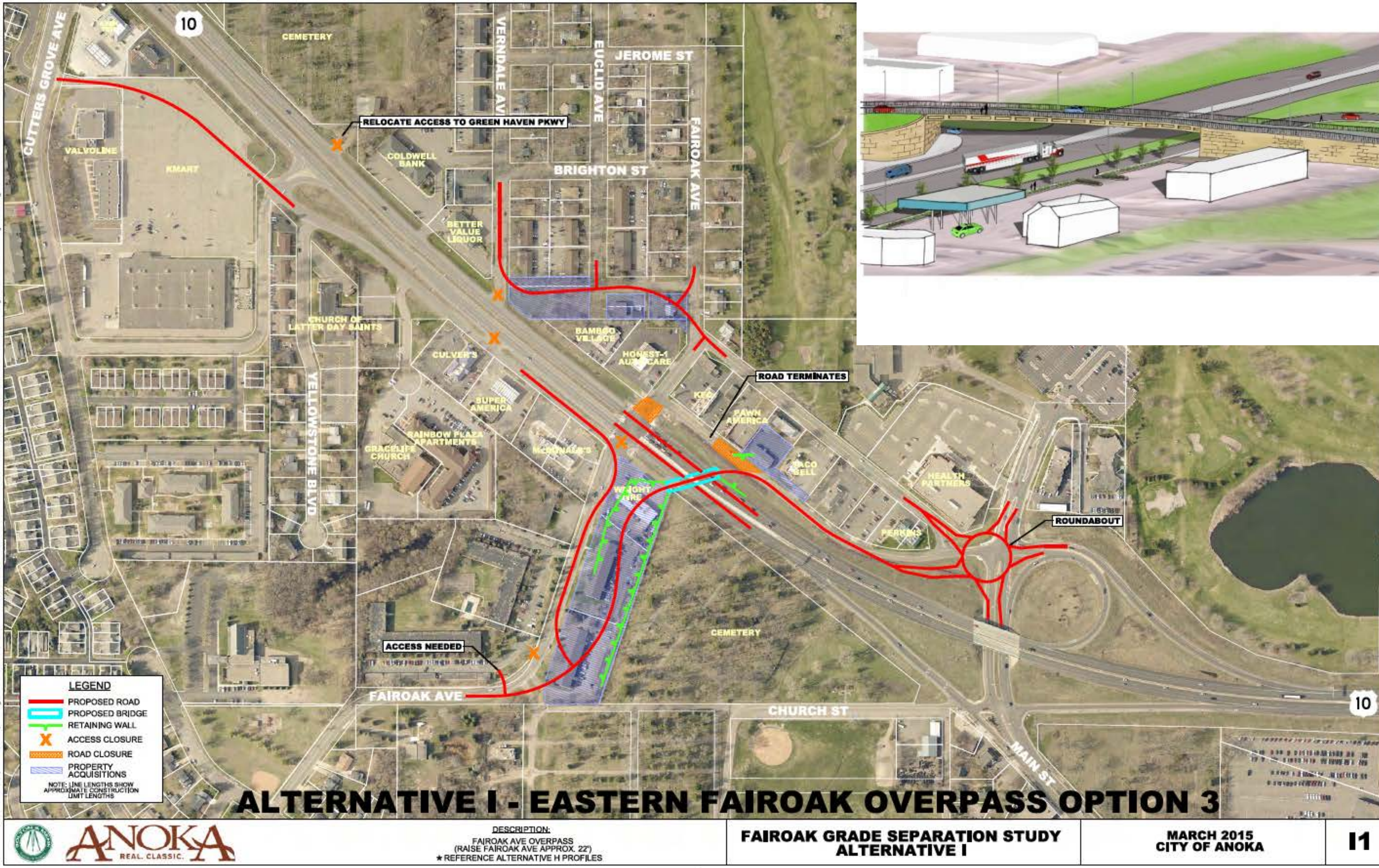


Fairoak Grade Separation Study

Alternative H

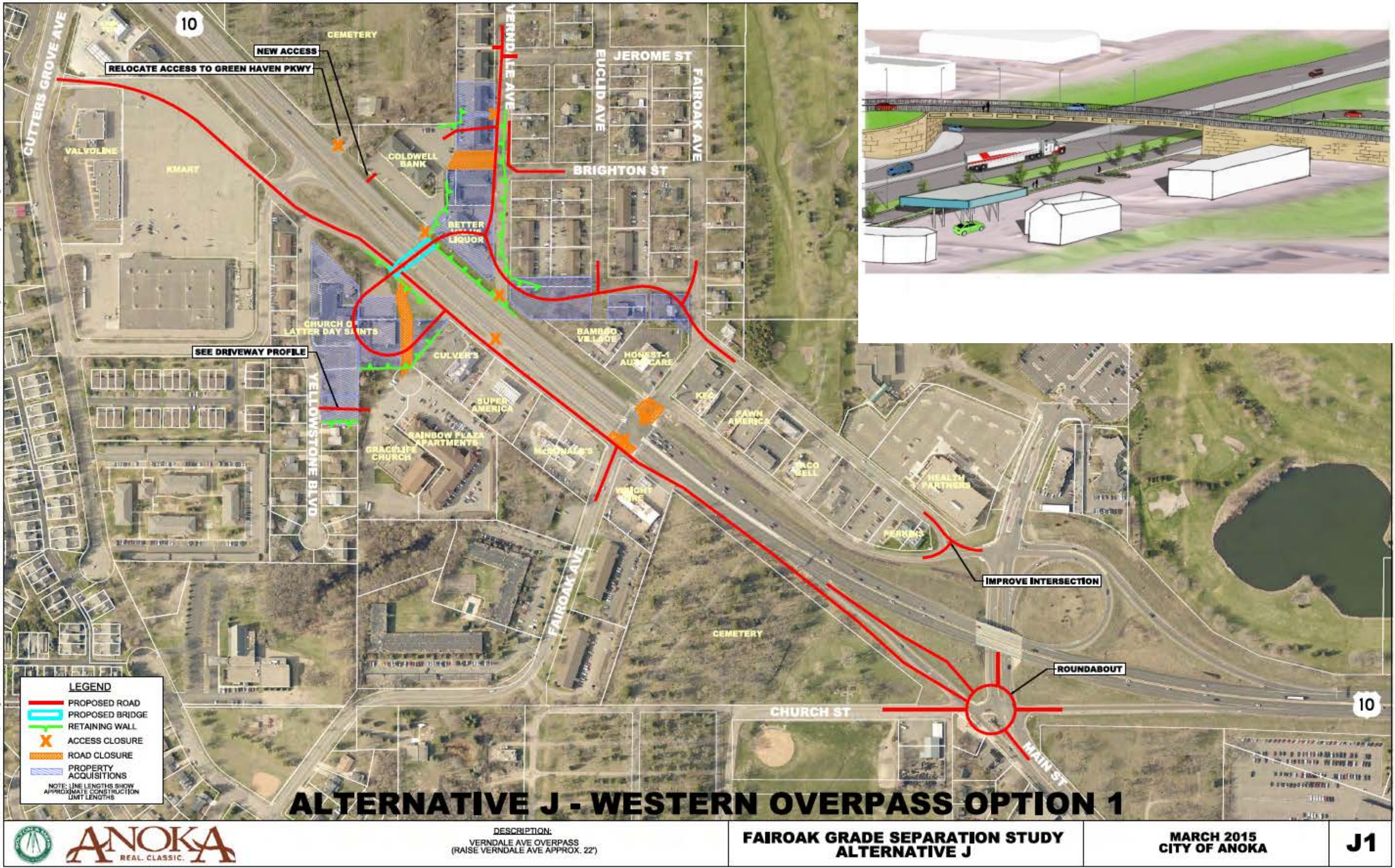
Fairoak Grade Separation Study

Alternative I



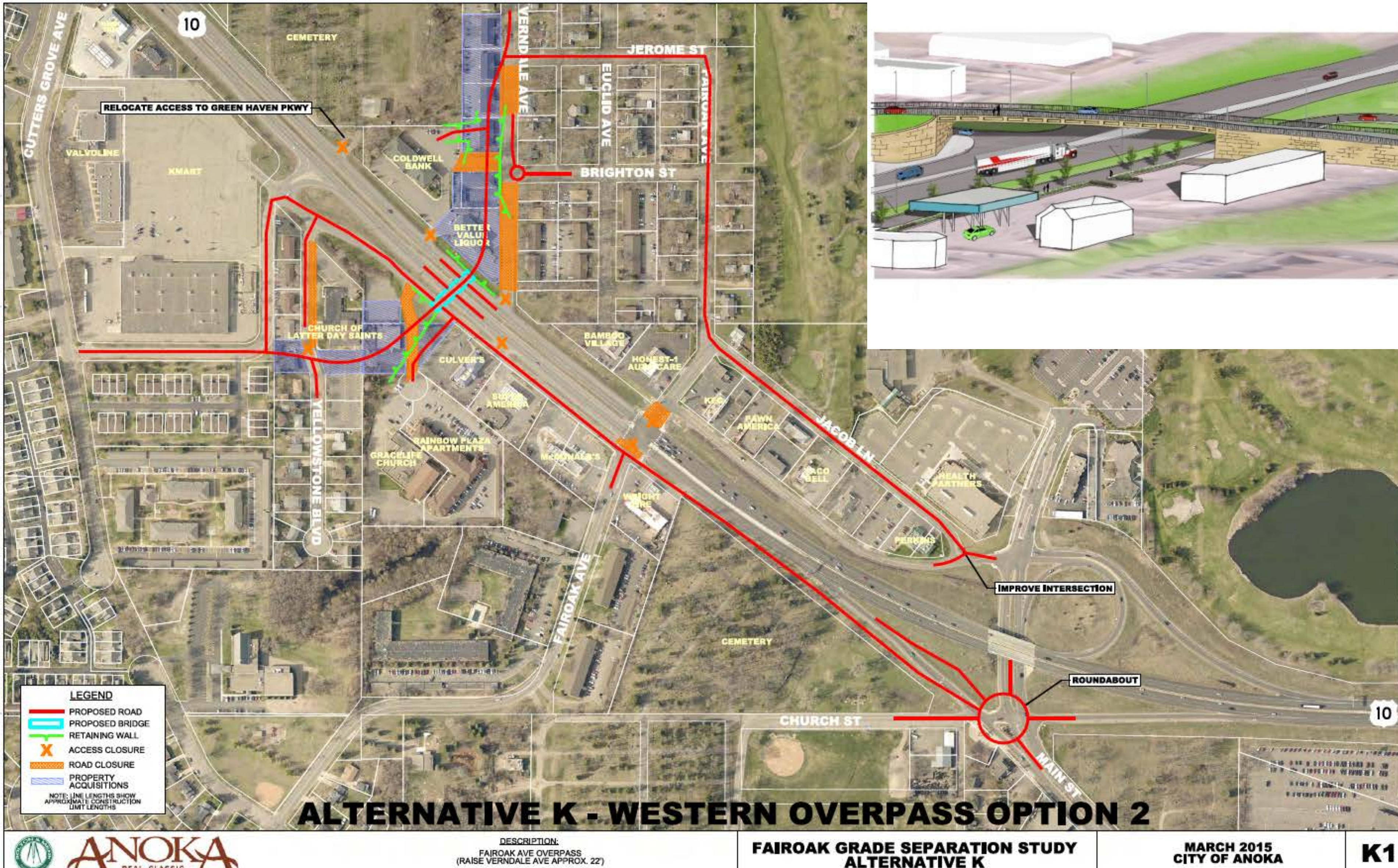
Fairoak Grade Separation Study

Alternative J



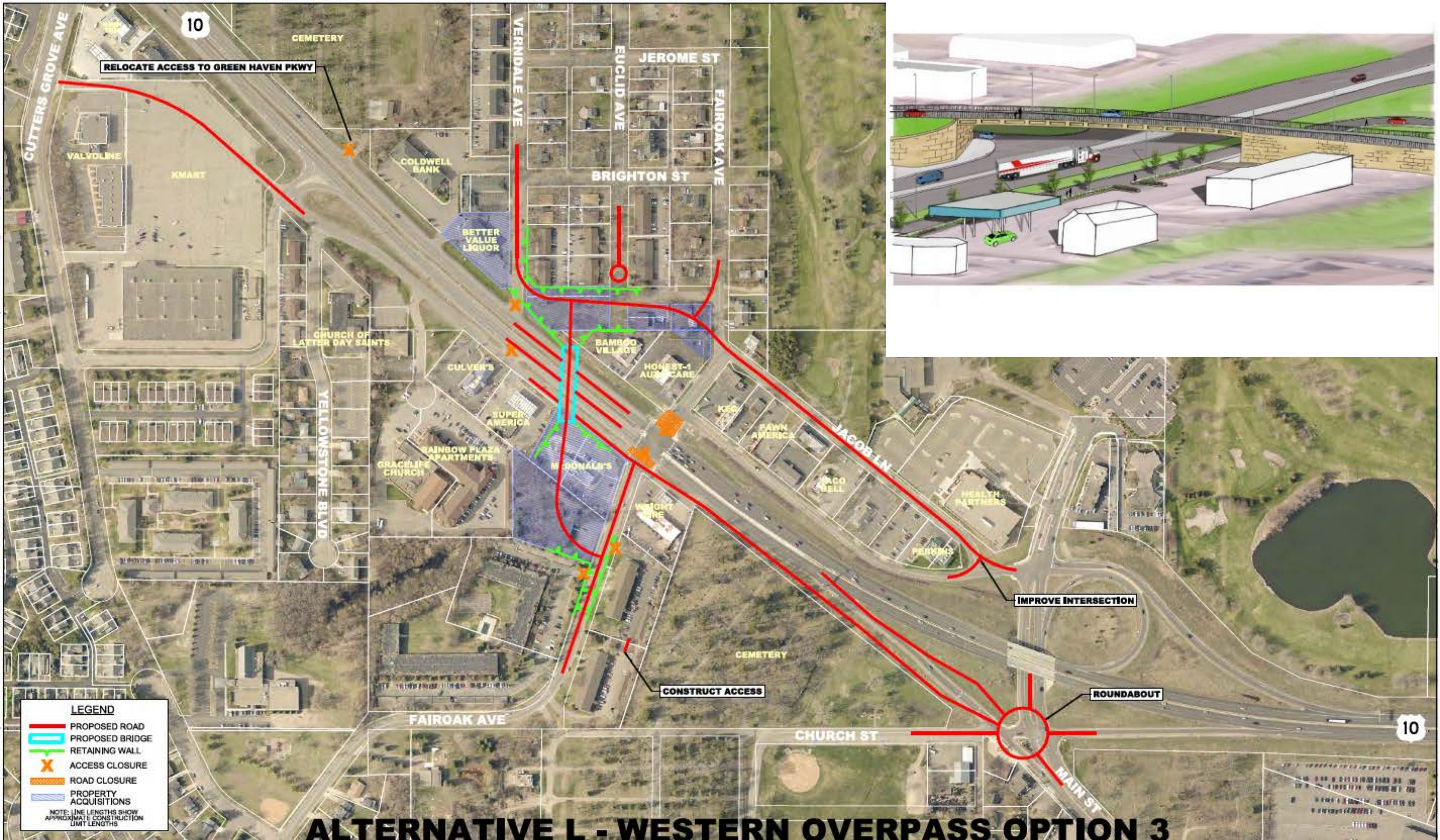
Fairoak Grade Separation Study

Alternative K



Fairoak Grade Separation Study

Alternative L



ANOKA REAL. CLASSIC.

DESCRIPTION:
FAIROAK AVE OVERPASS
(RAISE VERNDALE AVE APPROX. 22')

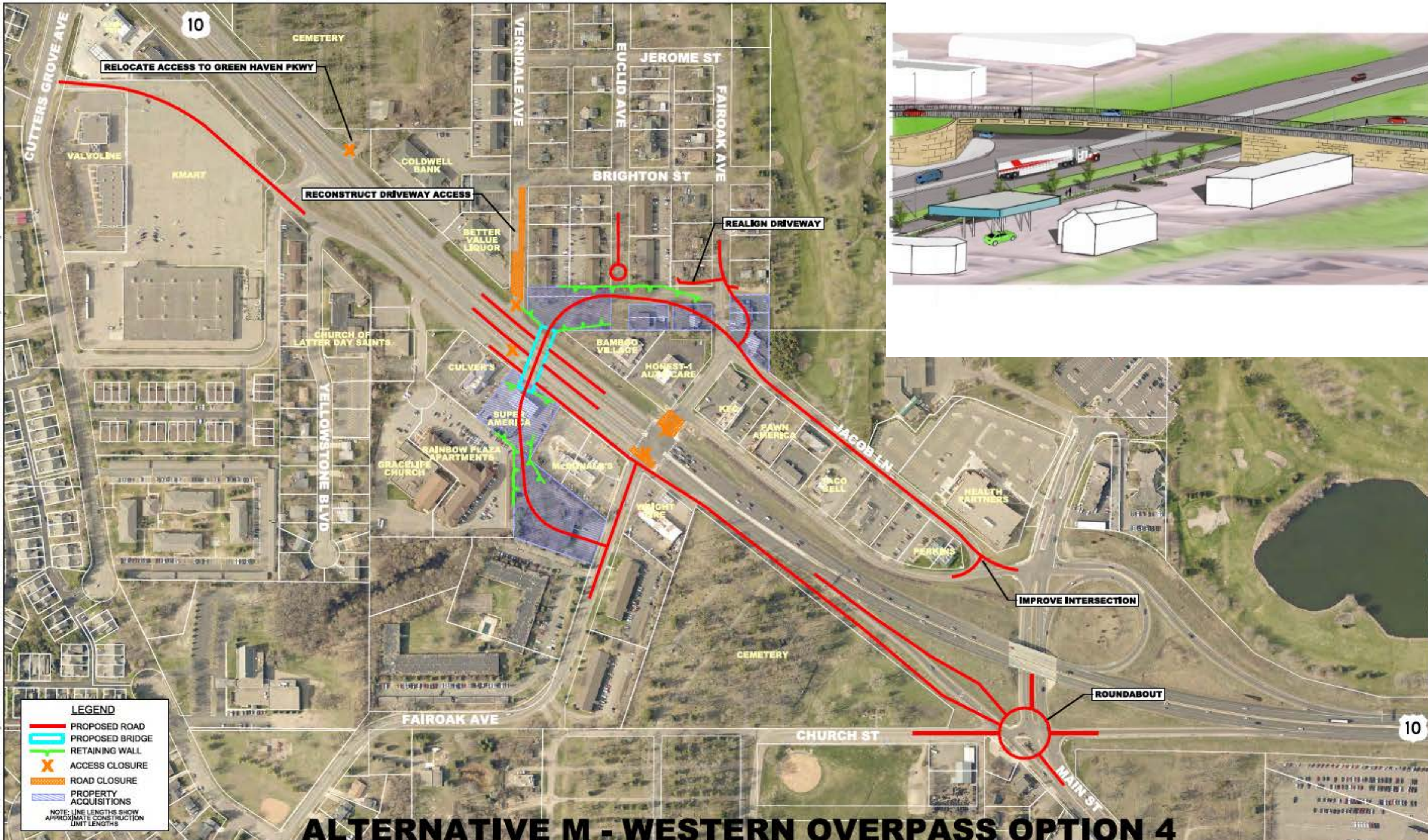
FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE L

MARCH 2015
CITY OF ANOKA

L1

Fairoak Grade Separation Study

Alternative M



ANOKA REAL. CLASSIC.

DESCRIPTION:
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(RAISE JACOB LN APPROX. 22')

FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE M

MARCH 2015
CITY OF ANOKA

M1

Anoka Solution
Highway 10/169 Improvements
City of Anoka, Minnesota ***(July 20, 2017)***

Fairoak Ave. Area Concept Development Overview

Highway 10 Access Planning Study

- Fairoak Ave Area improvements were the top, regional priority identified in the 2014 *Highway 10 Access Planning Study*, which was led by MnDOT, in partnership with Anoka County, City of Ramsey, City of Anoka, and Met Council. The corridor studied extended from the Sherburne/Anoka County line to Rum River. The Study's implementation plan included staged improvements at Fairoak Ave; see ***Figures 1*** and ***2***. The final vision for Fairoak Ave was closing access to Highway 10.

Figure 1*. Stage I: Fairoak Ave traffic signal removal, construction of a reduced conflict intersection at Fairoak Avenue, a frontage road from Cutters Grove to Fairoak Ave, and a pedestrian overpass near Verndale Avenue. Source: Highway 10 Access Planning Study, Fairoak Traffic Signal Removal, p. 81)*

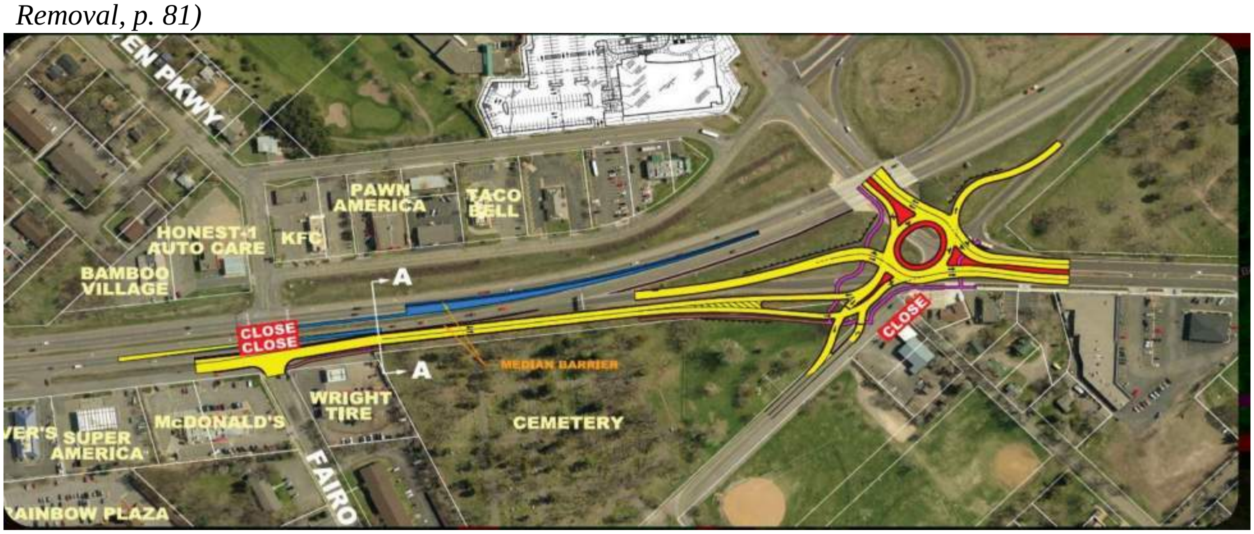


Figure 2*. Stage II: Closure of intersection at Highway 10 and Fairoak, to correspond with frontage road from Fairoak Ave to Main St. Source: Highway 10 Access Planning Study, South Frontage Road (Fairoak Ave to Main St), p. 86.*

- Study recommendations were broadly supported by partner agencies who were involved. MnDOT and the Metropolitan Council provided letters in support for the Study. The City and Anoka County passed resolutions generally endorsing the study findings and recommendations. The City's resolution is included with this memo as ***Attachment 1***.

Anoka Solution

- While the City generally supported the findings, the resolution did document concerns regarding some Study recommendations (see ***Attachment 1***). City representatives expressed concern that closing Fairoak Ave access across Highway 10 would sever the existing connection between the north and south sides of the highway.
- The City wanted to study options to maintain the north-south connectivity of Fairoak Ave. Reasoning for this decision is included in ***Attachment 2***, *Update on TH 10 Related Items, Council Work Session, City of Anoka* (March 16, 2015).
- In 2015, the City developed thirteen options for maintaining the north-south connectivity of Fairoak Ave, while also removing the existing traffic signal on Highway 10. The options, A through M, are documented in ***Attachment 3***, Council Worksession Memo (March 16, 2015).These options included variations on the general concepts listed below:
    - Underpass of Highway 10 at Fairoak Ave
    - Overpass of Highway 10 at Fairoak Ave
    - Eastern Overpass of Highway 10 at Fairoak Ave
    - Western Overpass of Highway 10 at Fairoak Ave
- The City ultimately selected Fairoak Underpass Option 2, shown in ***Figure 3***. An evaluation matrix comparing the geometrics and impacts that could be anticipated from each of the thirteen Fairoak Avenue options is included in ***Attachment 4***. The matrix shows that Option B, Fairoak Underpass 2, would meet the community's desire for Fairoak Ave route connectivity, while requiring less elevation of Highway 10, compared to other options.

Figure 3. *Recommended Fairoak Ave crossing of Highway. 10; one of 13 potential connections considered by City in 2015. Source Council Worksession Memo (March 16, 2015), in* ***Attachment 3****).*

- In July 2015, the City adopted the Anoka Solution Plan for Highway 10 through resolution see ***Attachment 5***). The Anoka Solution, shown in ***Figure 4***, includes eight distinct projects – each with independent utility – that could be built separately and all be competitive for various funding opportunities.

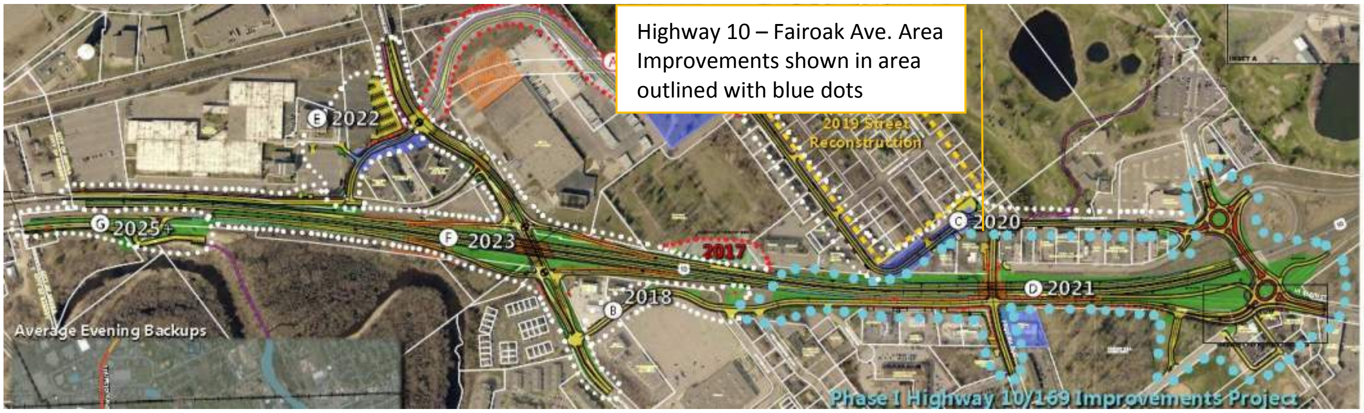


Figure 4*. Anoka Solution approved by the City through resolution in July 2015; Highway 10 – Fairoak Ave Area improvements shown in blue dotted outline*

- Fairoak Avenue area improvements included in the Anoka Solution reflect the Fairoak Ave underpass concept that maintains the existing north-south connection provided by Fairoak Avenue while still maintaining benefits to TH 10 with removing the traffic signal.

Since Adoption of Anoka Solution Plan

- In June 2015, the City of Anoka met with MnDOT and Anoka County to review concept development/refinement efforts the City had undertaken on Fairoak Ave at Highway 10 since completion of the *Highway 10 Access Planning Study*.
- In June 2016, the City Council prioritized regional improvements and dedicated $2M towards Fairoak Area improvements, thus taking the lead on the project.
- In July 2016, MnDOT provided a letter of support to the City for inclusion in the Regional Solicitation Application for the TH 10 /Fairoak Ave Interchange Project. The letter noted that, "MnDOT, as the agency with jurisdiction over TH 10, would allow the improvements included in the application for the interchange project" (see ***Attachment 6*** for the complete letter).
- This Regional Solicitation Application was submitted to the Metropolitan Council using the Fairoak Ave at Highway 10 concept included in the Anoka Solution Plan. In January 2017, the City was awarded $7M to construct the Fairoak Area Improvements through the Regional Solicitation program administered through the Met Council. This project was the highest scoring project in its category.
- The City has continued to lead the next stage of project development, undertaking preliminary engineering and environmental documentation. The City, County, and MnDOT are all currently participating on a Technical Advisory Committee for the project.
- On July 12, 2017, the City met with MnDOT and Anoka County to discuss project scope, schedule, and funding. At this meeting, the MnDOT supported moving forward with development of Fairoak Ave area improvements, as well as including the development of Thurston Ave based on schedule and effort benefits. In total, it is estimated that

implementation of this vision will cost $85 million.

- In August 2017, the City will submit a MnDOT Highway Freight Program application for funding for Fairoak Ave Area and Thurston Ave area elements included in the Anoka Solution Plan. Successful applications will be announced by the end of September. Letters of request from MnDOT and the Metropolitan Council are required for this application. The City must also pass a resolution that will commit to matching funding requirements. If successful with this solicitation, the City will have secured federal funding for both the Fairoak Ave area and the Thurston Ave area elements of the planned TH 10 project.
- The City is also planning to pursue additional funding sources as solicitations open, including Corridors of Commerce and Regional Solicitation for Thurston Ave.

Fairoak Avenue Grade Separation

Anoka, Minnesota

February 2015

Evaluation	Alternative													
	No Build	A Fairoak Underpass 1	B Fairoak Underpass 2	C TH 10 Over Fairoak	D Fairoak Overpass 1	E Fairoak Overpass 2	F Fairoak Overpass 3	G Eastern Fairoak Overpass 1	H Eastern Fairoak Overpass 2	I Eastern Fairoak Overpass 3	J Western Overpass 1	K Western Overpass 2	L Western Overpass 3	M Western Overpass 4
Geometrics														
TH 10 Change in Elevation	NA	+7	+15	+22	0	0	0	0	0	0	0	0	0	0
Fairoak Change in Elevation	NA	-15	-7	0	+22	+22	+22	+22	+22	+22	+22	+22	+22	+22
Retaining Walls	NA	-	-	---	-	---	-	-	---	-	---	-	---	---
Pedestrian Accommodations	---	+	+++	+++	+	+	+	-	---	---	+	+	+	+
Minimize Sharp Curves (Horz. & Vert.)	NA	+	+++	+++	+	-	-	-	-	---	---	-	+	---
Route Connectivity	+	+	+++	+++	+	-	-	-	---	---	-	+	+	---
Impacts														
Full Property Acquisitions	0	5	4	3	11	10	10	10	6	7	7	8	6	7
Full Commercial Acquisitions	0	1	1	0	3	1	3	3	3	2	2	3	3	2
Limits Neighborhood Disruption	NA	+	+	+++	-	---	---	-	-	---	---	---	-	---
Impacts Golf Course	NA	NA	NA	NA	NA	---	---	-	NA	NA	NA	NA	NA	NA
Noise Impacts / Walls?	NA	-	-	---	-	-	-	-	-	-	-	-	-	-
Contaminated Property	NA	---	---	---	---	---	---	---	---	---	+	-	+	---
Achieves Green Haven Parkway Vision	+++	+++	+++	+++	+++	+	+	+	+++	+++	+	---	+	---
TH 10 Construction Staging Impacts	NA	---	---	---	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
Number of Access Points (between Thurston and Main)														
Public	4	1	1	1	1	1	1	1	1	1	1	1	1	1
Private	2	1	1	0	1	1	1	1	1	1	1	0	1	1
Interim RI/RO	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cost														
Roadway Construction														
Bridge Construction														
ROW Cost														

Appendix D

Attachment 6: City of Anoka Council Work Session Material

COUNCIL WORKSESSION MEMO

3.1

Meeting Date	March 16, 2015
Agenda Section	Council Discussion
Item Description	Update; Hwy 10 – Fairoak Connection, Riverdale Extension & Green Haven Parkway
Submitted By	Greg Lee, Public Services Director

INTRODUCTION

The Trunk Highway 10 Access Planning Study was completed in September 2014. On November 3, 2014 the City Council accepted the Trunk Highway 10 Access Planning Study with some noted concerns in regards to the implementation of the various projects that make up the study.

DISCUSSION

Fairoak Connection -
One such concern was that the study severed the existing Fairoak Avenue connection between the north and south sides of Highway 10. The City stated that further study was warranted to better understand the options of keeping the Fairoak Avenue connection at TH10. In pursuit of these options, the City hired the engineering firm of Bolton-Menk. In recent weeks, Bolton-Menk has explored a total of thirteen (13) options to retain the Fairoak Avenue connection. See attached summary spreadsheet and associated options diagrams. Eric Johnson, the engineer at Bolton-Menk who develop these options will present them at the Worksession.

In general, there are no easy grade separation solutions, and all options come with significant impacts and costs. There needs to be about 22 feet vertical separation between Fairoak Avenue and Trunk Highway 10 (16'2" for roadway clearance and about 5' for bridge thickness). The current cost estimates for these options range from a minimum of $15M to perhaps twice that amount.

In April 2013, traffic counts and turning movements associated with Fairoak Avenue were taken by Bolton & Menk as part of the Trunk Highway 10 Study. It was determined that at that time, 800 vehicles travel North / South through Highway 10 on Fairoak Avenue per day. This number may grow to about 1,000 vehicles per day in 2030. However, as Thurston and other frontage connections are built, this future volume may drop back to 800 vehicles per day.

Green Haven Parkway –
Bolton-Menk continues to work for the City of Anoka on alignment and design options related to Green Haven Parkway. In December of 2014, the City submitted a Local Roads Improvement Program (LRIP) application for the construction of that portion of Green Haven Parkway from Thurston Avenue to Garfield Street. See attached layout. The amount of the requested funds was $750,000. It is anticipated that the applicants will be notified by the end of this month if they were successful in receiving the requested funds.

Riverdale Drive Extension –
In preparation of possible development of 6050 and 6058 Highway 10, Bolton-Menk has developed options for extending Riverdale Drive to the east. Attached are the current concepts which are consistent with the Trunk Highway 10 Access Planning Study. Note: Option B is not being pursued further due to its impacts on 6050 and 6058 Highway 10.

COUNCIL ACTION REQUESTED:

No action is required by the City Council at this time. However, staff is seeking direction on any and all aspects associated with the implementation of the Trunk Highway 10 Access Planning Study including the Fairoak Avenue connection, Green Haven Parkway, and Riverdale Drive Extension.

Update on TH 10 Related Items

Council Work Session

City of Anoka

City Hall Council Work Session Room

March 16, 2015

Overview of Discussion

- Fairoak Grade Separation
- Green Haven Parkway
- Riverdale Drive

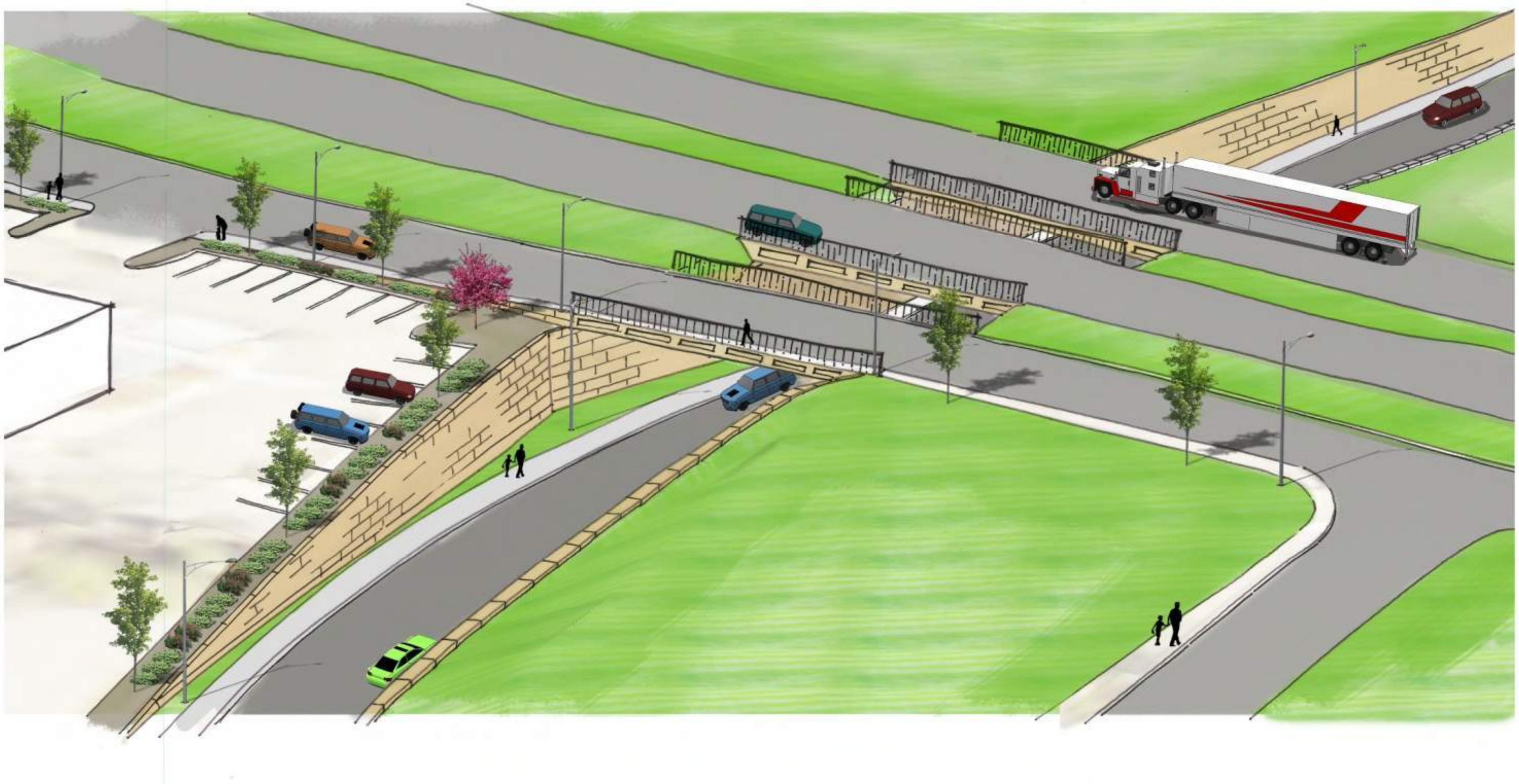
Fairoak Grade Separation

Evaluated Potential Connections Across TH 10

- Developed 13 concepts
  - Fairoak Underpass
  - Fairoak Overpass
  - Eastern Fairoak Overpass
  - Western Fairoak Overpass

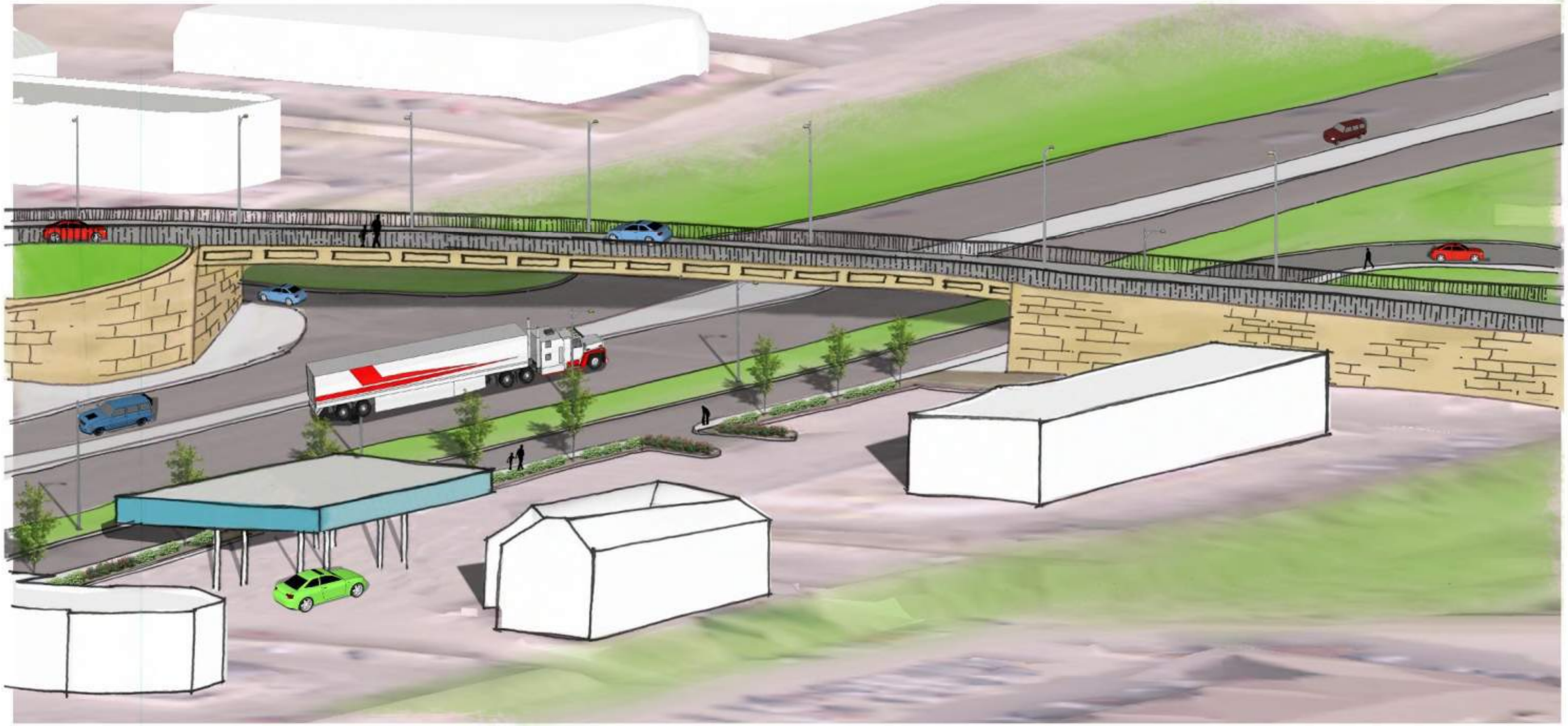
Grade Challenges

Fairoak Underpass

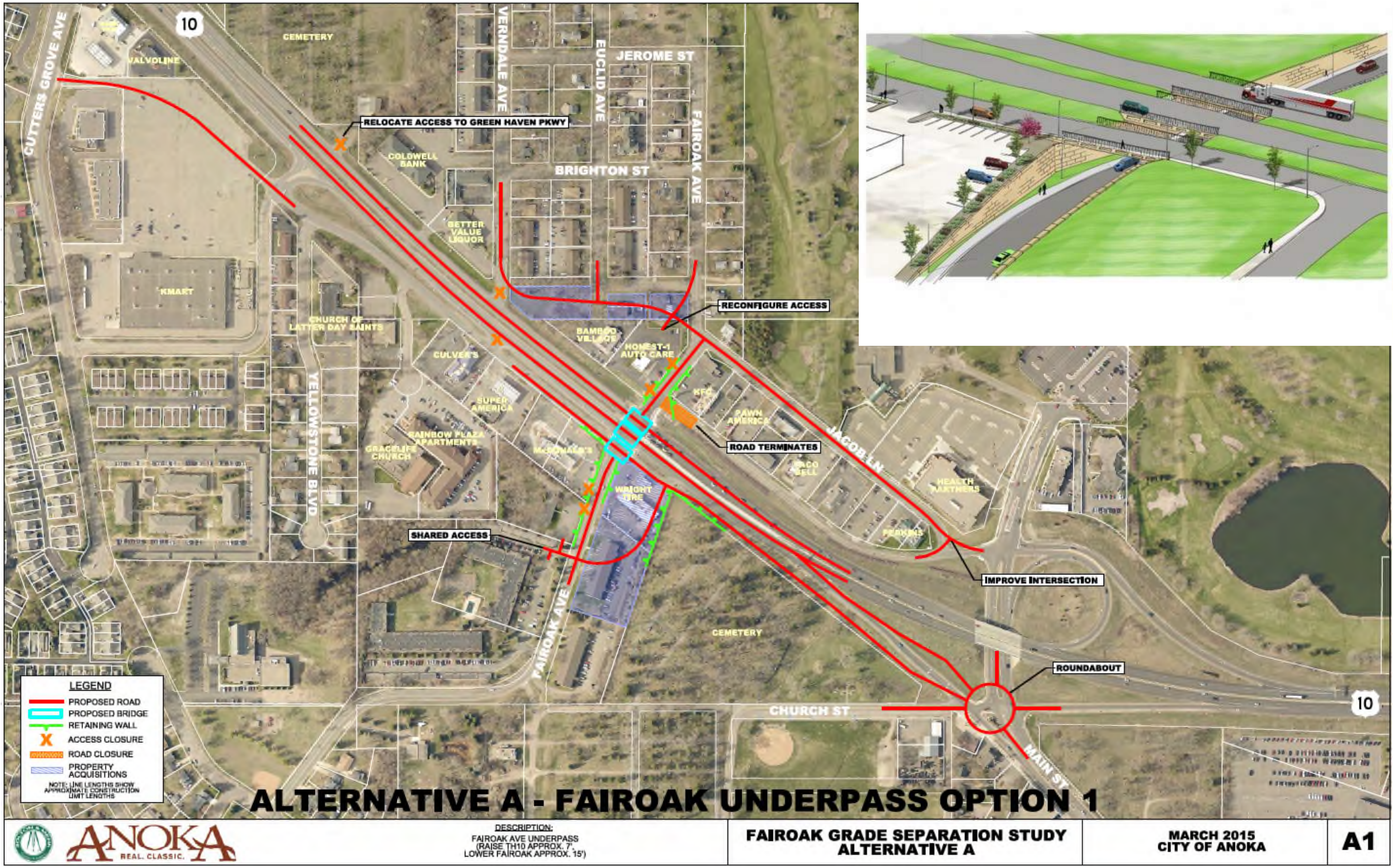


Elevate TH 10 and Lower Fairoak

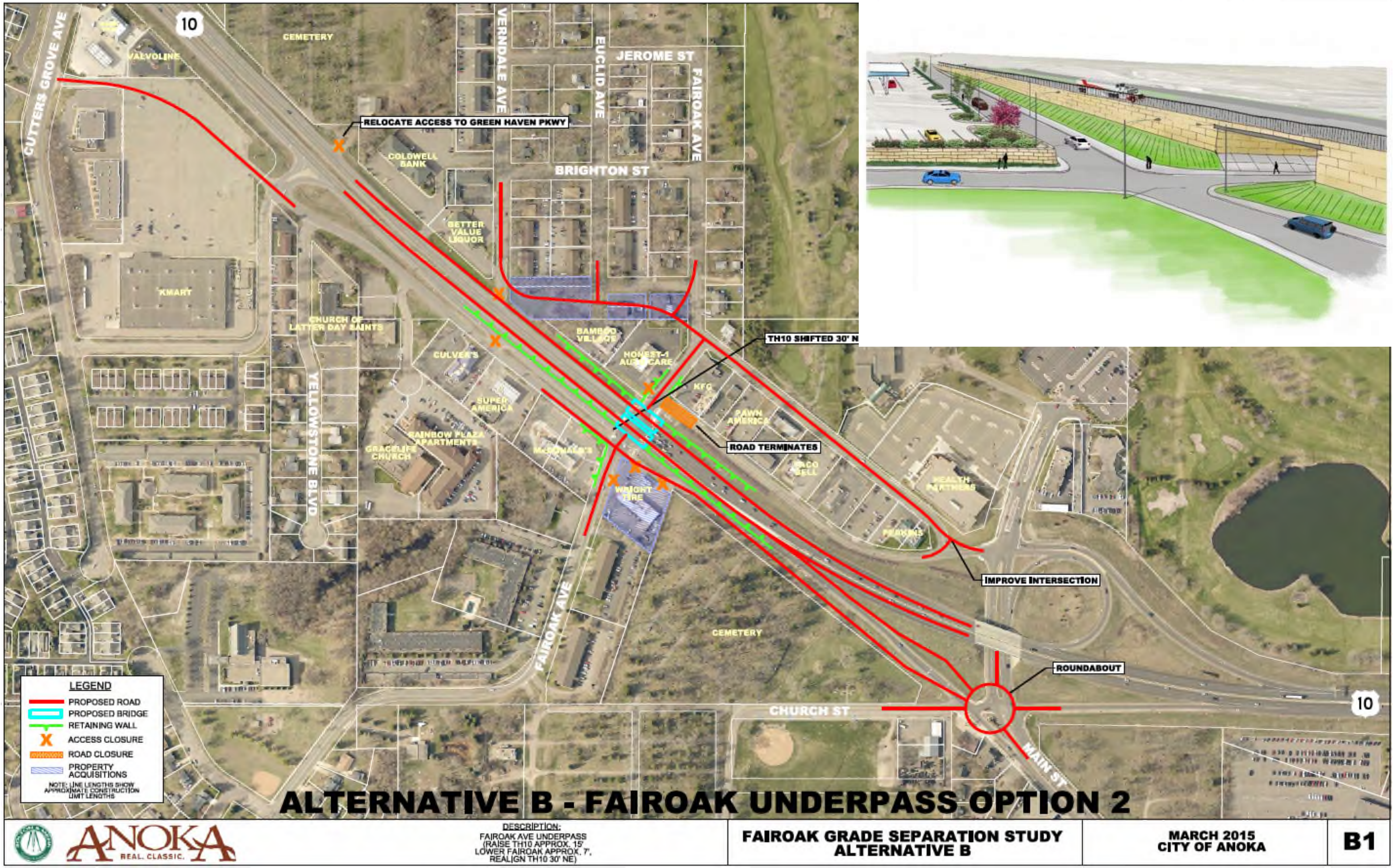
Fairoak Overpass



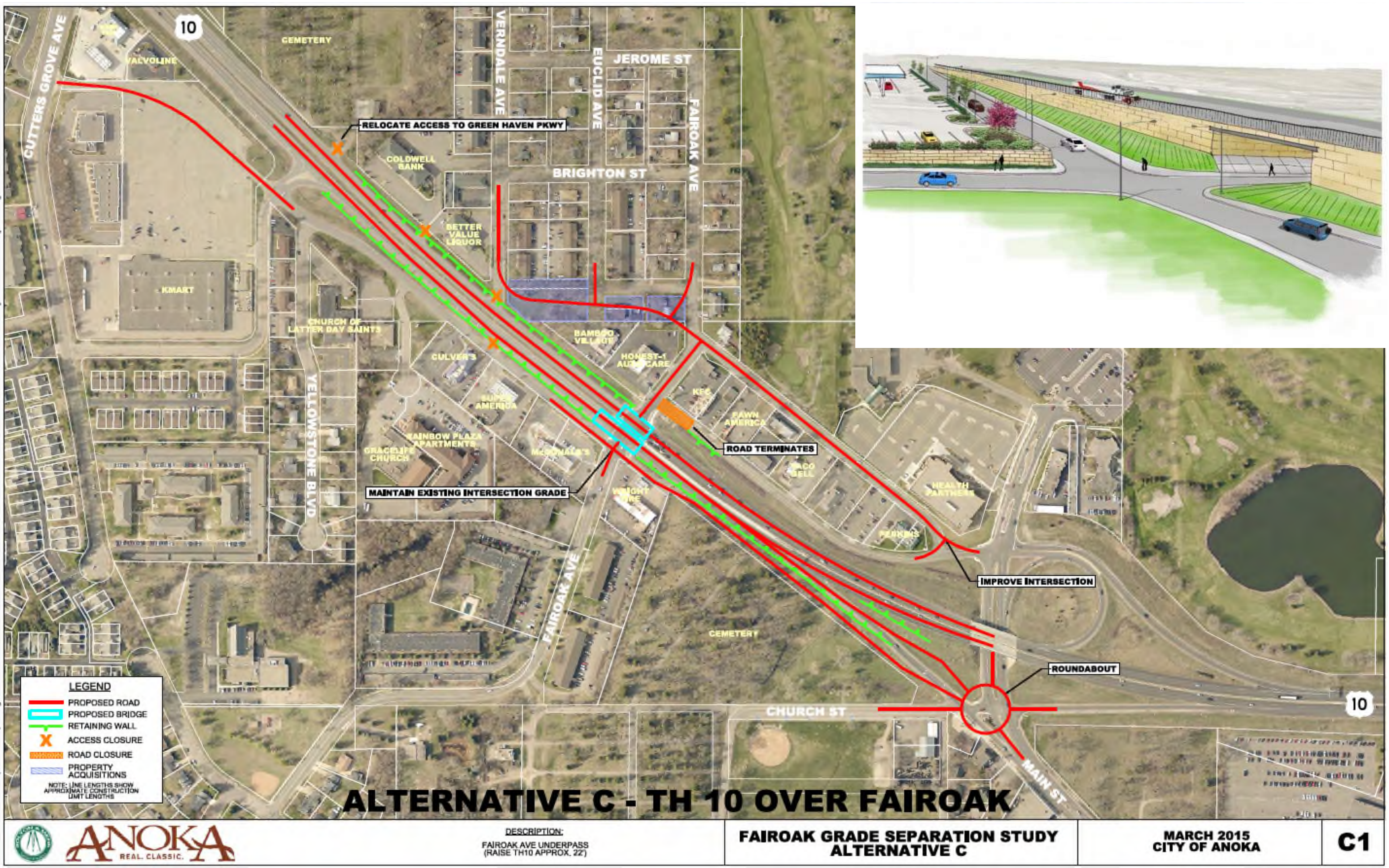
Alternative A – Fairoak Underpass Option 1



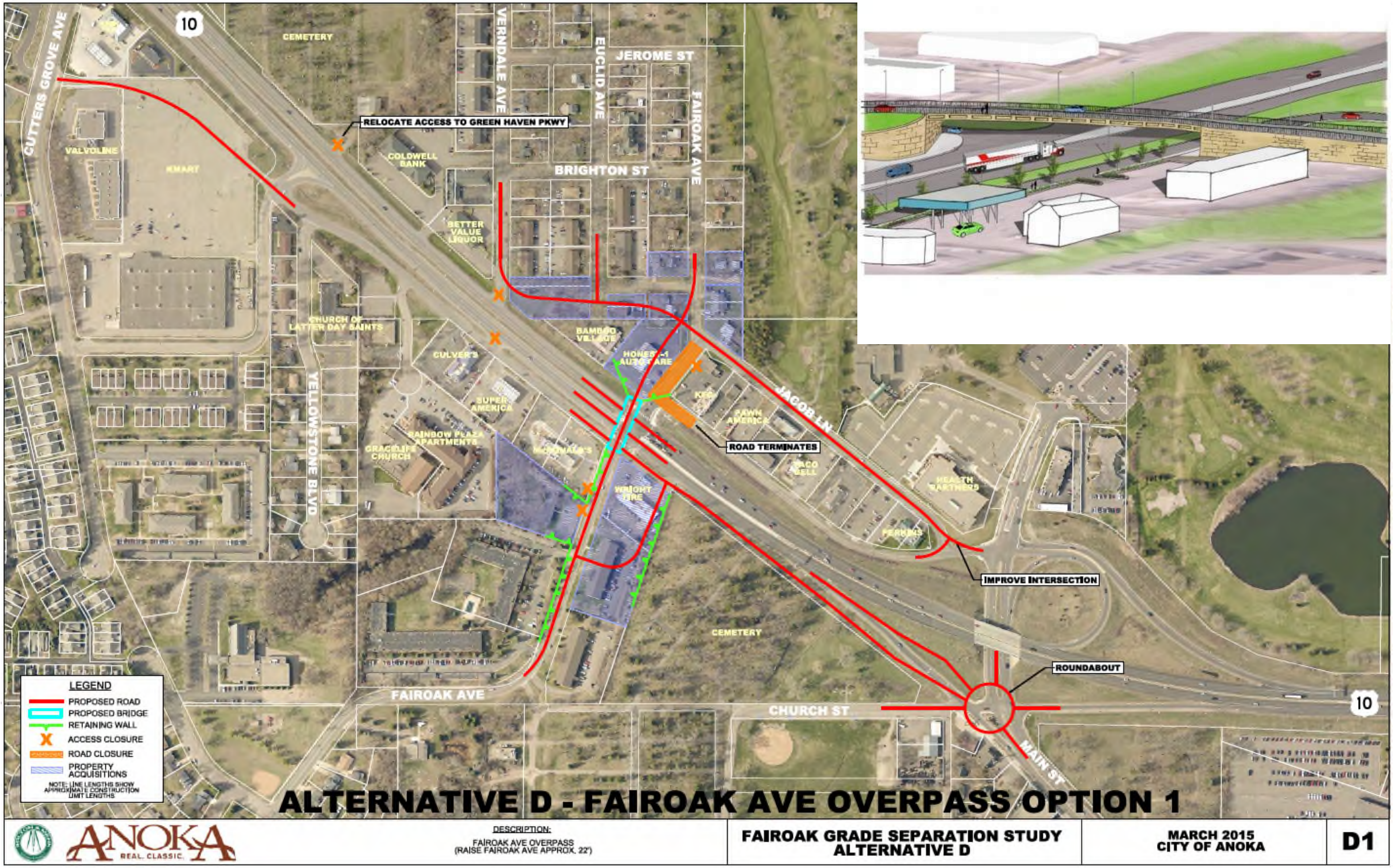
Alternative B – Fairoak Underpass Option 2



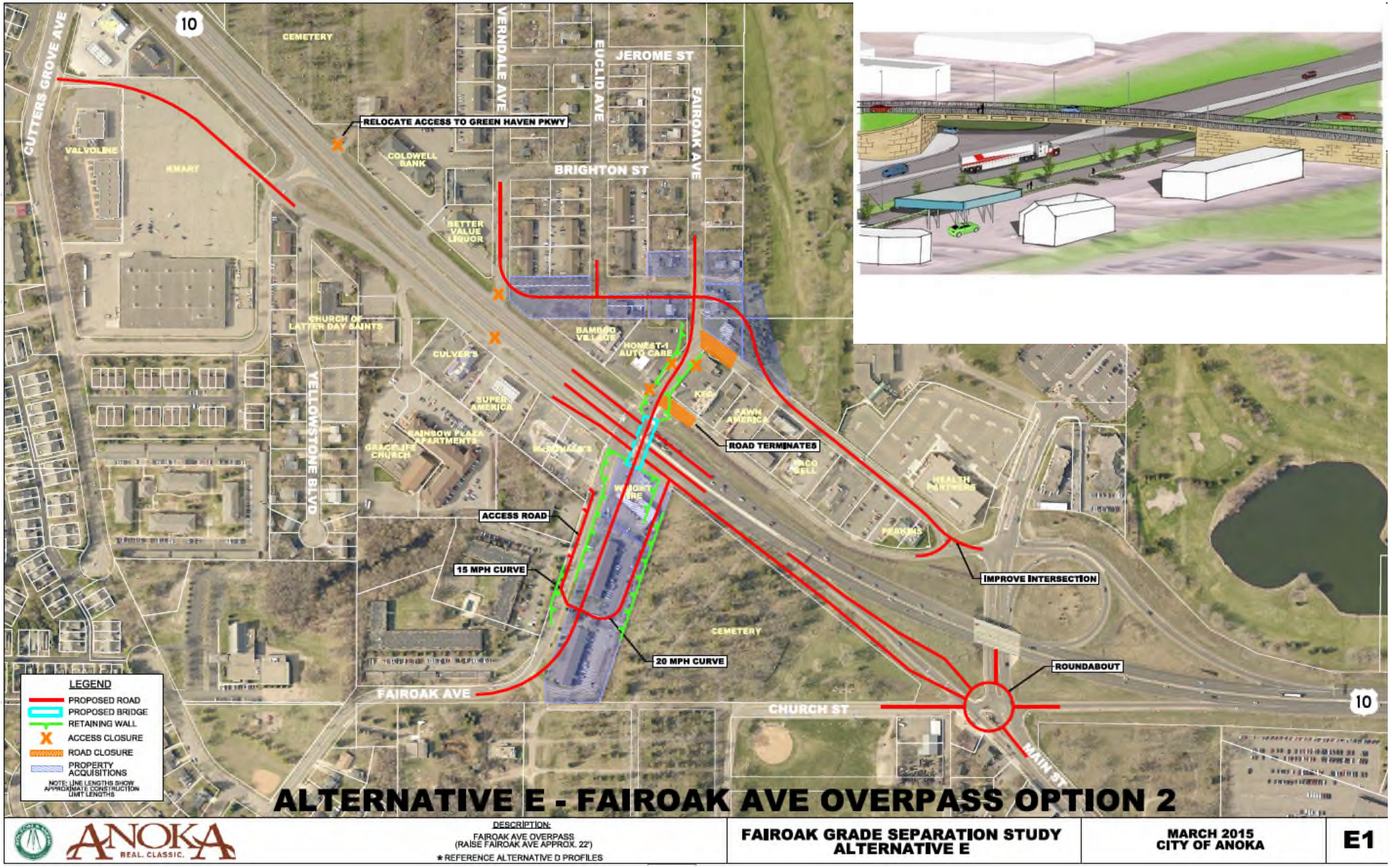
Alternative C – TH 10 Over Fairoak



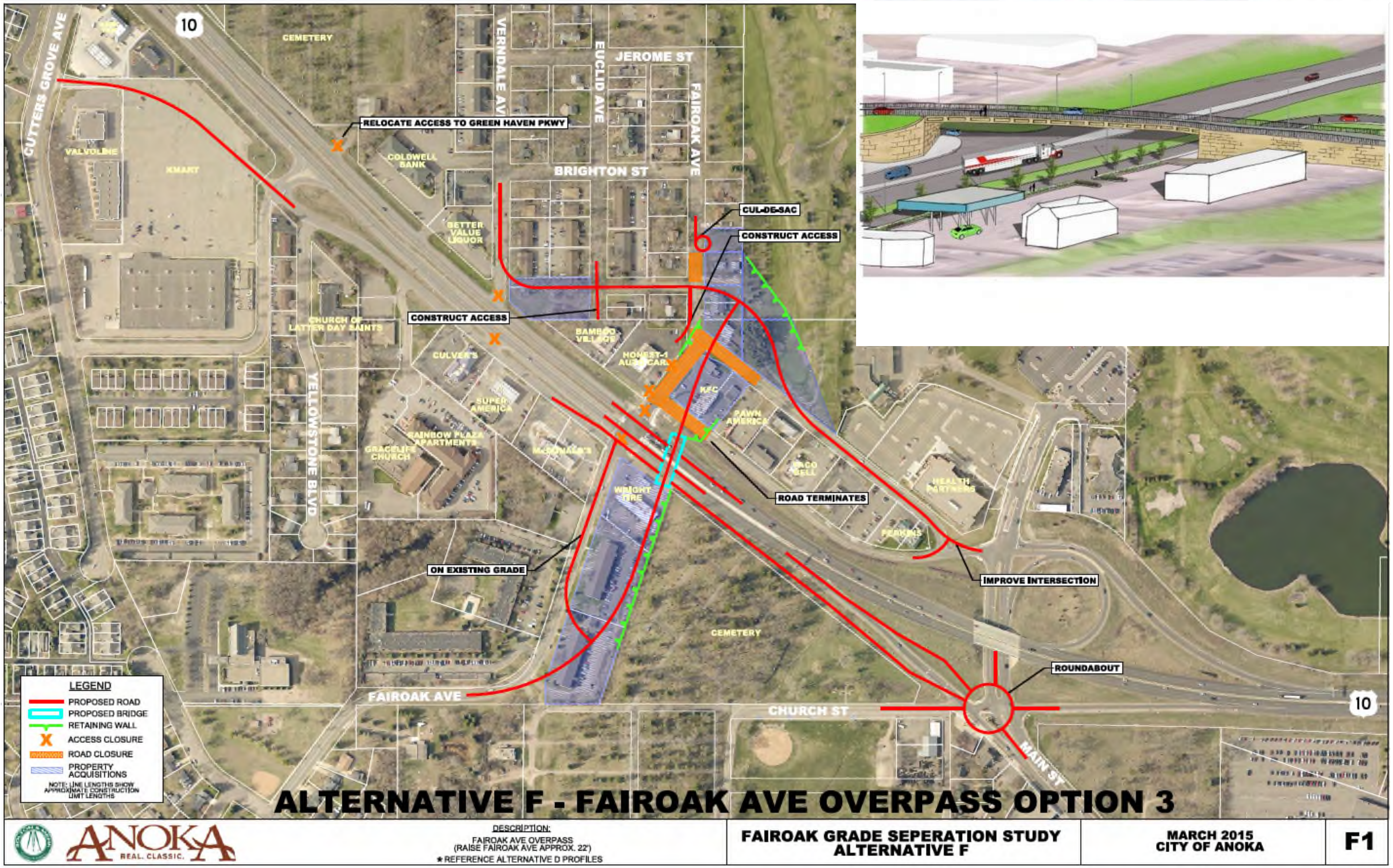
Alternative D –Fairoak Ave Overpass Option 1



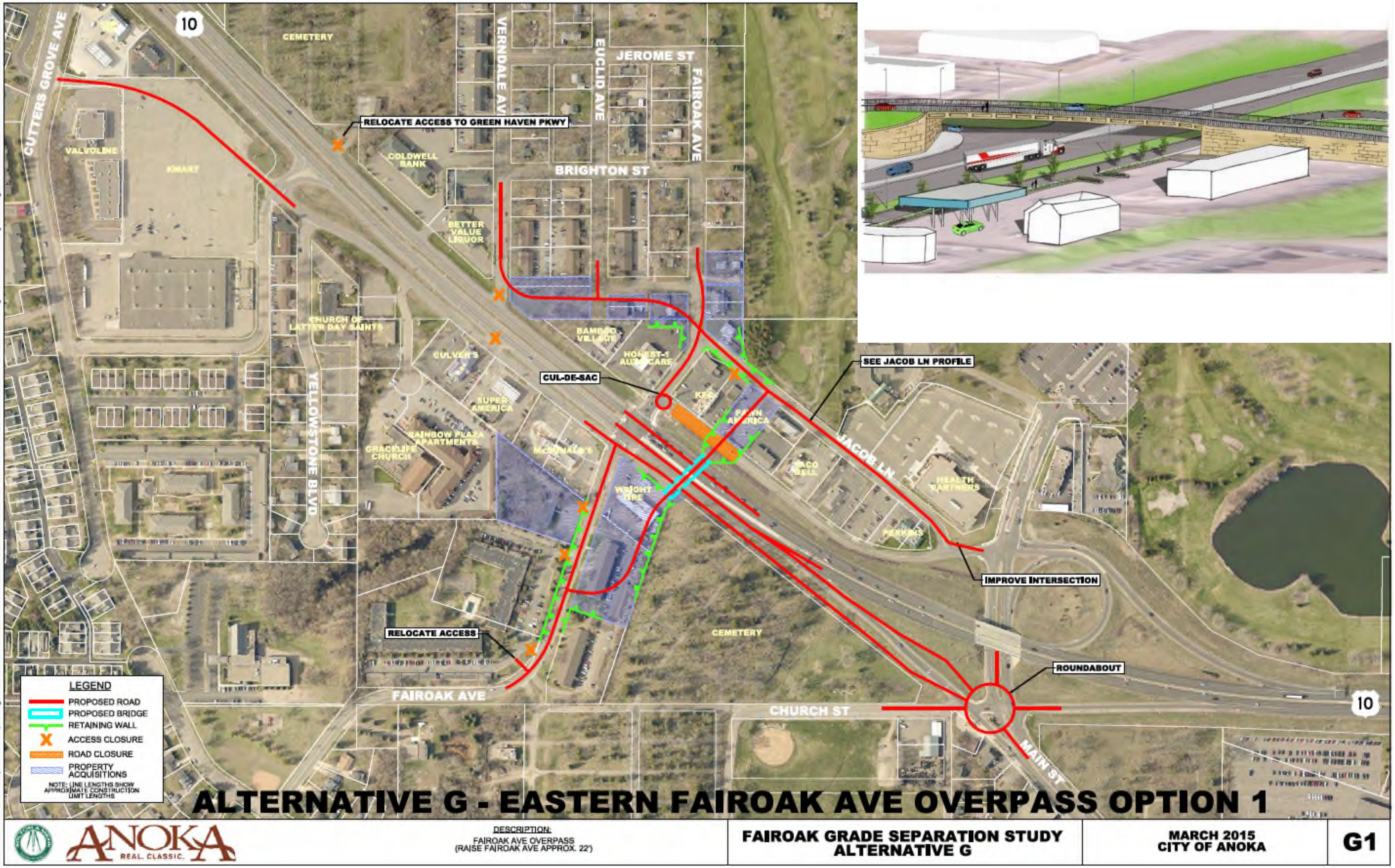
Alternative E –Fairoak Ave Overpass Option 2



Alternative F –Fairoak Ave Overpass Option 3

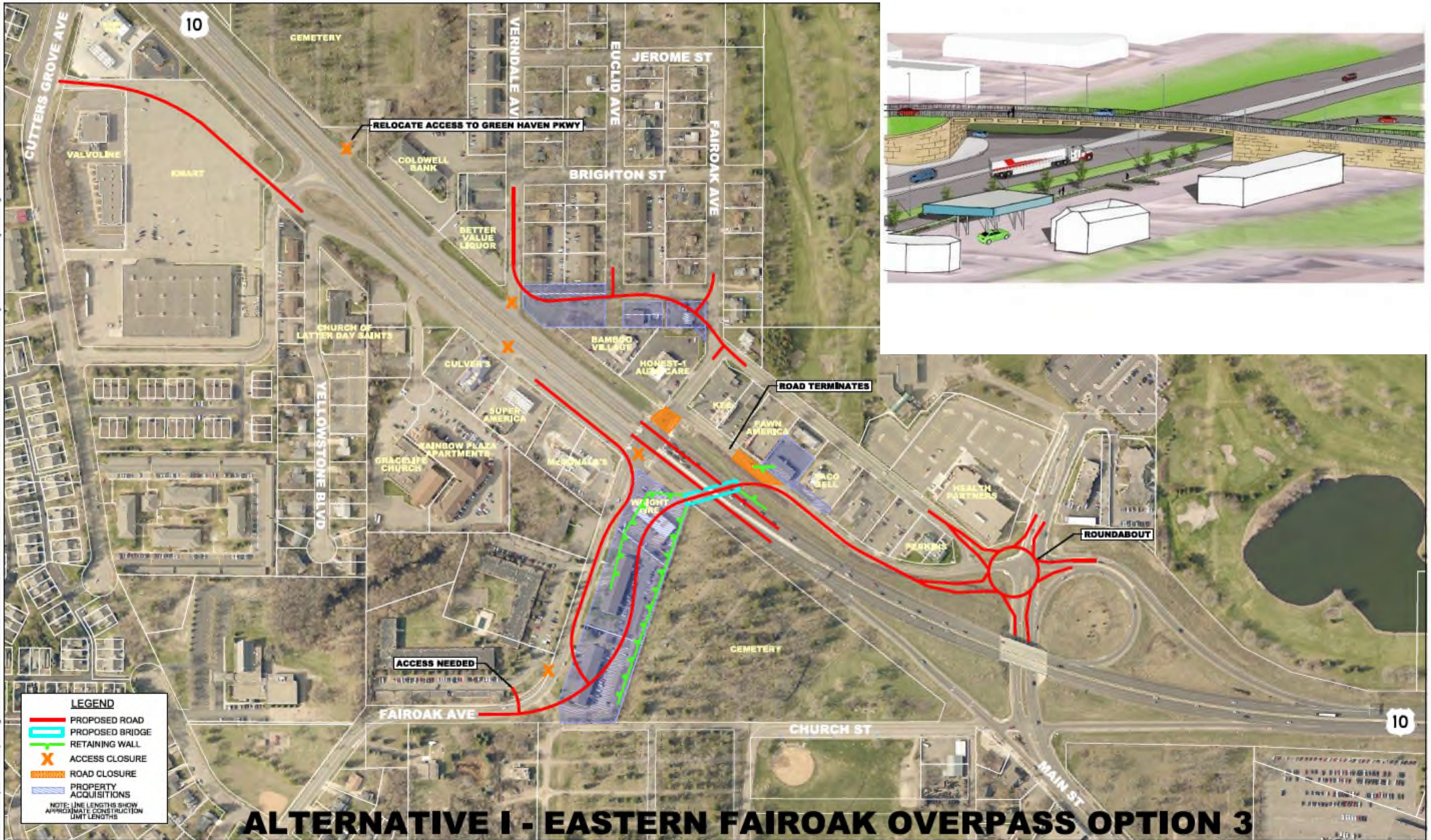


Alternative G – Eastern Fairoak Overpass Option 1



Alternative H – Eastern Fairoak Overpass Option 2

Alternative I – Eastern Fairoak Overpass Option 3



ANOKA REAL. CLASSIC.

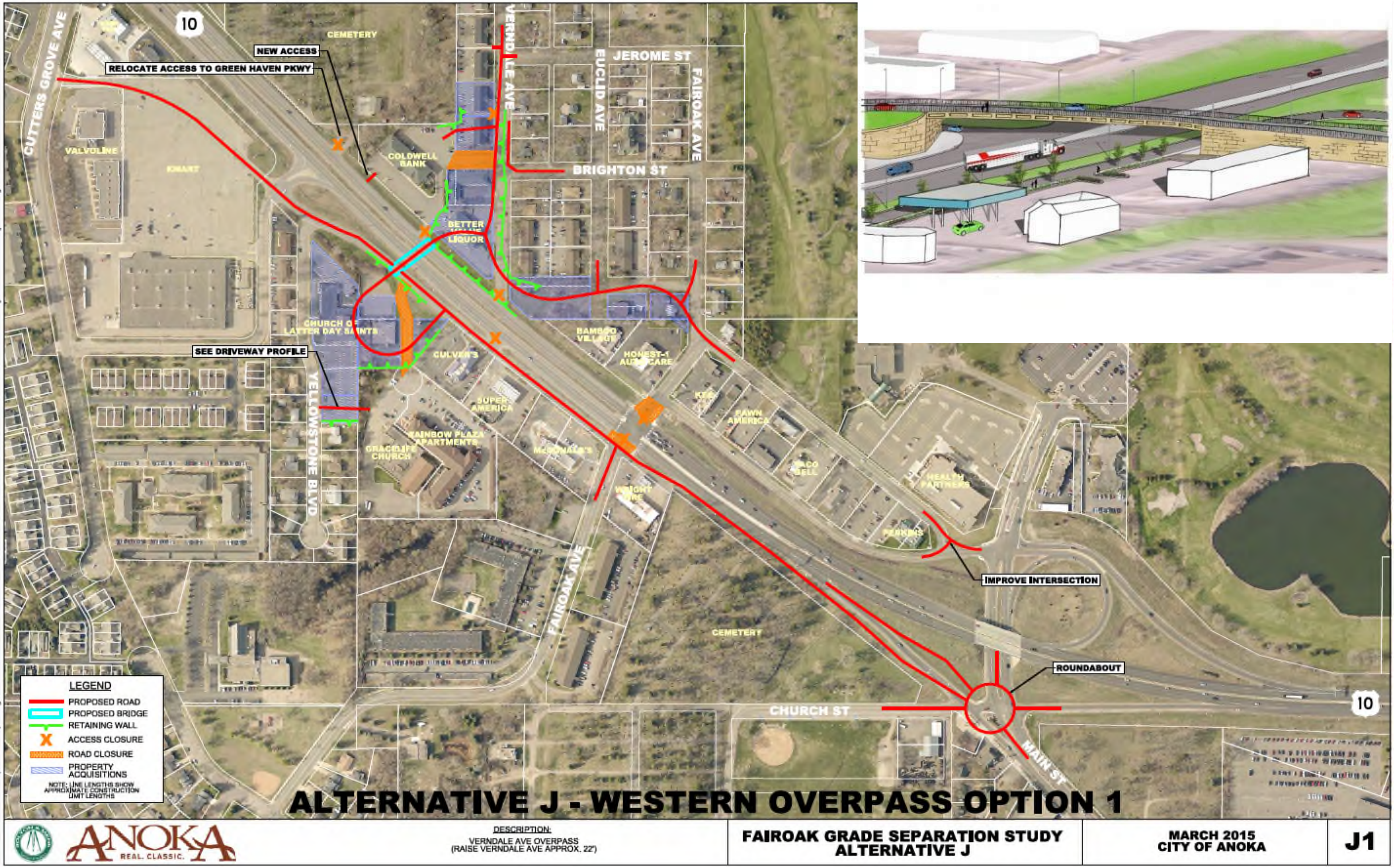
DESCRIPTION:
FAIROAK AVE OVERPASS
(RAISE FAIROAK AVE APPROX. 22')
★ REFERENCE ALTERNATIVE H PROFILES

FAIROAK GRADE SEPARATION STUDY
ALTERNATIVE I

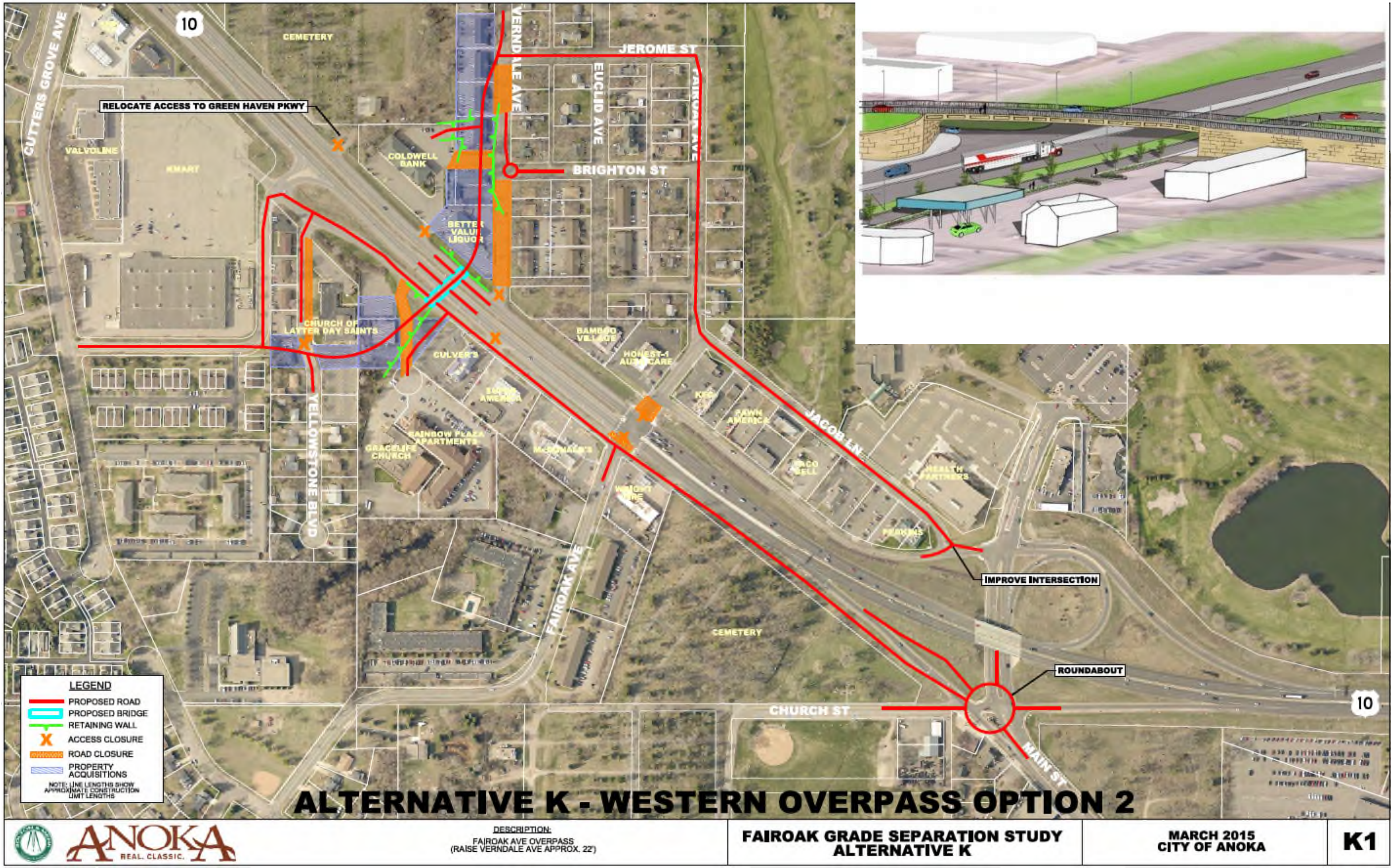
MARCH 2015
CITY OF ANOKA

I1

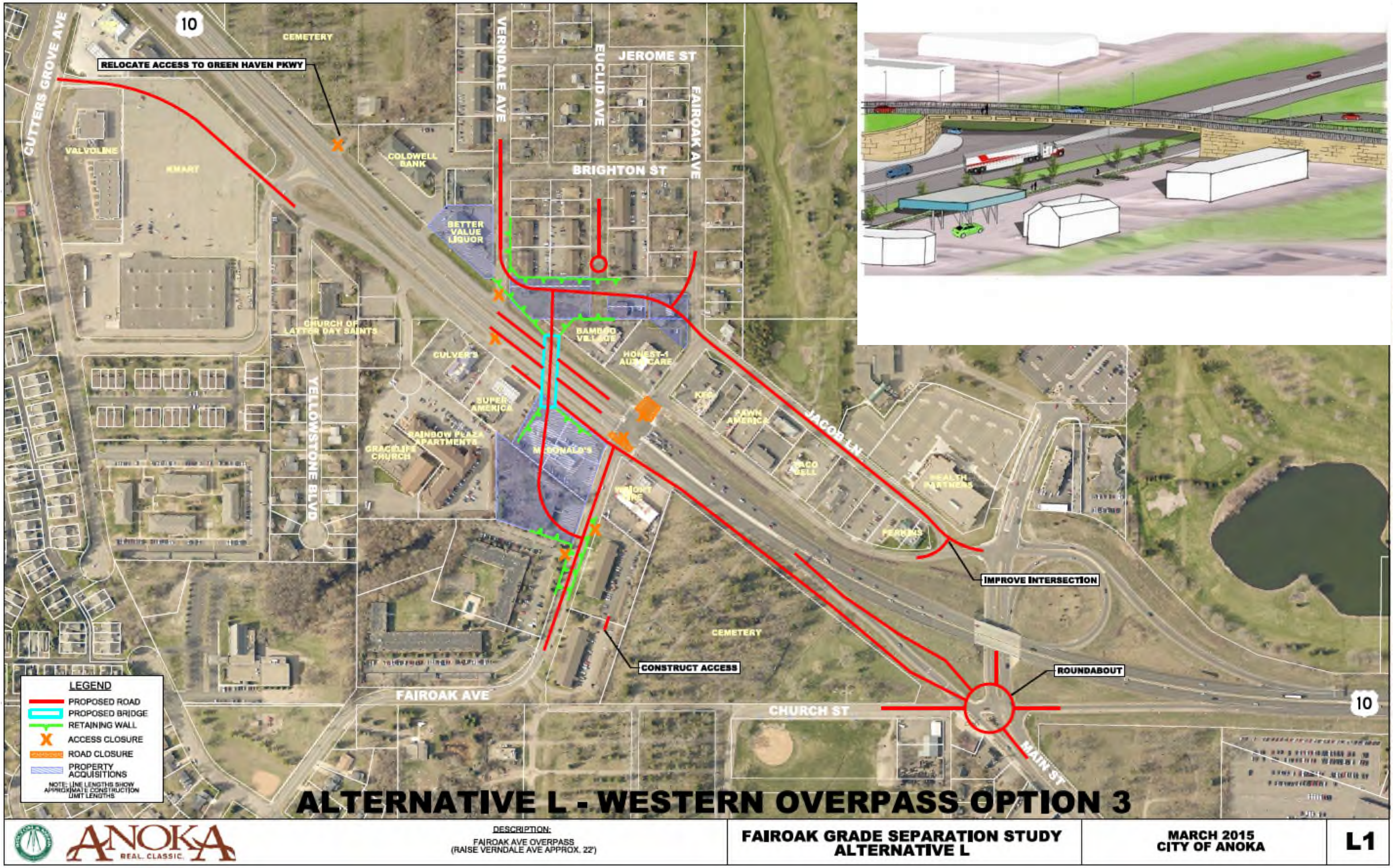
Alternative J – Western Overpass Option 1



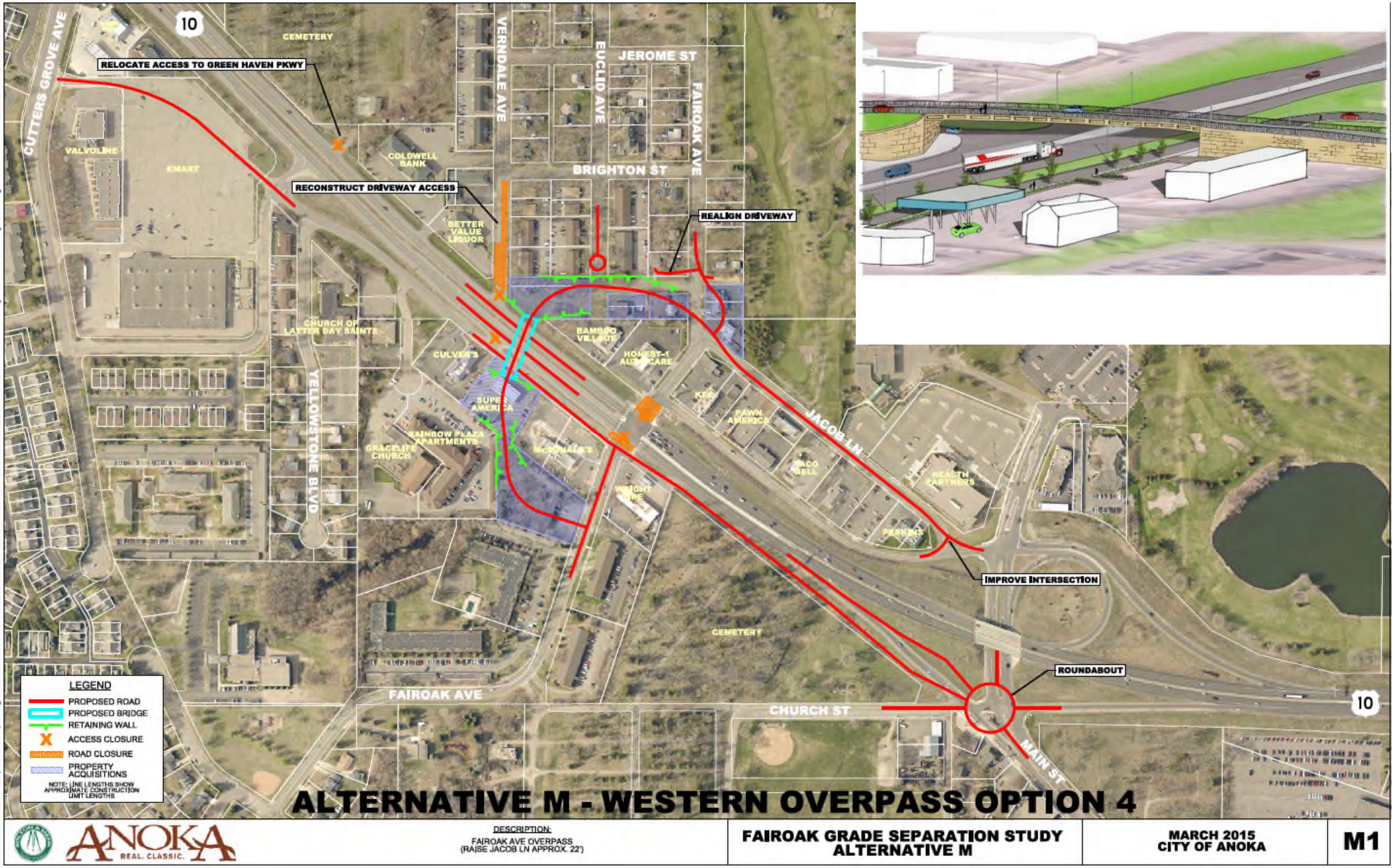
Alternative K – Western Overpass Option 2



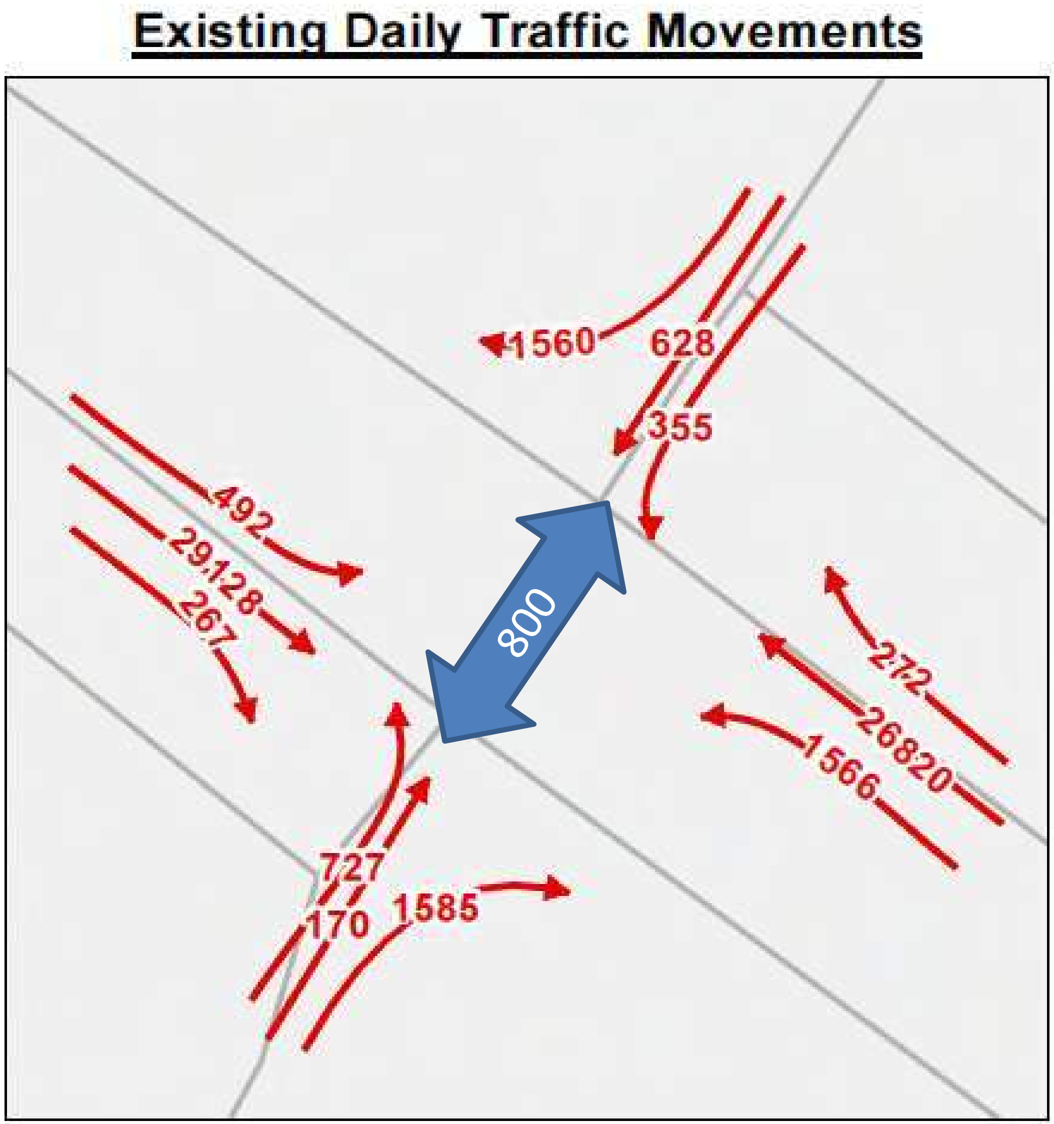
Alternative L – Western Overpass Option 3



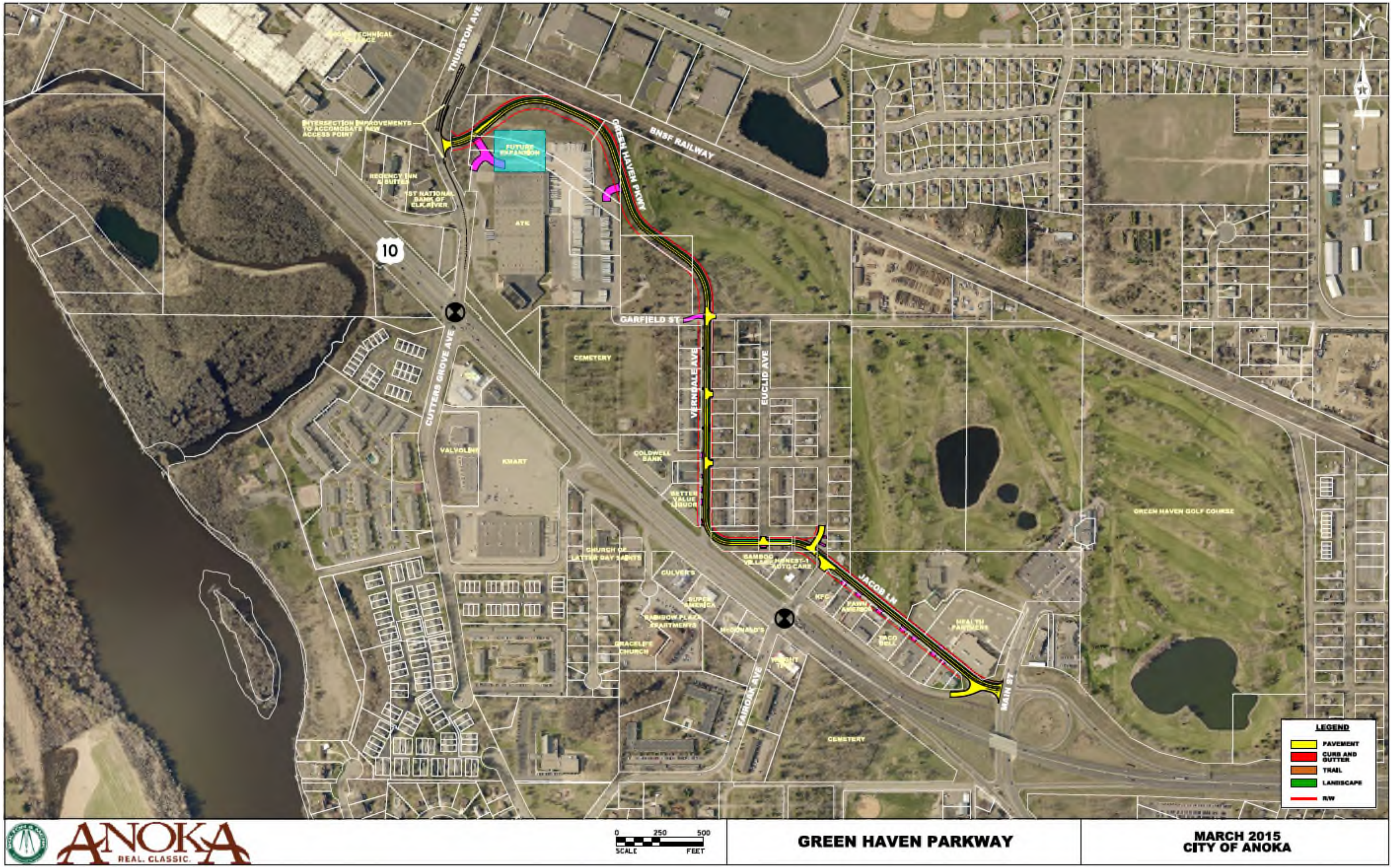
Alternative M – Western Overpass Option 4



Traffic Demands



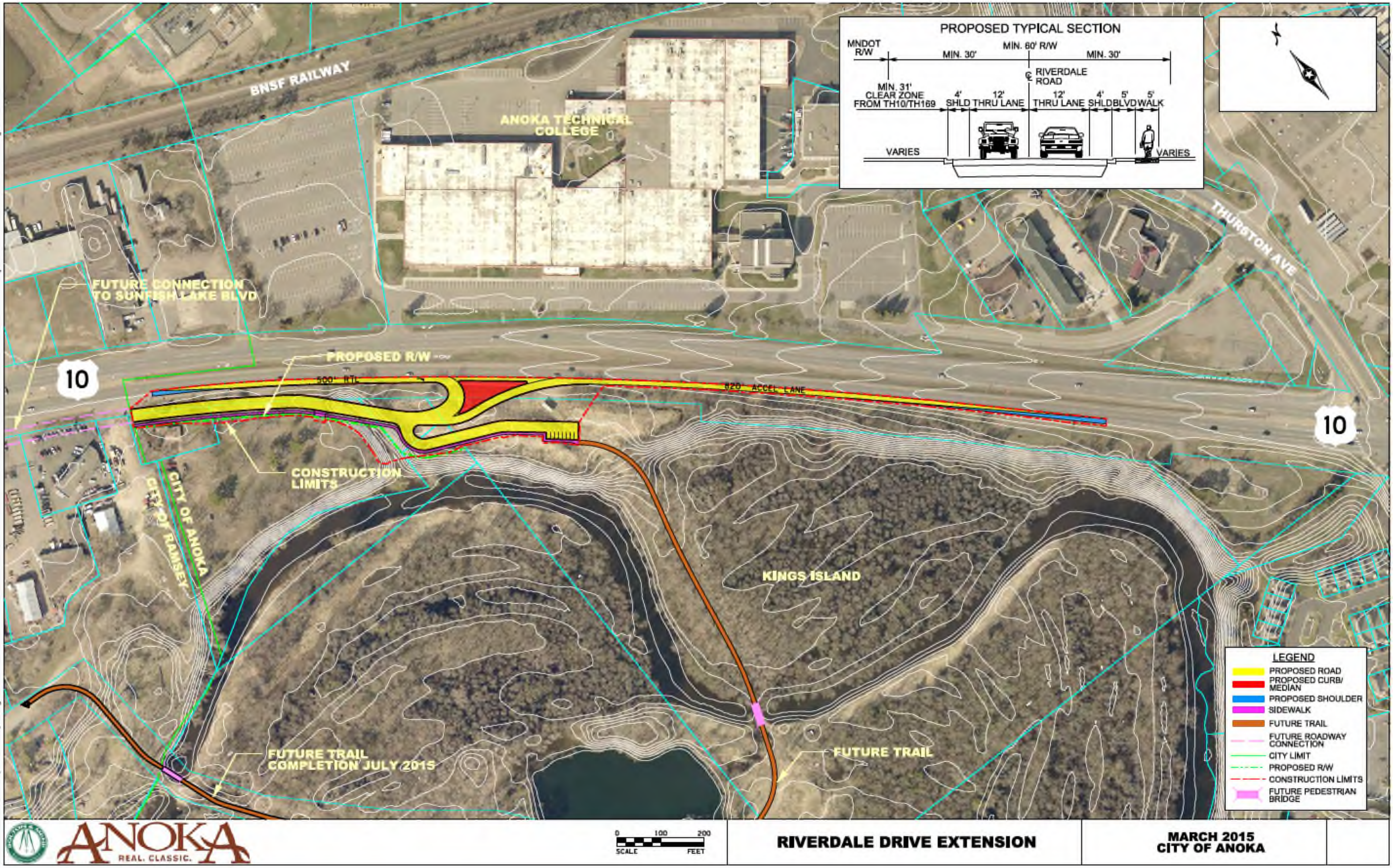
Green Haven Parkway



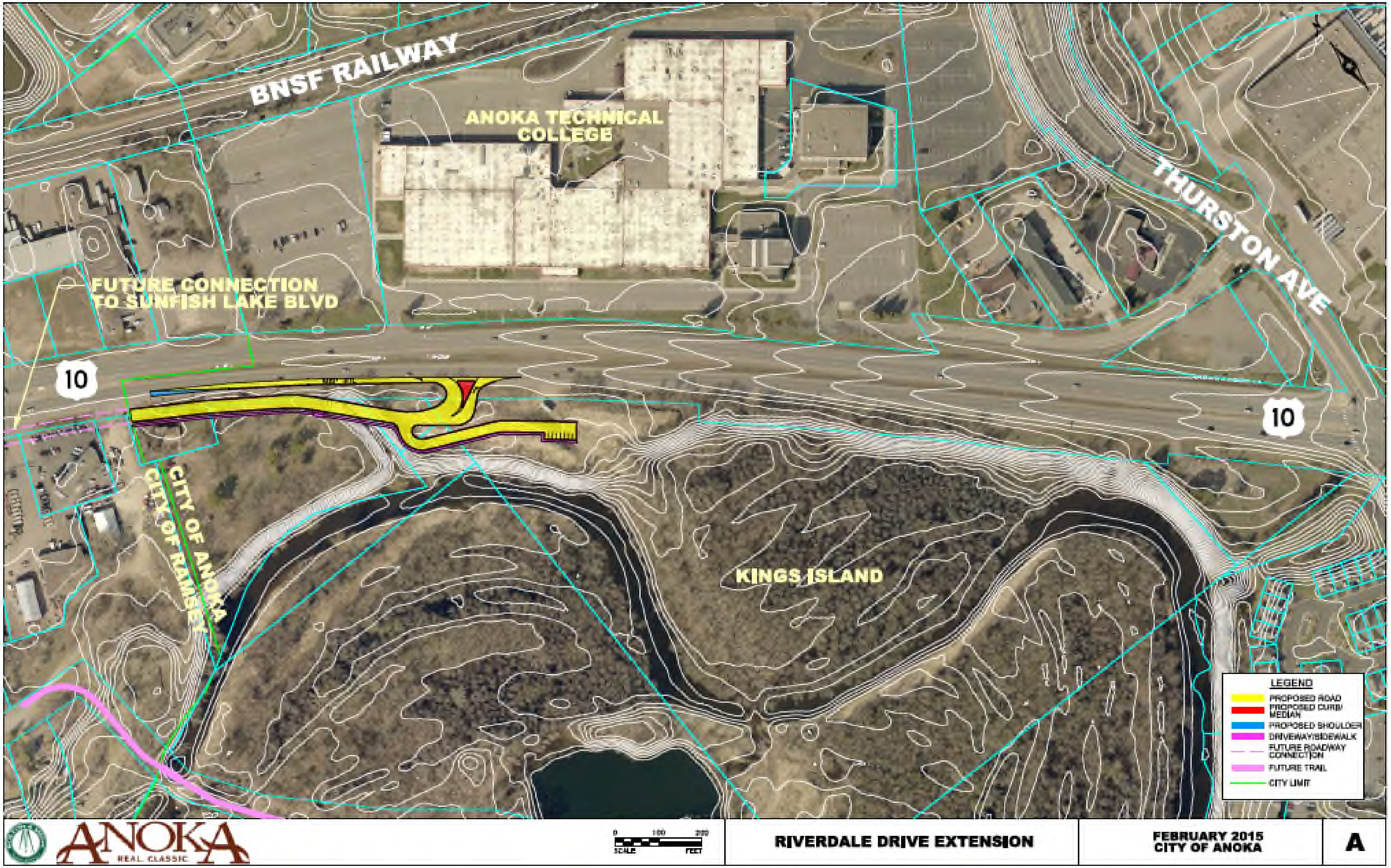
Green Haven Parkway Funding Opportunities

- Phased approach
- Local Road Improvement Program (LRIP)
  - Application submitted January 2015
  - Awards announced approx. April 1st
  - $750,000 maximum award
- Municipal Agreement
  - Applications due Spring 2015
  - Approx. $700,000 potential

Riverdale Drive



Riverdale Drive



Riverdale Drive

Riverdale Drive

Discussion

TH 10 Access Study Recommendations

TH 10 Access Study Recommendations

TH 10 Access Study Recommendations

Appendix D

Attachment 7: Anoka City Council Resolutions Supporting Highway 10 Improvements

2015 First Avenue, Anoka, MN 55303
Phone: (763) 576-2700 Website: www.ci.anoka.mn.us

CITY OF ANOKA, MINNESOTA
RESOLUTION

RES-2014-119

A RESOLUTION ACCEPTING HIGHWAY 10 ACCESS PLANNING STUDY

WHEREAS, Highway 10 is a 4-lane expressway (Anoka/Sherburne County line to the Rum River) that carries average daily traffic volumes ranging from 33,000 to 61,000 vehicles per day; and

WHEREAS, the Highway 10 corridor is commonly congested and has higher than average crash and severity rates; and

WHEREAS, the Highway 10 Access Planning Study identified high-benefit improvements that are fiscally responsible so that improvements can be funded, programmed, and implemented incrementally; and

WHEREAS, this more focused, realistic, innovative and flexible strategy results in a majority of the benefits at a fraction of the cost of the previous plans for a freeway; and

WHEREAS, the Highway 10 Access Planning Study recommendations are broadly supported by all partnering agencies, including the City of Anoka, Anoka County, the Minnesota Department of Transportation (Mn/Dot), and the Metropolitan Council; and

WHEREAS, the recommendations are consistent with the Metropolitan Council's Transportation Policy Plan, MnDot's Minnesota State Highway Investment Plan (MnSHIP) and MnDot's Enhancing Financial Effectiveness (EFE) efforts; and

WHEREAS, the partnering jurisdictions have adopted the Highway 10 Access Planning Study that supports mutual goals and objectives to improve the operations and safety of Highway 10 in balance with local community values.

NOW, THEREFORE, BE IT RESOLVED by the City Council of the City of Anoka, Minnesota:

1. The City of Anoka generally supports and endorses the study findings and recommendations for Highway 10.

2. The City of Anoka recognizes the regional significance of the corridor in supporting the local and regional economy and intends to reflect the Highway 10

Access Planning Study recommendations, strategies and polices through updates to the City land use and transportation plans and local development ordinances, as presented and as modified by resolution of the issues in Item 4.

3. The City of Anoka is committed to working in partnership with MnDot and the other corridor partners to further plan, obtain funding, design, and implement the recommendations of the Highway 10 Access Planning Study and as modified by resolution of the issues in Item 4.

4. The City of Anoka intends to bring forward the following issues for resolution and discussion in the next phase of project development:

   a. Concern about the aesthetics of the proposed and funded median barrier with fence to be located in areas between Fairoak Avenue and Thurston Avenue.
   b. The City's desire to move the Riverdale Drive Extension access to the east to also service the Kings Island Trailhead property.

   c. A determination by the City of Anoka on the following design elements of the Greenhaven Parkway (as discussed in the attached City of Anoka Highway 10 Implementation Plan:

      1. The road alignment – down Fairoak Avenue versus Verndale Avenue;
      2. Acquisition of the Connexus Tower Site.
      3. Determination of the current and future needs of ATK and determine the parkway alignment.
      4. Discussion and resolution of (1) the proposed left turn proposed from Highway 10 onto Fairoak Avenue (south); (2) the severing of the north/south local connection at Fairoak Avenue; and (3) leaving a east-bound stop light at Thurston. The City of Anoka does not currently support any of these items.
      5. The potential to combine the Fairoak Avenue Intersection Signal Removal Project, the South Frontage Roadway from Fairoak Avenue to West Main Street Project and the Thurston Avenue Grade Separation Project into one project.

   d. Development of a joint agreement between the City of Ramsey, Anoka County and the City of Anoka outlining project priorities, timing, roles, responsibilities, and accountability.

   e. Development of a policy for the sale of City-owned properties previously acquired through the Right-of-Way Acquisition and Loan Fund (RALF) that will no longer be needed for roadway purposes.

Adopted by the Anoka City Council this the 3rd day of November 2014.

ATTEST:

Amy T. Oehlers, City Clerk

Phil Rice, Mayor

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Phone: (763) 576-2700 Website: www.ci.anoka.mn.us

CITY OF ANOKA, MINNESOTA
RESOLUTION

RES-2015-77

RESOULTION APPROVING THE ANOKA SOLUTION PLAN FOR HIGHWAY 10

WHEREAS, the Highway 10 Access Planning Study was completed in partnership with Minnesota Department of Transportation (MnDOT), Anoka County, Metropolitan Council, and the City of Ramsey, and

WHEREAS, on November 3, 2014 the City Council accepted the Trunk Highway 10 Access Planning Study with some noted concerns in regards to the implementation of the various projects that make up the study, and

WHEREAS, the City of Anoka hired the engineering firm of Bolton Menk to assist the City in addressing these concerns by further refining various elements of the Highway 10 Access Planning Study and exploring several options, and

WHEREAS, the result is an overall layout plan of Highway 10 from Main Street to the City's western city limits referred to as the Anoka Solution Plan for Highway 10, and

WHEREAS, the Anoka Solution Plan for Highway 10 has been presented to several agencies and organizations including; Mn/DOT, Anoka County, the Highway 10 Workgroup and was presented at an Open House Meeting on June 18th and to the City Council at a worksession meeting on June 29, 2015.

NOW, THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF ANOKA AS FOLLOWS; that

1. The City Council hereby approves the Anoka Solution Plan for Highway 10, which includes the layout and summary sheet.

2. The City Council hereby submits said plan for Highway 10 to Mn/DOT, Anoka County, and the Highway 10 Workgroup and requests their support of the plan.

3. The City Council hereby directs staff to continue to develop refinements to the plan and work with other agencies and legislative bodies to secure funding to implement said plan.

Adopted by Anoka City Council this the 6th day of July 2015.

ATTEST:

Amy T. Oehlers

Amy T. Oehlers, City Clerk

Phil Rice, Mayor

APPENDIX E

Benefit-Cost Analysis

BOLTON & MENK
Real People. Real Solutions.

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MEMORANDUM

Date: 10/12/2017

To: City of Anoka, MN

From: Ross Tillman, P.E.
Keith Korman, E.I.T.

Subject: Highway 10/169 Safety and Mobility Improvements Project

Purpose

This memorandum documents the methodology and results of a benefit-cost analysis for the build alternative developed as part of the Highway 10/169 Safety and Mobility Improvements Project.

This stretch of divided highway is located in the northwest Minneapolis/St. Paul metro and involves the intersections and interchanges of TH 10 with the following roadways: Main Street West, Fairoak Avenue, and Thurston Avenue in Anoka, MN. In its current state, the Main Street West interchange has a conventional side street stop control for the north ramps and a five-legged side street stop for the south ramps. The Fairoak and Thurston intersections with TH 10 are currently signalized, at-grade intersections. Additionally, there are numerous driveway accesses for local business to TH 10, which pose safety risks when the high level of traffic and 60 mph speed limit are considered. The project would incorporate roundabouts for the Main Street West ramp terminals and would grade-separate the Fairoak (no access) and Thurston (full interchange) intersections in addition to removing driveway accesses. This stretch of highway is a key component of infrastructure both for commuter and recreational traffic. **Figure 1** shows an overview of the project location.

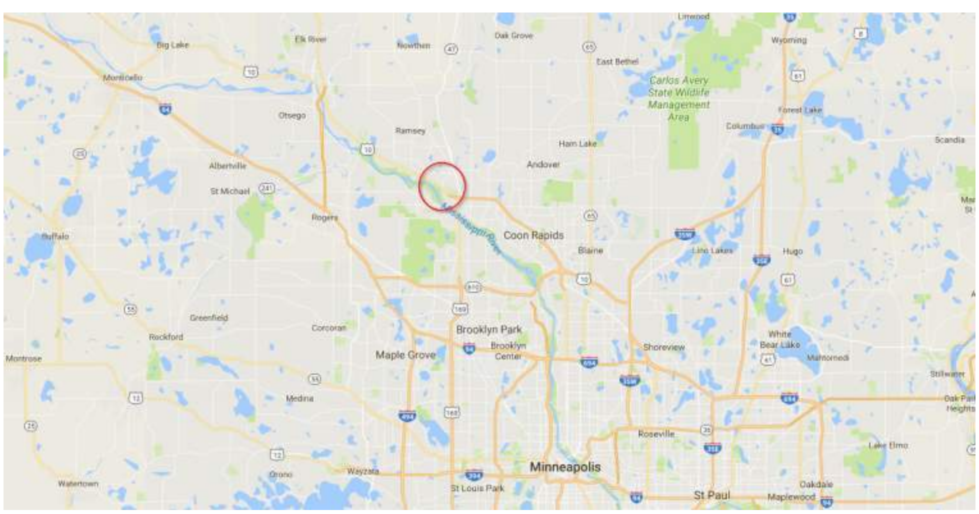


Figure 1. Project Location

For the study, a build alternative was analyzed and compared to the no-build alternative. The alternatives are listed below:

1. No-Build – Do nothing alternative
2. Fairoak Avenue and Thurston Avenue Signal Removals – construct an overpass to replace the existing signal at Fairoak Avenue and construct an interchange to replace the existing signal at Thurston Avenue. Removal of driveway and side street accesses will also take place with the intersection improvements.

A primary goal for this project is to improve safety along the TH 10 corridor. Using Minnesota Department of Transportation (MnDOT) crash data from 2006-2015, there were a total of 1128 crashes occurring along a 2.02 mile stretch from the western edge of Anoka city limits to the Rum River (project impact area) in the east. Among these 1128 crashes were two fatal and seven incapacitating collisions. In all, there were 325 injuries associated with this stretch of roadway in the 10-year time period. **Table 1** shows a summary of collisions along this stretch.

Table 1. 2006-2015 TH 10 Collisions

KABCO Level	Severity	Number of Collisions
K	Killed	2
A	Incapacitating	7
B	Non-Incapacitating	73
C	Possible Injury	220
O	No Injury	826
	Total	**1128**

Improving the flow of traffic is another priority in undertaking this project. Traffic queues often backup to excessive distances at the signalized intersections, causing significant delays during the peak travel times. The AADT in 2017 was estimated to be approximately 60600 vehicles per day (vpd) with an expected increase to 84800 vpd by 2041 under no-build conditions and 89700 vpd for build conditions. See **Table 2** for a summary of expected AADTs for build and no-build conditions.

Table 2. Expected TH 10 AADTs

Alternative	Year		
	2017	2021	2041
No-Build	60600	64100	84800
Build	--	64700	89700

The purpose of a benefit-cost analysis is to express the effects of an investment into a common measure, base-year dollars. This accounts for benefits occurring over long periods of time, while most of the costs are incurred with an initial investment. Under this approach, a project with monetized benefits greater than costs has a benefit-to-cost ratio greater than one and should be considered an economically beneficial endeavor.

Benefit-Cost Methodology

The monetary benefit for this project is quantified in terms of either a reduction or increase in vehicle miles traveled (VMT), vehicle hours traveled (VHT), project area collisions, vehicle emissions, and roadway maintenance. The costs considered for the project include surfacing, subbase/base, grading and drainage, bridge construction, signal and lighting construction, right-of-way acquisition, as well as engineering and design. The itemized cost breakdown of the build scenario is shown in **Table A2** at the conclusion of this technical memorandum. Remaining capital values of these roadway features at the end of the analysis period are subtracted from the total cost of the project. The salvage values can be found in **Table A3** for 3 and 7 percent discount rates.

The results of the analysis provide input for evaluating the overall benefit of the proposed improvements to the area. Since the current design is still preliminary, it should be noted that certain benefits and costs may change prior to final design, however these changes are anticipated to be relatively minor as initial cost estimates were made to be conservative.

General Assumptions

- All monetary values are discounted to the 2016 analysis year.
- The 20-year benefit period is based on a 2022 day-of-opening through the year 2042. Benefits are assumed to start January 1st, 2023 and end December 31st, 2042.
- Yearly Build and No-Build benefits are calculated based on linear interpolation over the 20-year analysis period.
- Longer travel times and rerouting of trips during construction years are not included in this analysis. Construction is anticipated to occur under traffic.
- Preliminary cost estimates were completed using cost per square foot for bridges and unit costs for grading, base, and pavement. An appropriate risk factor given the early stage in the project development process was therefore used.
- 260 days per year was used in the analysis of weekday VHT, VMT, and emissions.
- Since this corridor is a major recreational route for motorists traveling to cabins and lakes to the north, weekend VHT, VMT, and emissions were considered as well. Using MnDOT detector data at a nearby interchange to compare weekday and weekend traffic, a proportion of weekday VHT, VMT, and emissions benefits were applied to 105 weekend days per year. This process used the fraction of traffic observed on Saturdays and Sundays versus an average of Tuesday, Wednesday, and Thursday traffic to allocate weekend benefits since weekend traffic was not modeled as part of the traffic analysis.
- General assumptions regarding the costs associated with project area collisions, vehicle operating costs, time costs, component service life, analysis period, and discount rates can be found in **Table A1** at the conclusion of this document.

Traffic Analysis

Traffic forecasts were determined under both No-Build and Build scenarios. The forecasts were determined based on historical Annual Average Daily Traffic (AADT) counts available from the Minnesota Department of Transportation (MnDOT), current year traffic count data collected in May 2017, and the Twin Cities Regional Model. The existing Twin Cities Regional Model for year 2000 was used along with a future model for year 2030 with updates to include 2040 trip tables. The regional model provides a systematic procedure for forecasting volumes, taking into account the projected changes in regional land use/socioeconomic data and the regional transportation network.

The general approach to forecasting the traffic volumes consisted of the following:

- Utilize the Twin Cities Regional Travel Demand Model and model parameters, maintained by the Metropolitan Council, as the primary instrument for forecasting the daily volumes.
- Collect year 1995 to 2015 traffic count data from MnDOT and existing (2017) traffic counts throughout the study area for the purpose of validating the regional model run for the base year.
- Add additional county and other major local roadways to the roadway network in the regional model.
- Apply the regional model for the base year and validate its projections against the observed traffic count information; make appropriate adjustments as necessary to reach an acceptable validation.
- Apply the regional model for the forecast year (2040), taking into account the adjustments made to the 2000 model run and the anticipated changes to the roadway network by 2040, to generate the projected volumes.
- For the Build model the capacity of TH 10 was increased from Fairoak Avenue to Thurston Avenue to accurately model the lengthening of the freeway.
- Analyze traffic patterns that ultimately comprise the elements themselves, through a series of special selected link analyses; use this information as a basis for adjusting the forecasted volumes if determined to be necessary.
- Prepare the final set of forecast volumes.

Peak Hour Volumes

Once daily traffic volumes were determined, the peak hour turning movement counts collected as part of this study were adjusted. Existing turning movement counts were grown and reallocated at each count location based on the forecasted AADTs for each leg of the intersection using TurnsW32. In the build scenario, certain turning movements were then rerouted throughout the network based on access closures or relocations (removal of access to Fairoak Ave from TH 10 for example).

No Build

For the No Build forecast, the growth rate along TH 10 from Ramsey Boulevard to Round Lake Boulevard ranges from 0.5 percent to 1.41 percent per year. The growth rates along the side streets range from 0.3 percent to 1.95 percent per year. The No Build forecast re-routes trips that are anticipated to use the new intersection at Greenhaven Parkway and Thurston Ave, just north of Cornelius Place, which is being constructed in 2017.

Build

For the Build forecast the growth rate along TH 10 from Ramsey Boulevard to Round Lake Boulevard ranges from 0.53 percent to 1.65 percent per year. The growth rates along the side streets are the same or very close to the No Build growth rates except along Main Street south of TH 10 and TH 47 north of TH 10. Along Main Street south of TH 10 the No Build growth rate is 1.24 percent and the Build growth rate is 1.72 percent per year. At TH 47 north of TH 10 the No Build growth rate is 0.4 percent and the Build growth rate is 0.74 percent per year as more traffic is anticipated to remain on TH 10 until TH 47 with congestion reduced instead of taking alternative routes. The Build forecast accounts for rerouted traffic from the grade separation of TH 10 at Fairoak Avenue and the grade separation and conversion of Thurston Avenue to an interchange at TH 10.

Analysis

PTV Vissim was used to determine VMT and VHT for build and no-build scenarios. Vissim is a microscopic analysis tool used to model various traffic scenarios and configurations. The values obtained using the modeling software provide travel distance (miles) and travel time (vehicle-hours) for the corridor and side streets that feed into it. Vissim was used to model traffic for a full 24 hour weekday, allowing an estimate of daily travel times and miles traveled. See **Table 3** for VMT and VHT during 2021 and 2041 build and no-build scenarios.

Table 3. Yearly VMT and VHT

	Year	Type	No Build		Build	
VMT	2021	Cars	31,509,746	32,887,096	31,963,751	33,369,211
		Trucks	1,377,350		1,405,459	
	2041	Cars	37,771,637	39,430,079	39,908,480	41,651,249
		Trucks	1,658,442		1,742,770	
VHT	2021	Cars	904,214	943,567	417,038	433,903
		Trucks	39,353		16,866	
	2041	Cars	1,460,264	1,522,104	591,120	616,418
		Trucks	61,840		25,298	

Calculation of Benefits

Economic values for VHT, VMT, and emissions were obtained from the MnDOT guidance: "Benefit-Cost Analysis for Transportation Projects". See **Table 4** for a summary of 2016 economic values obtained from MnDOT that were used for this analysis. A 20-year analysis period beginning in 2023 and ending in 2042 was chosen for the benefit-cost evaluation with all values discounted to 2016 dollars.

Table 4. 2016 BCA MnDOT Recommended Standard Values

Occupancy Rates in Seven-County Metro Area	
Auto	1.3
Truck	1.0
Value of Travel Time Savings (per person-hour)	
Auto	$ 17.00
Truck	$ 27.90
Operating Costs (per mile)	
Auto	$ 0.25
Truck	$ 0.83
Emissions Costs (per mile)	
Auto	$ 0.03
Truck	$ 0.26

Delay Benefit

Delay benefit was calculated in terms of delay per person. Using MnDOT's guidance of 1.3 persons per car and 1.0 persons per truck, delay was calculated by using these multipliers and the travel time reported in vehicle hours by Vissim. The economic costs of this delay were then quantified by using MnDOT's suggested values for auto and truck travel time savings. The benefits derived from the build scenario for delay are estimated at **$109,481,000** for a 7 percent discount rate and **$199,875,000** for a 3 percent discount rate. 2022 and 2042 delay benefits can be seen in **Table A4** and a yearly breakdown of the benefit-cost analysis pertaining to delay can be found in **Table A5** at the conclusion of this document.

Vehicle Operation and Emissions Benefits

Vehicle operation and emissions benefit were determined by using MnDOT's suggested values based on a cost per mile traveled. These values were then used in conjunction with vehicle miles traveled as output by Vissim. The benefits derived from the build scenario for operating benefit are estimated at **-$2,503,000** for a 7 percent discount rate and **-$4,769,000** for a 3 percent discount rate. A benefit of **-$688,000** for a 7 percent discount rate and a benefit of **-$362,000** was estimated for a 3 percent discount rate. 2022 and 2042 vehicle operation and emissions benefits can be seen in **Table A6** and **Table A8**. A yearly breakdown of the benefit-cost analysis pertaining to vehicle operation and emissions can be found in **Table A7** and **Table A9** at the conclusion of this document.

Operation and Maintenance benefits

MnDOT provided an approximate schedule for mill and overlay maintenance expected to occur within the project year for no-build conditions. A mill and overlay from the western project boundary to Fairoak was expected to occur in 2026 and the remainder of the project area from Fairoak to Main St was scheduled to have a mill overlay in 2033. Using data from the last mill and overlay for the western project area, a 1.5 inch mill with 3.0 inch overlay was selected to match previous activity. More frequent maintenance activities such as crack sealing and routine activities (i.e. snow plowing) was taken to be equal between build and no-build scenarios and therefore not taken into considerations when monetizing maintenance operations.

MnDOT average bid prices were used in conjunction with approximate existing asphalt area within the project boundaries along TH 10 as a base to calculate mill and overlay costs. This figure was inflated to reflect a probable cost for year of expenditure. The year of expenditure cost in 2026 is expected to be $838,000 and in 2033 it's expected to be $281,000. Total discounted maintenance benefits are **$515,000** at a 7 percent rate and **$794,000** for a 3 percent rate. **Table A10** shows a yearly breakdown of the benefit-cost analysis for maintenance activities.

Safety Analysis

The methodology used to complete the crash analysis and corresponding benefit-cost ratio is described in the following paragraphs. Crash reduction within the project area was determined by separating intersections and segments so that factors and state averages could be applied appropriately. Crashes were obtained from the Minnesota Crash Mapping Analysis Tool database for a ten year period from 2006-2015. These collisions were then annualized and reductions and additions of crashes were added appropriately relative to geometry reconfigurations.

At the West Main Street ramps, no reduction factors were applied for the conversion to roundabouts due to limited Crash Modification Factors (CMF) available for interchange-related roundabouts. These potential reductions were considered negligible given limited crash history compared to the whole and were therefore ignored.

With the removal of signals at TH 10 and Fairoak Avenue, the collisions at this location were removed. However, segment crashes along Greenhaven Parkway, South Frontage Road, and TH 10 as well as intersection crashes at Thurston and Geenhaven Parkway and South Frontage Road and Church Street were considered. These stretches used average Minnesota crash rates and crash severity distributions from comparable segments (roadway type and volume) and intersections to give a good estimate for additional crashes that may result from the project.

Minnesota state average crash rates and severity distributions from the existing Thurston and TH 10 intersection were used when considering the crash reduction at Thurston and TH 10 to determine anticipated crash patterns with the new interchange and associated ramp terminals. In this process, the state average rate for "K" and "A" level crashes was multiplied by the proportion of "K" and "A" crashes relative to the sum of both types. For example, if there were 2 "K" crashes and 6 "A" crashes, then 25 percent of the state fatal and severe rate was assigned to the build "K" crashes and 75 percent of the state rate was assigned to the "A" crashes. This process was similar for the "B", "C", and "O" crashes.

After establishing no-build and build crashes for 2015, forecasted 2021 and 2041 collisions were obtained by inflating numbers according to the expected AADT growth along TH 10 for the no-build and build scenarios. After completing these steps, the conversion matrix as shown in **Table A11** was used to convert from KABCO to AIS format. See **Table 5** for annualized crash statistics after conversion from KABCO to AIS.

Table 5. AIS Collision Values

	Severity	Description	2015	2021		2041	
			No-Build	No-Build	Build	No-Build	Build
AIS	0	Property Damage Only	82.223	89.429	39.660	118.329	55.018
	1	Minor	27.299	29.692	12.210	39.287	16.939
	2	Moderate	2.511	2.732	1.100	3.614	1.526
	3	Serious	0.576	0.627	0.250	0.829	0.347
	4	Severe	0.104	0.114	0.045	0.150	0.063
	5	Critical	0.023	0.025	0.010	0.033	0.014
	6	Not Survivable	0.200	0.218	0.037	0.288	0.052
	Sum		112.94	122.83	53.31	162.53	73.96

Following conversion from KABCO to AIS, MnDOT's 2016 $10.6 million value of a statistical life (VSL) was used in conjunction with USDOT's fractional value of VSL for the remaining injury categories. For no injury crashes, MnDOT's value of $7,600 was used. A resulting benefit of **$62,717,000** was obtained for a 3 percent discount rate and **$34,990,000** was calculated for a 7 percent discount rate over the 20-year analysis period. Conversion from KABCO to AIS can be seen in **Table A12** and a yearly breakdown of the benefit-cost analysis pertaining to this decrease in collisions can be seen in **Table A13**.

Benefit-Cost Analysis Results

Table A14 shows a yearly breakdown of design and construction costs for the project. See **Table 6** for a results summary of the benefit-cost analysis for the Highway 10/169 Safety and Mobility Improvements Project.

Table 6. Benefit-Cost Analysis Summary

Item	Build	
	PV (3% Discount Rate)	PV (7% Discount Rate)
Travel Time Benefit	$ 199,875,000.00	$ 109,481,000.00
Collision Reduction Benefit	$ 62,717,000.00	$ 34,990,000.00
Operation and Maintenance Benefit	$ 794,000.00	$ 515,000.00
Emissions Benefit	$ (688,000.00)	$ (362,000.00)
Vehicle Operating Benefit	$ (4,769,000.00)	$ (2,503,000.00)
PV Total Benefit	**$ 257,929,000.00**	**$ 142,121,000.00**
PV Total Cost	**$ 81,600,000.00**	**$ 67,589,000.00**
PV Salvage Value	$ 16,447,000.00	$ 6,108,000.00
(PV Total Cost - Salvage Value)	**$ 65,153,000.00**	**$ 61,481,000.00**
Benefit-Cost Ratio	**3.959**	**2.312**

The analysis indicates that the build option has a benefit-cost ratio greater than one, meaning that it is an economically beneficial project. The benefits of the project are estimated to be greater than the costs associated with the construction of the project. A more complete breakdown of both the project costs and benefits can be found in **Table A15** at the conclusion of this technical memorandum.

Appendix

Benefit-Cost Analysis

Table A1

Assumptions Used in this Benefit-Cost Analysis

Injury Costs (2016 Dollars)[1]

Property Damage Only	$	7,600.00
MAIS 1 (Minor)	$	31,800.00
MAIS 2 (Moderate)	$	498,200.00
MAIS 3 (Serious)	$	1,113,000.00
MAIS 4 (Severe)	$	2,819,600.00
MAIS 5 (Critical)	$	6,285,800.00
MAIS 6 (Not Survivable)	$	10,600,000.00

Time Costs

Automobile (per person-hour)	$	17.00
Heavy Vehicle (per person-hour)	$	27.90

Vehicle Operating Costs

Automobile (per mile)	$	0.25
Heavy Vehicle (per mile)	$	0.83

Emissions Costs

Automobile (per mile)	$	0.03
Heavy Vehicle (per mile)	$	0.26

Routine Pavement Management Cost: No-Build

Medium Mill and Overlay - West of Fairoak (2026)	$	838,203.00
Medium Mill and Overlay - East of Fairoak (2033)	$	281,396.00

Routine Bridge Management Cost: Build

Maintenance and operations for the bridge are considered negligible until the wearing surface is rehabilitated after 30 Years	$	-

Component Service Life (Years)

Engineering	0
Right-of-Way	100
Bridge	60
Mass Grading and Drainage/Sewer	50
Base	40
Surface	25
Signal System	20

Analysis Period

20 Years (2023-2042)

Build Year

2021-2022

Discount Rate (Annual)

Alternative 1	3.0%
Alternative 2	7.0%

Sources

MnDOT Benefit-Cost Analysis for Transporation Projects, 2016

Benefit-Cost Analysis

Table A2

Project Costs

Item	No-Build	Build
Surfacing	$ -	$ 13,400,967.00
Subbase/Base	$ -	$ 1,215,573.00
Grading and Drainage/Sewer	$ -	$ 13,266,583.00
Major Structures	$ -	$ 34,119,786.00
Right-of-Way	$ -	$ 5,149,747.00
Engineering	$ -	$ 15,303,059.00
Lighting/Signals	$ -	$ 2,185,295.00
Other Costs	$ -	$ 9,934,262.00
Total Cost	**$ -**	**$ 94,575,272.00**
PV (3% Discount Rate)	**$ -**	**$ 81,596,864.68**
PV (7% Discount Rate)	**$ -**	**$ 67,585,539.06**

Benefit-Cost Analysis

Table A3

Project Salvage Values

Item	No-Build	Build
Surfacing	$ -	$ 1,663,000.00
Subbase/Base	$ -	$ 543,900.00
Grading and Drainage/Sewer	$ -	$ 7,459,100.00
Major Structures	$ -	$ 21,867,500.00
Right-of-Way	$ -	$ 3,934,600.00
Engineering	$ -	$ -
Lighting/Signals	$ -	$ -
Other Costs	$ -	$ -
Total Salvage Value	**$ -**	**$ 35,468,100.00**
PV (3% Discount Rate)	**$ -**	**$ 16,446,370.96**
PV (7% Discount Rate)	**$ -**	**$ 6,107,446.97**

Benefit-Cost Analysis

Table A4

Travel Time Analysis

	Veh-Hour				Hourly Value[1]		Cost			Difference (Benefit)
	Weekday		Weekend							
	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Total	
2021 No Build	676,000	36,400	228,214	2,953	$ 22.10	$ 27.90	$ 19,983,131.33	$ 1,097,944.86	$ 21,081,076.20	**$ 11,393,998.82**
2021 Build	312,000	15,600	105,038	1,266	$ 22.10	$ 27.90	$ 9,216,529.58	$ 470,547.80	$ 9,687,077.38	
2041 No Build	1,092,000	57,200	368,264	4,640	$ 22.10	$ 27.90	$ 32,271,837.44	$ 1,725,341.93	$ 33,997,179.37	**$ 20,227,615.48**
2041 Build	442,000	23,400	149,120	1,898	$ 22.10	$ 27.90	$ 13,063,742.19	$ 705,821.70	$ 13,769,563.89	

Sources:

[1]MnDOT Benefit-Cost Analysis for Transporation Projects, 2016

Notes:

[1]Car hourly rate based upon $17.00 value per person and an occupancy rate of 1.30 per vehicle.

[2]Weekend traffic is assumed to have 25 percent of the trucks as a normal weekday. Weekend veh-hours obtained by analyzing MnDOT detector data at the TH 10 and Ferry St interchange. Saturday and Sunday daily volumes were compared against averaged Tuesday, Wednesday, and Thursday volumes for 5/7/17-5/13/17.

Benefit-Cost Analysis

Table A5

Travel Time Benefit

	Travel Time Cost	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023	$ 22,372,686.51	$ 10,095,326.03
2024	$ 23,018,491.67	$ 10,299,450.35
2025	$ 23,664,296.83	$ 10,503,574.68
2026	$ 24,310,101.99	$ 10,707,699.01
2027	$ 24,955,907.15	$ 10,911,823.33
2028	$ 25,601,712.31	$ 11,115,947.66
2029	$ 26,247,517.47	$ 11,320,071.98
2030	$ 26,893,322.62	$ 11,524,196.31
2031	$ 27,539,127.78	$ 11,728,320.63
2032	$ 28,184,932.94	$ 11,932,444.96
2033	$ 28,830,738.10	$ 12,136,569.29
2034	$ 29,476,543.26	$ 12,340,693.61
2035	$ 30,122,348.42	$ 12,544,817.94
2036	$ 30,768,153.58	$ 12,748,942.26
2037	$ 31,413,958.73	$ 12,953,066.59
2038	$ 32,059,763.89	$ 13,157,190.91
2039	$ 32,705,569.05	$ 13,361,315.24
2040	$ 33,351,374.21	$ 13,565,439.57
2041	$ 33,997,179.37	$ 13,769,563.89
2042	$ 34,642,984.53	$ 13,973,688.22

	Undiscounted Travel Time Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 12,277,360.49
2024		$ 12,719,041.32
2025		$ 13,160,722.15
2026		$ 13,602,402.98
2027		$ 14,044,083.82
2028		$ 14,485,764.65
2029		$ 14,927,445.48
2030		$ 15,369,126.32
2031		$ 15,810,807.15
2032		$ 16,252,487.98
2033		$ 16,694,168.81
2034		$ 17,135,849.65
2035		$ 17,577,530.48
2036		$ 18,019,211.31
2037		$ 18,460,892.15
2038		$ 18,902,572.98
2039		$ 19,344,253.81
2040		$ 19,785,934.64
2041		$ 20,227,615.48
2042		$ 20,669,296.31
	Total	$ 329,466,567.95

3%	PV Travel Time Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 9,982,617.59
2024		$ 10,040,528.67
2025		$ 10,086,597.67
2026		$ 10,121,465.29
2027		$ 10,145,744.96
2028		$ 10,160,023.87
2029		$ 10,164,864.00
2030		$ 10,160,803.07
2031		$ 10,148,355.47
2032		$ 10,128,013.19
2033		$ 10,100,246.68
2034		$ 10,065,505.68
2035		$ 10,024,220.02
2036		$ 9,976,800.41
2037		$ 9,923,639.21
2038		$ 9,865,111.08
2039		$ 9,801,573.79
2040		$ 9,733,368.76
2041		$ 9,660,821.80
2042		$ 9,584,243.72
	Total	$ 199,874,544.92

7%	PV Travel Time Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 7,645,723.07
2024		$ 7,402,597.85
2025		$ 7,158,560.85
2026		$ 6,914,771.93
2027		$ 6,672,243.05
2028		$ 6,431,852.74
2029		$ 6,194,359.17
2030		$ 5,960,412.16
2031		$ 5,730,564.12
2032		$ 5,505,279.98
2033		$ 5,284,946.32
2034		$ 5,069,879.59
2035		$ 4,860,333.65
2036		$ 4,656,506.62
2037		$ 4,458,547.05
2038		$ 4,266,559.58
2039		$ 4,080,610.05
2040		$ 3,900,730.14
2041		$ 3,726,921.51
2042		$ 3,559,159.67
	Total	$ 109,480,559.10

Benefit-Cost Analysis

Table A6

Vehicle Operating Analysis

	Vehicle Miles Traveled				Value Per Mile[1]		Cost			Difference (Benefit)
	Weekday		Weekend							
	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Total	
2021 No Build	23,556,000	1,274,000	7,953,746	103,350	$ 0.25	$ 0.83	$ 7,877,436.52	$ 1,143,200.66	$ 9,020,637.17	**$ (136,831.95)**
2021 Build	23,894,000	1,300,000	8,069,751	105,459	$ 0.25	$ 0.83	$ 7,990,937.84	$ 1,166,531.28	$ 9,157,469.13	
2041 No Build	28,236,000	1,534,000	9,535,637	124,442	$ 0.25	$ 0.83	$ 9,442,909.17	$ 1,376,506.91	$ 10,819,416.08	**$ (604,202.58)**
2041 Build	29,835,000	1,612,000	10,073,480	130,770	$ 0.25	$ 0.83	$ 9,977,119.88	$ 1,446,498.79	$ 11,423,618.66	

Sources:

[1]MnDOT Benefit-Cost Analysis for Transporation Projects, 2016

Notes:

Weekend traffic is assumed to have 25 percent of the trucks as a normal weekday. Weekend vehicle miles traveled obtained by analyzing MnDOT detector data at the TH 10 and Ferry St interchange. Saturday and Sunday daily volumes were compared against averaged Tuesday, Wednesday, and Thursday volumes for 5/7/17-5/13/17.

Benefit-Cost Analysis

Table A7

Vehicle Operating Benefits

	Annual Vehicle Operating Cost	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023	$ 9,200,515.06	$ 9,384,084.08
2024	$ 9,290,454.01	$ 9,497,391.56
2025	$ 9,380,392.95	$ 9,610,699.03
2026	$ 9,470,331.90	$ 9,724,006.51
2027	$ 9,560,270.85	$ 9,837,313.99
2028	$ 9,650,209.79	$ 9,950,621.46
2029	$ 9,740,148.74	$ 10,063,928.94
2030	$ 9,830,087.68	$ 10,177,236.42
2031	$ 9,920,026.63	$ 10,290,543.89
2032	$ 10,009,965.57	$ 10,403,851.37
2033	$ 10,099,904.52	$ 10,517,158.85
2034	$ 10,189,843.46	$ 10,630,466.33
2035	$ 10,279,782.41	$ 10,743,773.80
2036	$ 10,369,721.36	$ 10,857,081.28
2037	$ 10,459,660.30	$ 10,970,388.76
2038	$ 10,549,599.25	$ 11,083,696.23
2039	$ 10,639,538.19	$ 11,197,003.71
2040	$ 10,729,477.14	$ 11,310,311.19
2041	$ 10,819,416.08	$ 11,423,618.66
2042	$ 10,909,355.03	$ 11,536,926.14

	Undiscounted Operating Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (183,569.02)
2024		$ (206,937.55)
2025		$ (230,306.08)
2026		$ (253,674.61)
2027		$ (277,043.14)
2028		$ (300,411.67)
2029		$ (323,780.20)
2030		$ (347,148.74)
2031		$ (370,517.27)
2032		$ (393,885.80)
2033		$ (417,254.33)
2034		$ (440,622.86)
2035		$ (463,991.39)
2036		$ (487,359.92)
2037		$ (510,728.45)
2038		$ (534,096.99)
2039		$ (557,465.52)
2040		$ (580,834.05)
2041		$ (604,202.58)
2042		$ (627,571.11)
	Total	$ (8,111,401.28)

3%	PV Operating Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (149,258.41)
2024		$ (163,358.41)
2025		$ (176,510.43)
2026		$ (188,757.73)
2027		$ (200,141.86)
2028		$ (210,702.70)
2029		$ (220,478.56)
2030		$ (229,506.21)
2031		$ (237,820.93)
2032		$ (245,456.61)
2033		$ (252,445.73)
2034		$ (258,819.49)
2035		$ (264,607.81)
2036		$ (269,839.37)
2037		$ (274,541.71)
2038		$ (278,741.21)
2039		$ (282,463.18)
2040		$ (285,731.86)
2041		$ (288,570.52)
2042		$ (291,001.42)
	Total	$ (4,768,754.17)

7%	PV Operating Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (114,317.56)
2024		$ (120,439.54)
2025		$ (125,271.25)
2026		$ (128,955.31)
2027		$ (131,621.20)
2028		$ (133,386.38)
2029		$ (134,357.27)
2030		$ (134,630.26)
2031		$ (134,292.51)
2032		$ (133,422.75)
2033		$ (132,092.04)
2034		$ (130,364.41)
2035		$ (128,297.49)
2036		$ (125,943.07)
2037		$ (123,347.61)
2038		$ (120,552.72)
2039		$ (117,595.61)
2040		$ (114,509.47)
2041		$ (111,323.83)
2042		$ (108,064.92)
	Total	$ (2,502,785.17)

Benefit-Cost Analysis

Table A8

Environmental Analysis

	Miles				Value Per Mile[1]		Cost			Difference (Benefit)
	Weekday		Weekend							
	Cars	Trucks	Cars	Trucks	Cars	Trucks	Cars	Trucks	Total	
2021 No Build	23,556,000	1,274,000	7,953,746	103,350	$ 0.03	$ 0.26	$ 945,292.38	$ 358,111.05	$ 1,303,403.43	**$ (20,928.55)**
2021 Build	23,894,000	1,300,000	8,069,751	105,459	$ 0.03	$ 0.26	$ 958,912.54	$ 365,419.44	$ 1,324,331.98	
2041 No Build	28,236,000	1,534,000	9,535,637	124,442	$ 0.03	$ 0.26	$ 1,133,149.10	$ 431,194.94	$ 1,564,344.04	**$ (86,030.45)**
2041 Build	29,835,000	1,612,000	10,073,480	130,770	$ 0.03	$ 0.26	$ 1,197,254.39	$ 453,120.10	$ 1,650,374.49	

Sources:

[1]MnDOT Benefit-Cost Analysis for Transporation Projects, 2016

Notes:

Weekend traffic is assumed to have 25 percent of the trucks as a normal weekday. Weekend vehicle miles traveled obtained by analyzing MnDOT detector data at the TH 10 and Ferry St interchange. Saturday and Sunday daily volumes were compared against averaged Tuesday, Wednesday, and Thursday volumes for 5/7/17-5/13/17.

Benefit-Cost Analysis

Table A9

Environmental Benefit

	Environmental Cost	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023	$ 1,329,497.49	$ 1,356,936.23
2024	$ 1,342,544.52	$ 1,373,238.36
2025	$ 1,355,591.55	$ 1,389,540.48
2026	$ 1,368,638.58	$ 1,405,842.61
2027	$ 1,381,685.61	$ 1,422,144.73
2028	$ 1,394,732.64	$ 1,438,446.86
2029	$ 1,407,779.67	$ 1,454,748.98
2030	$ 1,420,826.70	$ 1,471,051.11
2031	$ 1,433,873.73	$ 1,487,353.23
2032	$ 1,446,920.76	$ 1,503,655.36
2033	$ 1,459,967.79	$ 1,519,957.48
2034	$ 1,473,014.82	$ 1,536,259.61
2035	$ 1,486,061.86	$ 1,552,561.73
2036	$ 1,499,108.89	$ 1,568,863.86
2037	$ 1,512,155.92	$ 1,585,165.99
2038	$ 1,525,202.95	$ 1,601,468.11
2039	$ 1,538,249.98	$ 1,617,770.24
2040	$ 1,551,297.01	$ 1,634,072.36
2041	$ 1,564,344.04	$ 1,650,374.49
2042	$ 1,577,391.07	$ 1,666,676.61

	Undiscounted Environmental Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (27,438.74)
2024		$ (30,693.83)
2025		$ (33,948.93)
2026		$ (37,204.02)
2027		$ (40,459.12)
2028		$ (43,714.21)
2029		$ (46,969.31)
2030		$ (50,224.40)
2031		$ (53,479.50)
2032		$ (56,734.59)
2033		$ (59,989.69)
2034		$ (63,244.78)
2035		$ (66,499.88)
2036		$ (69,754.98)
2037		$ (73,010.07)
2038		$ (76,265.17)
2039		$ (79,520.26)
2040		$ (82,775.36)
2041		$ (86,030.45)
2042		$ (89,285.55)
	Total	$ (1,167,242.84)

3%	PV Environmental Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (22,310.21)
2024		$ (24,230.00)
2025		$ (26,019.03)
2026		$ (27,683.29)
2027		$ (29,228.53)
2028		$ (30,660.27)
2029		$ (31,983.81)
2030		$ (33,204.25)
2031		$ (34,326.46)
2032		$ (35,355.12)
2033		$ (36,294.75)
2034		$ (37,149.65)
2035		$ (37,923.95)
2036		$ (38,621.64)
2037		$ (39,246.51)
2038		$ (39,802.22)
2039		$ (40,292.26)
2040		$ (40,719.99)
2041		$ (41,088.62)
2042		$ (41,401.24)
	Total	$ (687,541.78)

7%	PV Environmental Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ (17,087.47)
2024		$ (17,864.09)
2025		$ (18,465.97)
2026		$ (18,912.64)
2027		$ (19,221.84)
2028		$ (19,409.63)
2029		$ (19,490.59)
2030		$ (19,477.89)
2031		$ (19,383.43)
2032		$ (19,217.97)
2033		$ (18,991.20)
2034		$ (18,711.85)
2035		$ (18,387.77)
2036		$ (18,026.01)
2037		$ (17,632.89)
2038		$ (17,214.05)
2039		$ (16,774.55)
2040		$ (16,318.88)
2041		$ (15,851.04)
2042		$ (15,374.57)
	Total	$ (361,814.33)

Benefit-Cost Analysis

Table A10

Operation and Maintenance Benefit

	No-Build Maintenance Costs	
Year	Activity	Cost
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ -
2024		$ -
2025		$ -
2026	Mill and Overlay from West of Thurston to Fairoak	$ 838,203.02
2027		$ -
2028		$ -
2029		$ -
2030		$ -
2031		$ -
2032		$ -
2033	Mill and Overlay from Fairoak to Main St	$ 281,396.28
2034		$ -
2035		$ -
2036		$ -
2037		$ -
2038		$ -
2039		$ -
2040		$ -
2041		$ -
2042		$ -

	Maintenance Costs	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023	$ -	$ -
2024	$ -	$ -
2025	$ -	$ -
2026	$ 838,203.02	$ -
2027	$ -	$ -
2028	$ -	$ -
2029	$ -	$ -
2030	$ -	$ -
2031	$ -	$ -
2032	$ -	$ -
2033	$ 281,396.28	$ -
2034	$ -	$ -
2035	$ -	$ -
2036	$ -	$ -
2037	$ -	$ -
2038	$ -	$ -
2039	$ -	$ -
2040	$ -	$ -
2041	$ -	$ -
2042	$ -	$ -

	Undiscounted Maintenance Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ -
2024		$ -
2025		$ -
2026		$ 838,203.02
2027		$ -
2028		$ -
2029		$ -
2030		$ -
2031		$ -
2032		$ -
2033		$ 281,396.28
2034		$ -
2035		$ -
2036		$ -
2037		$ -
2038		$ -
2039		$ -
2040		$ -
2041		$ -
2042		$ -
	Total	$ 1,119,599.30

3%	PV Maintenance Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ -
2024		$ -
2025		$ -
2026		$ 623,701.77
2027		$ -
2028		$ -
2029		$ -
2030		$ -
2031		$ -
2032		$ -
2033		$ 170,249.38
2034		$ -
2035		$ -
2036		$ -
2037		$ -
2038		$ -
2039		$ -
2040		$ -
2041		$ -
2042		$ -
	Total	$ 793,951.15

7%	PV Maintenance Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ -
2024		$ -
2025		$ -
2026		$ 426,099.91
2027		$ -
2028		$ -
2029		$ -
2030		$ -
2031		$ -
2032		$ -
2033		$ 89,082.86
2034		$ -
2035		$ -
2036		$ -
2037		$ -
2038		$ -
2039		$ -
2040		$ -
2041		$ -
2042		$ -
	Total	$ 515,182.77

Benefit-Cost Analysis

Table A11

KABCO to AIS Conversion Matrix

		KABCO Level						
		O	C	B	A	K	U	Non-Fatal
AIS	0	0.92534	0.23437	0.08347	0.03437	0.00000	0.21538	0.43676
	1	0.07426	0.68946	0.76843	0.55449	0.00000	0.62728	0.41739
	2	0.00198	0.06391	0.10898	0.20908	0.00000	0.10400	0.08872
	3	0.00008	0.01071	0.03191	0.14437	0.00000	0.03858	0.04817
	4	0.00000	0.00142	0.00620	0.03986	0.00000	0.00442	0.00617
	5	0.00003	0.00001	0.00101	0.01783	0.00000	0.01034	0.00279
	6	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000
	Sum	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Sources:

[1]NHTSA, July 2011

Benefit-Cost Analysis

Table A12

KABCO to AIS Conversion

2015 No-Build KABCO to MAIS Conversion

		KABCO Level							Sum	Unit Value	Value
		O	C	B	A	K	U	Non-Fatal			
KABCO Value		82.60	22.00	7.30	0.70	0.20	0.00	0.00			
AIS	0	76.433	5.156	0.609	0.024	0.000	0.000	0.000	82.22	$ 7,600.00	$ 624,891.87
	1	6.134	15.168	5.610	0.388	0.000	0.000	0.000	27.30	$ 31,800.00	$ 868,121.88
	2	0.164	1.406	0.796	0.146	0.000	0.000	0.000	2.51	$ 498,200.00	$ 1,251,218.34
	3	0.007	0.236	0.233	0.101	0.000	0.000	0.000	0.58	$ 1,113,000.00	$ 641,343.99
	4	0.000	0.031	0.045	0.028	0.000	0.000	0.000	0.10	$ 2,819,600.00	$ 294,371.88
	5	0.002	0.000	0.007	0.012	0.000	0.000	0.000	0.02	$ 6,285,800.00	$ 142,172.22
	6	0.000	0.000	0.000	0.000	0.200	0.000	0.000	0.20	$ 10,600,000.00	$ 2,120,000.00
	Sum	82.74	22.00	7.30	0.70	0.20	0.00	0.00		**Total**	**$ 5,942,120.18**

2021 No-Build KABCO to MAIS Conversion

		KABCO Level							Sum	Unit Value	Value
		O	C	B	A	K	U	Non-Fatal			
KABCO Value		89.84	23.93	7.94	0.76	0.22	0.00	0.00			
AIS	0	83.132	5.608	0.663	0.026	0.000	0.000	0.000	89.43	$ 7,600.00	$ 679,656.65
	1	6.671	16.497	6.101	0.422	0.000	0.000	0.000	29.69	$ 31,800.00	$ 944,203.05
	2	0.178	1.529	0.865	0.159	0.000	0.000	0.000	2.73	$ 498,200.00	$ 1,360,873.63
	3	0.007	0.256	0.253	0.110	0.000	0.000	0.000	0.63	$ 1,113,000.00	$ 697,550.61
	4	0.000	0.034	0.049	0.030	0.000	0.000	0.000	0.11	$ 2,819,600.00	$ 320,170.28
	5	0.003	0.000	0.008	0.014	0.000	0.000	0.000	0.02	$ 6,285,800.00	$ 154,632.03
	6	0.000	0.000	0.000	0.000	0.218	0.000	0.000	0.22	$ 10,600,000.00	$ 2,305,794.28
	Sum	89.99	23.93	7.94	0.76	0.22	0.00	0.00		**Total**	**$ 6,462,880.53**

2021 Build KABCO to MAIS Conversion

		KABCO Level							Sum	Unit Value	Value
		O	C	B	A	K	U	Non-Fatal			
KABCO Value		40.11	9.71	3.07	0.31	0.04	0.00	0.00			
AIS	0	37.116	2.277	0.257	0.011	0.000	0.000	0.000	39.66	$ 7,600.00	$ 301,417.06
	1	2.979	6.697	2.363	0.172	0.000	0.000	0.000	12.21	$ 31,800.00	$ 388,290.06
	2	0.079	0.621	0.335	0.065	0.000	0.000	0.000	1.10	$ 498,200.00	$ 548,106.61
	3	0.003	0.104	0.098	0.045	0.000	0.000	0.000	0.25	$ 1,113,000.00	$ 278,422.29
	4	0.000	0.014	0.019	0.012	0.000	0.000	0.000	0.05	$ 2,819,600.00	$ 127,517.91
	5	0.001	0.000	0.003	0.006	0.000	0.000	0.000	0.01	$ 6,285,800.00	$ 62,656.69
	6	0.000	0.000	0.000	0.000	0.037	0.000	0.000	0.04	$ 10,600,000.00	$ 393,871.53
	Sum	40.18	9.71	3.07	0.31	0.04	0.00	0.00		**Total**	**$ 2,100,282.17**

2041 No-Build KABCO to MAIS Conversion

		KABCO Level							Sum	Unit Value	Value
		O	C	B	A	K	U	Non-Fatal			
KABCO Value		118.87	31.66	10.51	1.01	0.29	0.00	0.00			
AIS	0	109.997	7.420	0.877	0.035	0.000	0.000	0.000	118.33	$ 7,600.00	$ 899,301.30
	1	8.827	21.829	8.073	0.559	0.000	0.000	0.000	39.29	$ 31,800.00	$ 1,249,341.17
	2	0.235	2.023	1.145	0.211	0.000	0.000	0.000	3.61	$ 498,200.00	$ 1,800,667.19
	3	0.010	0.339	0.335	0.145	0.000	0.000	0.000	0.83	$ 1,113,000.00	$ 922,978.07
	4	0.000	0.045	0.065	0.040	0.000	0.000	0.000	0.15	$ 2,819,600.00	$ 423,639.72
	5	0.004	0.000	0.011	0.018	0.000	0.000	0.000	0.03	$ 6,285,800.00	$ 204,604.47
	6	0.000	0.000	0.000	0.000	0.288	0.000	0.000	0.29	$ 10,600,000.00	$ 3,050,957.88
	Sum	119.07	31.66	10.51	1.01	0.29	0.00	0.00		**Total**	**$ 8,551,489.80**

2041 Build KABCO to MAIS Conversion

		KABCO Level							Sum	Unit Value	Value
		O	C	B	A	K	U	Non-Fatal			
KABCO Value		55.64	13.47	4.27	0.43	0.05	0.00	0.00			
AIS	0	51.489	3.158	0.356	0.015	0.000	0.000	0.000	55.02	$ 7,600.00	$ 418,134.01
	1	4.132	9.290	3.278	0.239	0.000	0.000	0.000	16.94	$ 31,800.00	$ 538,646.62
	2	0.110	0.861	0.465	0.090	0.000	0.000	0.000	1.53	$ 498,200.00	$ 760,348.52
	3	0.004	0.144	0.136	0.062	0.000	0.000	0.000	0.35	$ 1,113,000.00	$ 386,235.03
	4	0.000	0.019	0.026	0.017	0.000	0.000	0.000	0.06	$ 2,819,600.00	$ 176,896.34
	5	0.002	0.000	0.004	0.008	0.000	0.000	0.000	0.01	$ 6,285,800.00	$ 86,919.08
	6	0.000	0.000	0.000	0.000	0.052	0.000	0.000	0.05	$ 10,600,000.00	$ 546,389.38
	Sum	55.74	13.47	4.27	0.43	0.05	0.00	0.00		**Total**	**$ 2,913,568.98**

Benefit-Cost Analysis

Table A13

Collision Reduction Benefit

	Collision Cost	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023	$ 6,671,741.45	$ 2,181,610.85
2024	$ 6,776,171.92	$ 2,222,275.19
2025	$ 6,880,602.38	$ 2,262,939.53
2026	$ 6,985,032.84	$ 2,303,603.87
2027	$ 7,089,463.31	$ 2,344,268.21
2028	$ 7,193,893.77	$ 2,384,932.55
2029	$ 7,298,324.23	$ 2,425,596.89
2030	$ 7,402,754.70	$ 2,466,261.23
2031	$ 7,507,185.16	$ 2,506,925.57
2032	$ 7,611,615.62	$ 2,547,589.91
2033	$ 7,716,046.09	$ 2,588,254.25
2034	$ 7,820,476.55	$ 2,628,918.59
2035	$ 7,924,907.01	$ 2,669,582.93
2036	$ 8,029,337.48	$ 2,710,247.27
2037	$ 8,133,767.94	$ 2,750,911.61
2038	$ 8,238,198.41	$ 2,791,575.96
2039	$ 8,342,628.87	$ 2,832,240.30
2040	$ 8,447,059.33	$ 2,872,904.64
2041	$ 8,551,489.80	$ 2,913,568.98
2042	$ 8,655,920.26	$ 2,954,233.32

	Undiscounted Collision Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 4,490,130.61
2024		$ 4,553,896.73
2025		$ 4,617,662.85
2026		$ 4,681,428.97
2027		$ 4,745,195.10
2028		$ 4,808,961.22
2029		$ 4,872,727.34
2030		$ 4,936,493.47
2031		$ 5,000,259.59
2032		$ 5,064,025.71
2033		$ 5,127,791.84
2034		$ 5,191,557.96
2035		$ 5,255,324.08
2036		$ 5,319,090.20
2037		$ 5,382,856.33
2038		$ 5,446,622.45
2039		$ 5,510,388.57
2040		$ 5,574,154.70
2041		$ 5,637,920.82
2042		$ 5,701,686.94
	Total	$ 101,918,175.47

3%	PV Collision Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 3,650,887.08
2024		$ 3,594,888.13
2025		$ 3,539,054.07
2026		$ 3,483,422.81
2027		$ 3,428,029.90
2028		$ 3,372,908.64
2029		$ 3,318,090.21
2030		$ 3,263,603.73
2031		$ 3,209,476.36
2032		$ 3,155,733.40
2033		$ 3,102,398.39
2034		$ 3,049,493.15
2035		$ 2,997,037.89
2036		$ 2,945,051.28
2037		$ 2,893,550.52
2038		$ 2,842,551.41
2039		$ 2,792,068.42
2040		$ 2,742,114.75
2041		$ 2,692,702.38
2042		$ 2,643,842.17
	Total	$ 62,716,904.71

7%	PV Collision Benefit	
Year	No-Build	Build
2015		
2016		
2017		
2018		
2019		
2020		
2021		
2022		
2023		$ 2,796,227.68
2024		$ 2,650,409.36
2025		$ 2,511,702.64
2026		$ 2,379,801.11
2027		$ 2,254,408.01
2028		$ 2,135,236.29
2029		$ 2,022,008.61
2030		$ 1,914,457.28
2031		$ 1,812,324.19
2032		$ 1,715,360.71
2033		$ 1,623,327.57
2034		$ 1,535,994.67
2035		$ 1,453,140.90
2036		$ 1,374,553.99
2037		$ 1,300,030.25
2038		$ 1,229,374.39
2039		$ 1,162,399.30
2040		$ 1,098,925.76
2041		$ 1,038,782.27
2042		$ 981,804.79
	Total	$ 34,990,269.75

Benefit-Cost Analysis

Table A14

Design and Constuction Cost

	Undiscounted Design/Construction Cost	
Year	No-Build	Build
2015		$ 85,354.00
2016		$ 307,497.00
2017		$ 2,317,709.00
2018		$ 2,047,724.00
2019		$ 2,880,750.00
2020		$ 13,726,410.00
2021		$ 34,961,756.00
2022		$ 38,248,072.00
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
	Total	$ 94,575,272.00

3%	PV Design/Construction Cost	
Year	No-Build	Build
2015		$ 86,480.67
2016		$ 307,497.00
2017		$ 2,250,202.91
2018		$ 1,930,176.27
2019		$ 2,636,294.34
2020		$ 12,195,737.50
2021		$ 30,158,317.84
2022		$ 32,032,158.15
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
	Total	$ 81,596,864.68

7%	PV Design/Construction Cost	
Year	No-Build	Build
2015		$ 86,480.67
2016		$ 307,497.00
2017		$ 2,166,083.18
2018		$ 1,788,561.45
2019		$ 2,351,550.11
2020		$ 10,471,812.47
2021		$ 24,927,248.84
2022		$ 25,486,305.35
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
	Total	$ 67,585,539.06

Benefit-Cost Analysis

Table A15

Anoka TH 10 BCA Summary

Item	Build	
	PV (3% Discount Rate)	PV (7% Discount Rate)
Travel Time Benefit	$ 199,875,000.00	$ 109,481,000.00
Collision Reduction Benefit	$ 62,717,000.00	$ 34,990,000.00
Operation and Maintenance Benefit	$ 794,000.00	$ 515,000.00
Emissions Benefit	$ (688,000.00)	$ (362,000.00)
Vehicle Operating Benefit	$ (4,769,000.00)	$ (2,503,000.00)
PV Total Benefit	**$ 257,929,000.00**	**$ 142,121,000.00**
Major Structures	$ 29,045,000.00	$ 23,611,000.00
Surfacing	$ 11,537,000.00	$ 9,526,000.00
Grading and Drainage/Sewer	$ 11,413,000.00	$ 9,417,000.00
Lighting/Signals	$ 1,865,000.00	$ 1,522,000.00
Subbase/Base	$ 1,053,000.00	$ 877,000.00
Engineering	$ 13,463,000.00	$ 11,449,000.00
Right-of-Way	$ 4,660,000.00	$ 4,102,000.00
Other Costs	$ 8,564,000.00	$ 7,085,000.00
PV Total Cost	**$ 81,600,000.00**	**$ 67,589,000.00**
PV Salvage Value	$ 16,447,000.00	$ 6,108,000.00
(PV Total Cost - Salvage Value)	**$ 65,153,000.00**	**$ 61,481,000.00**
Benefit-Cost Ratio	**3.959**	**2.312**

APPENDIX F

Wetland Delineation Information

1. Department of the Army/Corps of Engineers Jurisdictional Determination Approval Letter
2. Wetland Technical Review Memorandum

DEPARTMENT OF THE ARMY
ST. PAUL DISTRICT, CORPS OF ENGINEERS
180 FIFTH STREET EAST, SUITE 700
ST. PAUL, MN 55101-1678

July 31, 2018

REPLY TO ATTENTION OF
REGULATORY BRANCH

Regulatory File No. 2009-04049-LMG

City of Anoka
c/o Mr. Greg Lee
2015 First Avenue
Anoka, Minnesota 55303

Dear Mr. Lee:

This letter is in response to your request for an approved jurisdictional determination for a section of Highway 10 from the Anoka/Ramsey border to 1600 feet east of Main Street/Greenhaven Road. The project site is in Sections 1, 12, and 13, Township 31 North, Range 25 West, Anoka County, Minnesota. The review area for our jurisdictional determination is identified on the enclosed figures labeled MVP-2009-04049-LMG Page 1 of 2 through 2 of 2.

The review area contains no waters of the United States subject to Corps of Engineers (Corps) jurisdiction. Therefore, you are not required to obtain Department of the Army authorization to discharge dredged or fill material within this area. The rationale for this determination is provided in the enclosed Approved Jurisdictional Determination form. This determination is only valid for the review area shown on the enclosed figures.

If you object to this approved jurisdictional determination, you may request an administrative appeal under Corps regulations at 33 CFR 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination, you must submit a completed RFA form to the Mississippi Valley Division Office at the address shown on the form.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the enclosed NAP. It is not necessary to submit an RFA form to the division office if you do not object to the determination in this letter

This approved jurisdictional determination may be relied upon for five years from the date of this letter. However, the Corps reserves the right to review and revise the boundary in response to changing site conditions, information that was not considered during our initial review, or off-site activities that could indirectly alter the extent of wetlands and other resources on-site. This determination may be renewed at the end of the five year period provided you submit a written request and our staff are able to verify that the limits established during the original determination are still accurate.

If you have any questions, please contact me in our St. Paul office at (651) 290-5324 or LeeAnn.M.Glomski@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,

LeeAnn Glomski
Lead Project Manager

Enclosures

cc:
Kristina Bloomquist, Bolton & Menk

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): July 31, 2018

B. ST PAUL, MN DISTRICT OFFICE, FILE NAME, AND NUMBER:
2009-04049-LMG Highway 10 Improvements at Thurston and Fairoak

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: Minnesota County/parish/borough: Anoka City: Anoka/Ramsey
Center coordinates of site (lat/long in degree decimal format): Lat. 45.20831° **N**, Long. -93.40615° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Mississippi River
Name of watershed or Hydrologic Unit Code (HUC): 07010206 Upper Mississippi Region
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: July 20, 2018
☐ Field Determination. Date(s):

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There are no "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There are no"*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. **Waters of the U.S.:** N/A

2. **Non-regulated waters/wetlands (check if applicable):**[1]
☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The drainage ditch labeled as Wetland I1 on the enclosed figure labeled MVP-2009-04049-LMG Page 2 of 2 was constructed wholly in uplands, drains only uplands and has less than permanent flow. Per the Rapanos decision this ditch is not WOUS.**

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs: N/A

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY): N/A

C. SIGNIFICANT NEXUS DETERMINATION: N/A

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY): N/A

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY): N/A

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain:

[1] Supporting documentation is presented in Section III.F.

☐ Other (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Bolton and Menk
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☒ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps:
☐ Corps navigable waters' study:
☐ U.S. Geological Survey Hydrologic Atlas:
  ☐ USGS NHD data.
  ☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 1:24K Anoka
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: Anoka County Soil Survey
☒ National wetlands inventory map(s). Cite name: USFWS NWI
☐ State/Local wetland inventory map(s):
☐ FEMA/FIRM maps:
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Google Earth 1991 - 2018
  or ☐ Other (Name & Date):
☐ Previous determination(s). File no. and date of response letter:
☐ Applicable/supporting case law:
☐ Applicable/supporting scientific literature:
☐ Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:

ANOKA REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit F: TH 10 Approved Delineation

July 2018

BOLTON & MENK

Real People. Real Solutions.

MVP-2009-04049-LMG Page 1 of 2

Map Document: H:\ANOK\T44114009\GIS\ESRI\Wetland\Maps\114009_F_TH10_Approved_Delineation.mxd | Date Saved: 7/13/2018 9:29:22 AM

Anoka County MINNESOTA
Respectful, Innovative, Fiscally Responsible

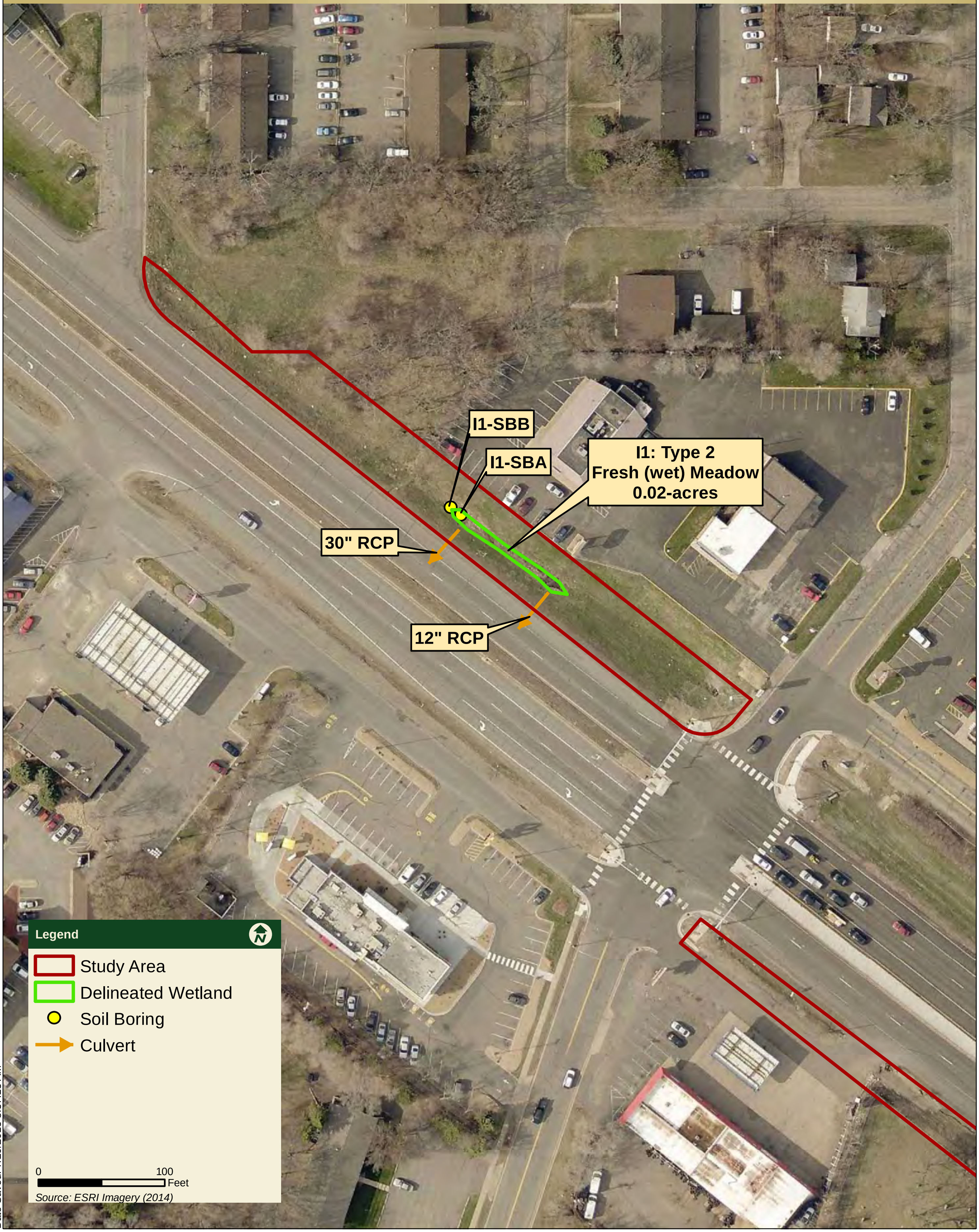
TH 10 Pedestrian Trail

July, 2015

Delineated Wetland

Exhibit F

BOLTON & MENK Engineers & Surveyors



Map Document: H:\AKCO\T42109237\GIS\ESRI\Maps\109237_Delineation_8x11.mxd
Date Saved: 7/29/2015 8:37:13 AM

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: City of Anoka	File No.: MVP-2009-04049-LMG	Date: July 31, 2018

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://usace.army.mil/inet/functions/cw/cecwo/reg or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT		
REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)		
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.		
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:		
If you have questions regarding this decision and/or the appeal process you may contact: U.S. Army Corps of Engineers Attn. LeeAnn Glomski 180 Fifth Street East, Suite 700 St. Paul, MN 55101	If you only have questions regarding the appeal process you may also contact the Division Engineer through: Administrative Appeals Review Officer Mississippi Valley Division P.O. Box 80 (1400 Walnut Street) Vicksburg, MS 39181-0080 601-634-5820 FAX: 601-634-5816	
RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.		
______________________________ Signature of appellant or agent.	Date:	Telephone number:

BOLTON & MENK
Real People. Real Solutions.

1960 Premier Drive
Mankato, MN 56001-5900

Ph: (507) 625-4171
Fax: (507) 625-4177
Bolton-Menk.com

MEMORANDUM

Date: June 18, 2018

From: Kristina Bloomquist, Wetland Specialist

Subject: Highway 10 Improvments at Thurston and Fairoak
City of Anoka
Project No.: T44.114009

The City of Anoka is proposing to improve TH 10 from the Ramsey/Anoka boundary to approximately 1,600' east of Main St/Greenhaven Rd. Several site visits were completed to confirm the existence of wetlands as part of the design process. This assessment included the review of the following items:

- Location Map (Exhibit A)
- Two foot LiDAR contours (Exhibit B).
- The National Wetland Inventory (Exhibit C).
- The Public Waters Inventory (Exhibit D).
- The Anoka County Soil Survey (Exhibit E).
- TH 10 Delineations (Exhibit F)

Site visits were conducted on 6/19/15, 8/22/17, and 6/1/18 (Exhibit F). It was determined that no wetlands exist within the study area, beyond a previously identified incidental wetland based on a 6/09/15 site visit and approved wetland delineation report and no loss determination[1].

Through the use of using methods described in the "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)" it has been determined that no wetlands exist in the area being considered for construction, beyond the previously identified referenced incidental wetland. The attached exhibits illustrate the findings of this study.

[1] *WCA number Anoka 1/2015, approved 11/4/2015; Corps number MVP-2015-03229-ADB, approved 9/20/2016.*

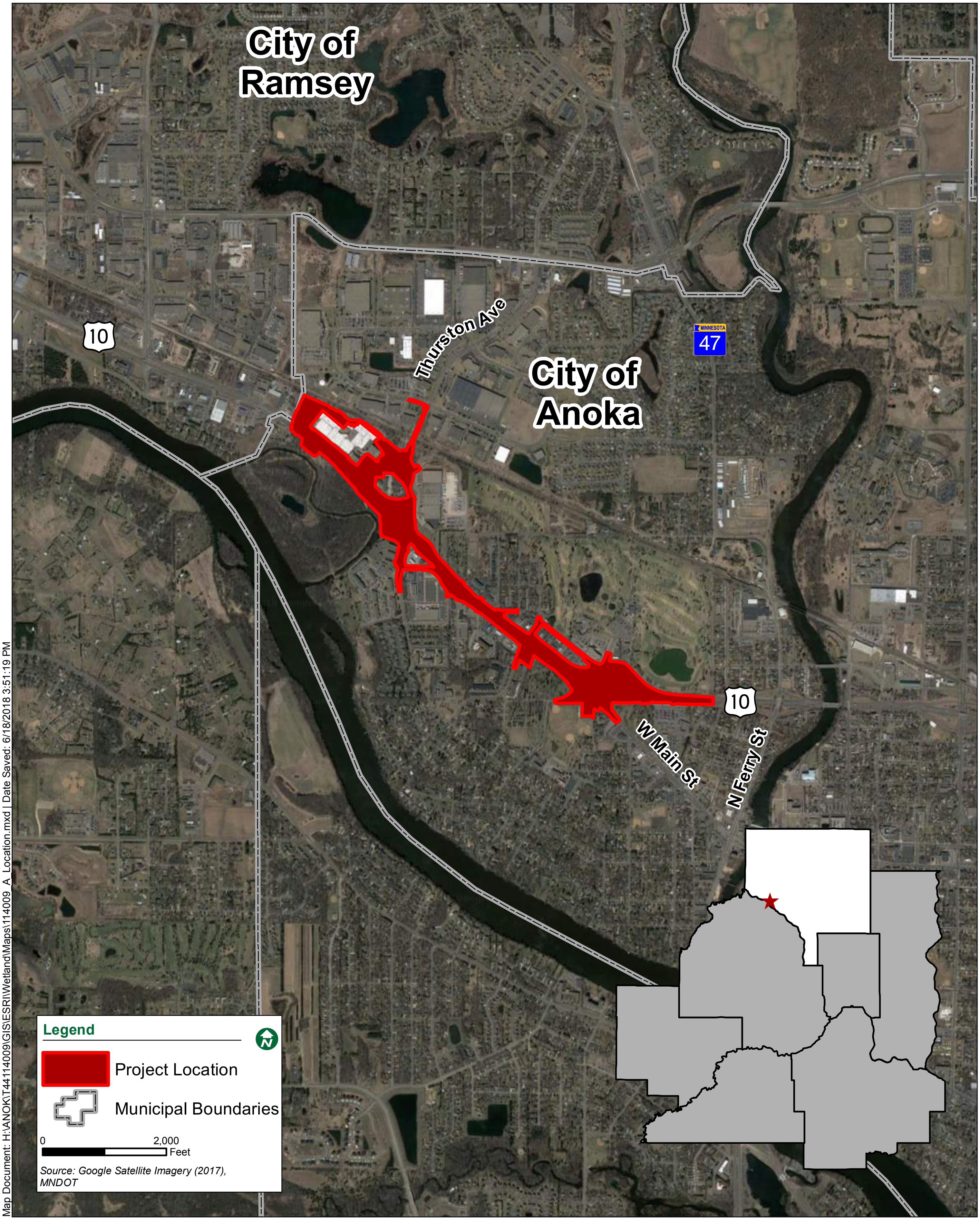
ANOKA REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit A: Location Map

June, 2018

BOLTON & MENK
Real People. Real Solutions.



Map Document: H:\ANOK\T44114009\GIS\ESRI\Wetland\Maps\114009_A_Location.mxd | Date Saved: 6/18/2018 3:51:19 PM

ANOKA REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit B: 2 Foot LiDAR Contours

June 2018

BOLTON & MENK
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ANOKA REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit C: National Wetlands Inventory

June 2018

BOLTON & MENK

Real People. Real Solutions.

Map Document: H:\ANOK\T44114009\GIS\ESRI\Wetland\Maps\114009_C_NWI.mxd | Date Saved: 6/18/2018 3:56:04 PM

ANOKA REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit D: Public Waters Inventory

June 2018

BOLTON & MENK
Real People. Real Solutions.

Map Document: H:\ANOK\T44114009\GIS\ESRI\Wetland\Maps\114009_D_PWI.mxd | Date Saved: 6/18/2018 4:16:02 PM

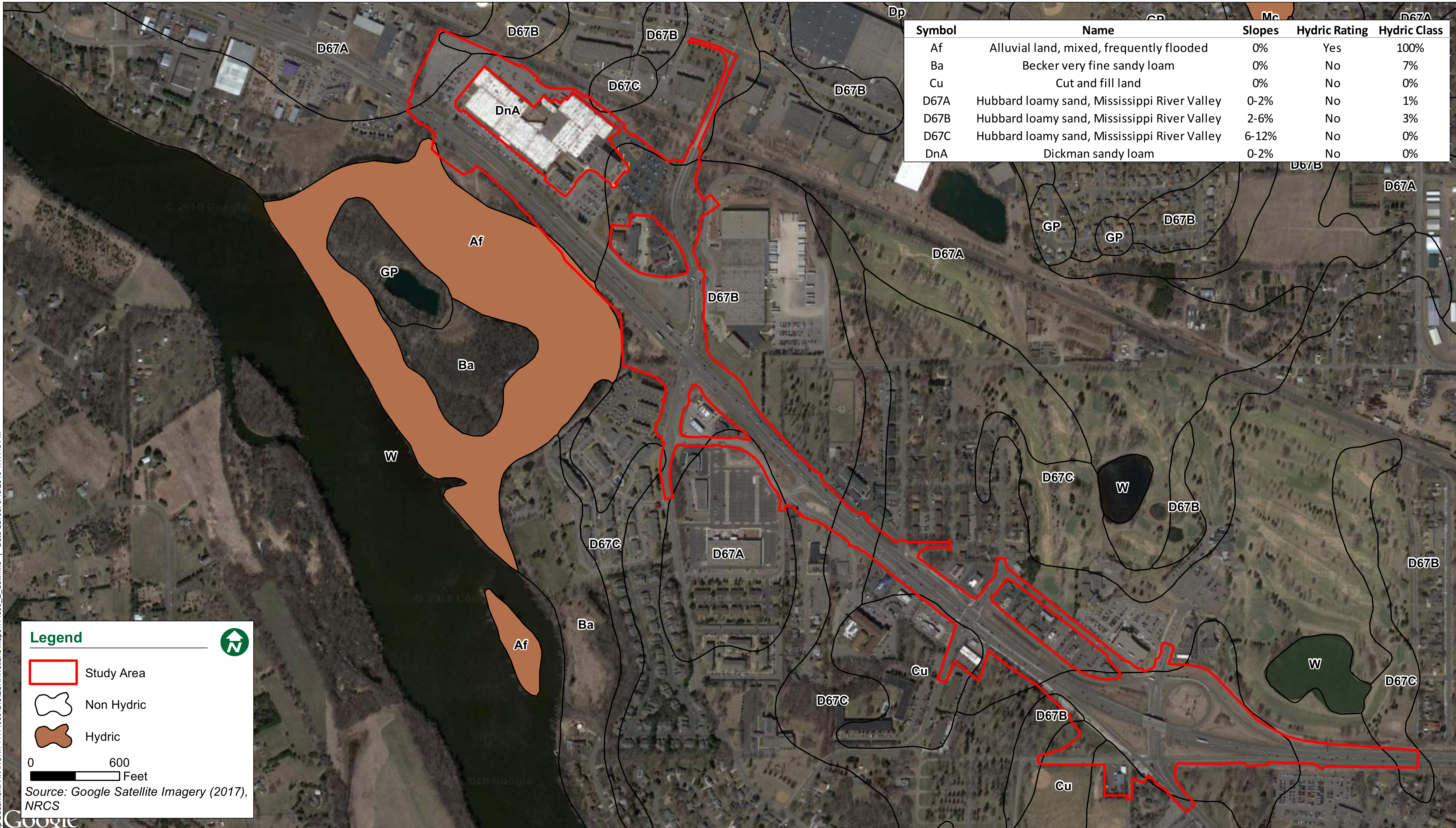
ANOKA
REAL. CLASSIC.

Highway 10 Improvements at Thurston and Fairoak

Exhibit E: Anoka County Soil Survey

June 2018

BOLTON & MENK
Real People. Real Solutions.



Symbol	Name	Slopes	Hydric Rating	Hydric Class
Af	Alluvial land, mixed, frequently flooded	0%	Yes	100%
Ba	Becker very fine sandy loam	0%	No	7%
Cu	Cut and fill land	0%	No	0%
D67A	Hubbard loamy sand, Mississippi River Valley	0-2%	No	1%
D67B	Hubbard loamy sand, Mississippi River Valley	2-6%	No	3%
D67C	Hubbard loamy sand, Mississippi River Valley	6-12%	No	0%
DnA	Dickman sandy loam	0-2%	No	0%

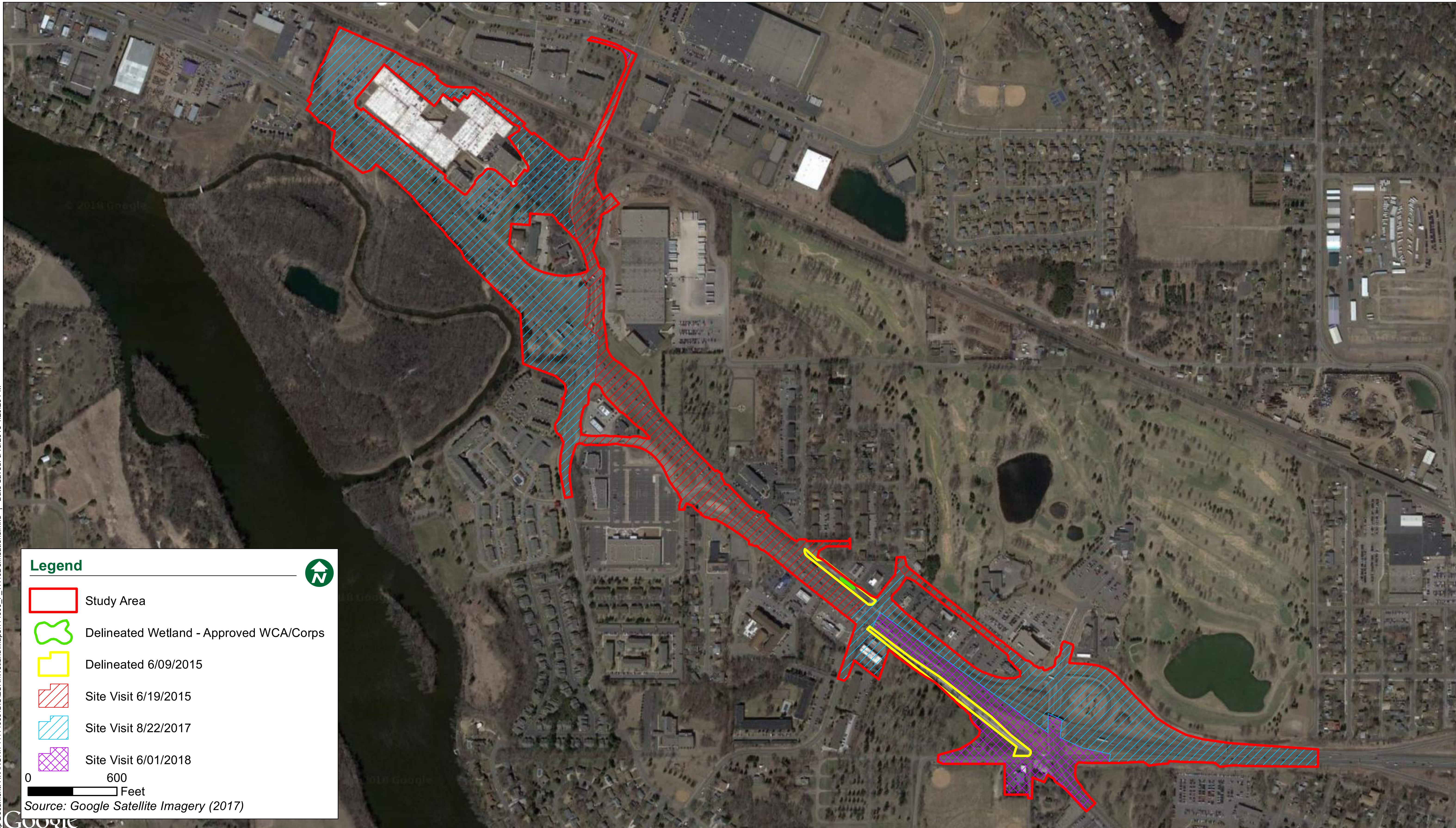
Map Document: H:\ANOKT\44114009\GIS\ESRI\Wetland\Maps\114009_E_Soil.mxd | Date Saved: 6/18/2018 4:17:40 PM

Highway 10 Improvements at Thurston and Fairoak

Exhibit F: TH 10 Delineations

June 2018

BOLTON & MENK
Real People. Real Solutions.



Map Document: H:\ANOK\T44114009\GIS\ESRI\Wetland\Maps\114009_F_TH10Delineations.mxd | Date Saved: 6/18/2018 4:20:23 PM

APPENDIX G

Minnesota Department of Health Well Logs

Minnesota Unique Well Number

249214

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/22/2003
Update Date 12/27/2017
Received Date

Well Name	Township	Range	Dir	Section	Subsection
WOODLYN	32	25	W	35	CADCAA

Elevation 853 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 6050 10 HY NW RAMSEY MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GLACIAL DRIFT	0	88		
ST. LAWRENCE	88	117		
TUNNEL CITY GROUP	117	203		

Remarks

GAMMA LOGGED 8-10-2015. LOGGED FOR STRAT.
SEALED 12-22-2015 BY 1431.

Well Depth	Depth Completed	Date Well Completed
203 ft.	203 ft.	

Drill Method **Drill Fluid**

Use community supply(municipal) **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4 in. To 114 ft. lbs./ft.

Open Hole From 114 ft. To 203 ft.
Screen? ☐ **Type** **Make**

Static Water Level
23 ft. land surface Measure 08/10/2015

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☒ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock St.Lawrence Formation Aquifer St.Lawrence-
Last Strat Tunnel City Group Depth to Bedrock 88 ft
Located by Minnesota Department of Health
Locate Method GPS Differentially Corrected
System UTM - NAD83, Zone 15, Meters X 466962 Y 5007106
Unique Number Verification Info/GPS from data Input Date 07/26/1999

Angled Drill Hole

Well Contractor
Minnesota Geological Survey MGS
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

209270

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/15/1991
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir Section	Subsection
JOHNSON,	31	25	W 1	BDADAD

Elevation 863 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 500 GREENHAVEN RD ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY & SAND	0	27	BROWN	
CLAY	27	53	BROWN	
GRAVEL	53	78	TAN	
MUDDY SAND	78	82	BROWN	
CLAY	82	113	BROWN	
HARDPAN GRAVEL	113	166	BROWN	
SANDROCK	166	176	GRN/WHT	
SHALE	176	177	GREEN	

Remarks

Well Depth	Depth Completed	Date Well Completed
177 ft.	177 ft.	01/02/1973

Drill Method **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
4 in. To 166 ft. lbs./ft. 4 in. To 177 ft.

Open Hole From 166 ft. To 177 ft.
Screen? ☐ **Type** **Make**

Static Water Level
28 ft. land surface Measure 01/02/1973

Pumping Level (below land surface)
28 ft. hrs. Pumping at 33 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Jordan-St.Lawrence Aquifer Jordan-St.
Last Strat St.Lawrence Formation Depth to Bedrock 166 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 468660 Y 5006070
Unique Number Verification Address verification Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Tweed Richard Well	02316	

Minnesota Unique Well Number

624973

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/20/2000
Update Date 08/18/2014
Received Date 01/28/2000

Well Name	Township	Range	Dir Section	Subsection
	31	25	W 1	CAACCA

Elevation 860 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 2300 REED AV ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	38	BROWN	SOFT
CLAY GRAVEL	38	90	BROWN	SOFT
SAND	90	99	GRAY	SOFT
CLAY, GRAVEL,	99	230	BROWN	HARD
SHALE BROKEN ROCK	230	238	GREEN	MEDIUM
SANDSTONE	238	250	RED/GRY	MEDIUM

Remarks

Well Depth 250 ft. **Depth Completed** 250 ft. **Date Well Completed** 09/02/1999

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter **Weight**
4 in. To 239 ft. 11 lbs./ft.

Hole Diameter
8 in. To 30 ft.
6.2 in. To 238 ft.
4 in. To 250 ft.

Open Hole From 239 ft. To 250 ft.
Screen? ☐ **Type** **Make**

Static Water Level
30 ft. land surface Measure 09/02/1999

Pumping Level (below land surface)
210 ft. 4 hrs. Pumping at 40 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
high solids bentonite	2.5	Sacks	0 ft.	30 ft.

Nearest Known Source of Contamination
90 feet Northwes Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/19/1999
Manufacturer's name GOULDS
Model Number HP 0.5 Volt 230
Length of drop pipe 63 ft Capacity g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Tunnel City Group Aquifer Tunnel City
Last Strat Tunnel City Group Depth to Bedrock 230 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - NAD83, Zone 15, Meters X 468512 Y 5005656
Unique Number Verification Address verification Input Date 09/06/2006

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Stodola Don Well Co.	27172	MOORE, C.

Minnesota Unique Well Number

804773

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 05/12/2015
Update Date 05/28/2015
Received Date 04/00/2015

Well Name	Township	Range	Dir Section	Subsection
DEHN OIL	31	25	W 1	BCBACC

Elevation 870.1 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 750 MAIN ST W ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	30	BROWN	MEDIUM

Remarks

Well Depth	Depth Completed	Date Well Completed
30 ft.	30 ft.	03/31/2015

Drill Method Auger (non-specified) **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ From To

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 20 ft. lbs./ft. 8 in. To 30 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	30	10 ft.	10 ft.	20 ft.

Static Water Level
24 ft. land surface Measure 03/31/2015

Pumping Level (below land surface)
ft. hrs. Pumping at g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☒ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
bentonite	4	Sacks	ft.	18 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged)
System UTM - NAD83, Zone 15, Meters X 467970 Y 5006139
Unique Number Verification Info/GPS from data Input Date 03/30/2015

Angled Drill Hole

Well Contractor

Bergerson Caswell, Inc.	1767	SANDBERG, C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

804772

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 05/12/2015
Update Date 05/28/2015
Received Date 04/00/2015

Well Name	Township	Range	Dir Section	Subsection
DEHN OIL	31	25	W 1	BCBACB

Elevation 870.4 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 750 MAIN ST W ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	32	BROWN	MEDIUM

Remarks

Well Depth	Depth Completed	Date Well Completed
32 ft.	32 ft.	03/31/2015

Drill Method Auger (non-specified) **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 22 ft. lbs./ft. 8 in. To 32 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** slotted pipe **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	32	10 ft.	10 ft.	22 ft.

Static Water Level
25 ft. land surface Measure 03/31/2015

Pumping Level (below land surface)
ft. hrs. Pumping at g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☒ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
bentonite	4	Sacks	1 ft.	20 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method GPS SA Off (averaged)
System UTM - NAD83, Zone 15, Meters X 467982 Y 5006156
Unique Number Verification Info/GPS from data Input Date 03/30/2015

Angled Drill Hole

Well Contractor

Bergerson Caswell, Inc.	1767	SANDBERG, C.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Well Index Report **804772**

Minnesota Unique Well Number

522354

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/01/1993
Update Date 02/14/2014
Received Date 01/11/1993

Well Name	Township	Range	Dir Section	Subsection
ANGLERS	31	25	W 1	BBCDBA

Elevation 865 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 2141 COON RAPIDS BL COON RAPIDS MN 55433

Well 809 MAIN W ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	4	BLACK	SOFT
SAND	4	27	BROWN	SOFT
CLAY	27	31	GRAY	SOFT
SAND/GRAVEL	31	66	TAN	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
66 ft.	66 ft.	12/22/1992

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint** Glued

Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**

4 in. To 56 ft. lbs./ft.

8.7 in. To 30 ft.
6.2 in. To 66 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** EVER-FLO

Diameter	Slot/Gauze	Length	Set	
4 in.	10	10 ft.	56 ft.	66 ft.

Static Water Level

20 ft. land surface Measure 12/22/1992

Pumping Level (below land surface)

ft. 1 hrs. Pumping at 25 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MONITOR Model 8PL41UC1

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	5 Sacks	ft.	30 ft.

Nearest Known Source of Contamination

50 feet West Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 12/28/1992

Manufacturer's name MYERS

Model Number RM3N52-12 HP 0.5 Volt 230

Length of drop pipe 40 ft Capacity 10 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer Quat. Water

Last Strat sand +larger-brown Depth to Bedrock ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:24,000)

System UTM - NAD83, Zone 15, Meters X 467996 Y 5006293

Unique Number Verification Address verification Input Date 06/18/2008

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Mork Well Co.	02133	LEIBY, F.

Minnesota Unique Well Number

270123

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/26/2008
Update Date 08/26/2008
Received Date

Well Name	Township	Range	Dir Section	Subsection
CHURCH OF ST.	31	25	W 2	AAAACD

Elevation 885 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 991 10 SH ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
GRAVEL	0	10	BROWN	
CLAY	10	23	GRAY	
GRAVEL	23	33	BLACK	
SANDY CLAY	33	83	BROWN	
GRAVEL	83	112		

Remarks

GEOLOGY FROM WELL AT 3211 XJUMO ST. UNIQUE NO. 431617.
SITE WORK BY RAY RENNER.
THIS IS CALVARY CEMETERY WELL.
CONTAMINATION: GRAVES.
ORIGINAL DRILLER UNKNOWN.

Well Depth	Depth Completed	Date Well Completed
112 ft.	112 ft.	00/00/1951

Drill Method Cable Tool **Drill Fluid**

Use irrigation **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter **Weight**
8 in. To 102 ft. 28.5 lbs./ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
in.	10	10 ft.	102 ft.	112 ft.

Static Water Level
50 ft. land surface Measure 09/07/2007

Pumping Level (below land surface)
70 ft. 2 hrs. Pumping at 200 g.p.m.

Wellhead Completion
Pitless adapter manufacturer MAASS Model 8J3
☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination
20 feet Direction Other Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 05/22/2008
Manufacturer's name GRUNDFOS
Model Number SP27-100 HP 10 Volt 230
Length of drop pipe 84 ft Capacity 135 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer Quat. buried
Last Strat gravel (+larger) Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - NAD83, Zone 15, Meters X 467804 Y 5006535
Unique Number Verification Address verification Input Date 08/19/2008

Angled Drill Hole

Well Contractor
EH Renner and Sons, Inc. 1431

Licensee Business	Lic. or Reg. No.	Name of Driller
EH Renner and Sons, Inc.	1431	

Minnesota Unique Well Number

733424

County Anoka
Quad Anoka
Quad ID 120B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/07/2005
Update Date 03/03/2017
Received Date 10/26/2005

Well Name	Township	Range	Dir Section	Subsection
MW #1B	32	25	W 35	DDBDCD

Elevation 881 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W ONE CORNELIUS PL ANOKA MN 55303

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	2	DK. BRN	MEDIUM
SAND GRAVEL	2	25	BROWN	MEDIUM
SAND GRAVEL CLAY	25	41	RED/BRN	MEDIUM
SAND GRAVEL	41	49	BROWN	MEDIUM

Remarks

SEALED 06-23-2006 BY 1337.

Well Depth 49 ft. **Depth Completed** 45.5 ft. **Date Well Completed** 09/28/2005

Drill Method Auger (non-specified) **Drill Fluid**

Use monitor well **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter **Weight** **Hole Diameter**
2 in. To 35.5 ft. 0.69 lbs./ft. 8.2 in. To 49 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** TIMCO

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	35 ft.	45.5 ft.

Static Water Level
43 ft. land surface Measure 09/28/2005

Pumping Level (below land surface)
ft. hrs. Pumping at g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	2	Sacks	0 ft.	4 ft.
high solids bentonite	4	Sacks	4 ft.	35.5 ft.
bentonite	1	Sacks	35.5 ft.	37.5 ft.

Nearest Known Source of Contamination
0 feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer Quat. buried
Last Strat sand +larger-brown Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:24,000)
System UTM - NAD83, Zone 15, Meters X 467640 Y 5006876
Unique Number Verification Info/GPS from data Input Date 09/30/2005

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Thein Well Co.	34625	THEIN, M.

APPENDIX H

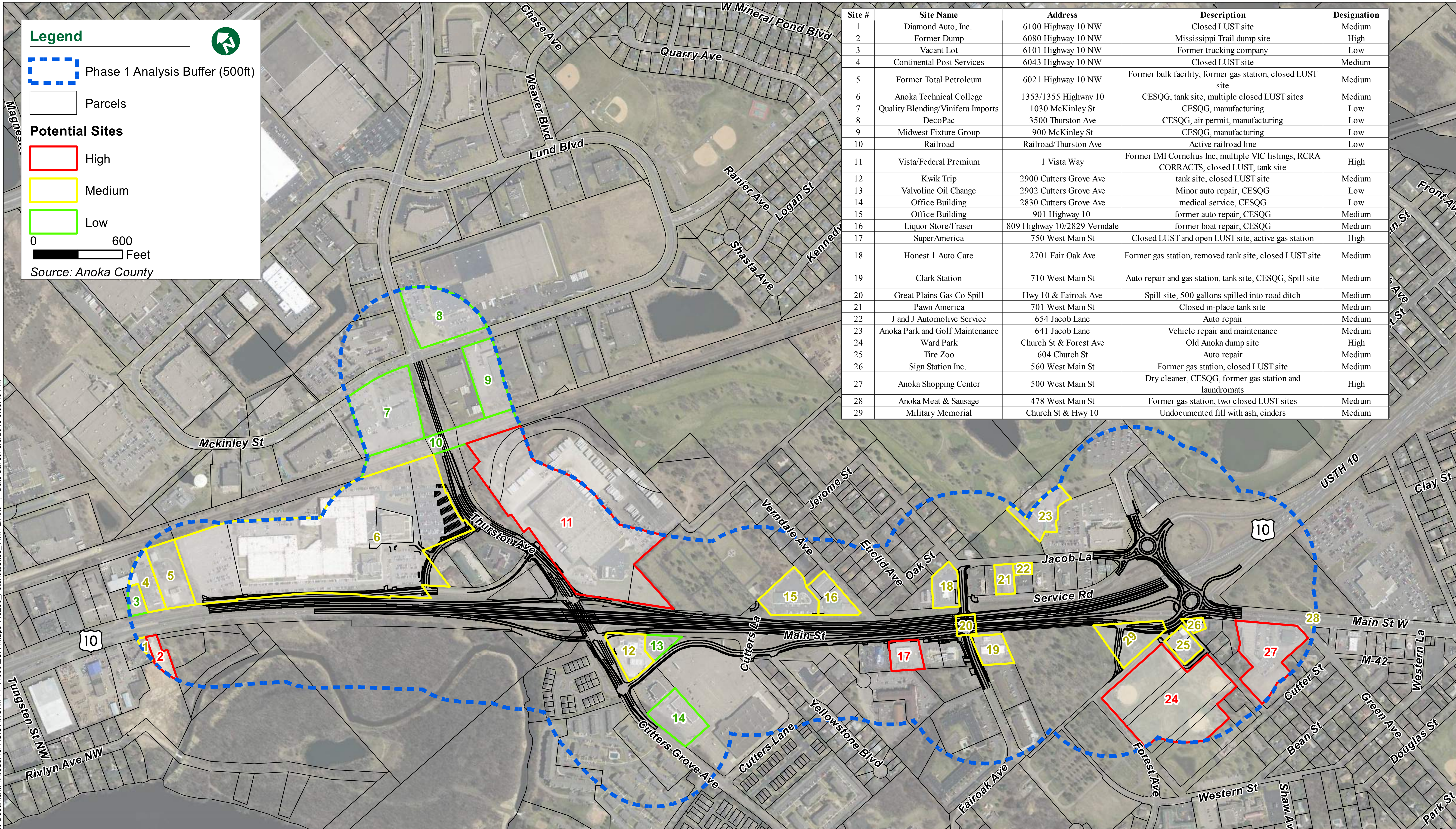
Phase I Environmental Site Assessment Summary Findings Map
(August 2018)

TH 10 Anoka Solution
City of Anoka, Minnesota

Figure 3 - Potential Sites
August 2018

BOLTON & MENK
Real People. Real Solutions.

Site #	Site Name	Address	Description	Designation
1	Diamond Auto, Inc.	6100 Highway 10 NW	Closed LUST site	Medium
2	Former Dump	6080 Highway 10 NW	Mississippi Trail dump site	High
3	Vacant Lot	6101 Highway 10 NW	Former trucking company	Low
4	Continental Post Services	6043 Highway 10 NW	Closed LUST site	Medium
5	Former Total Petroleum	6021 Highway 10 NW	Former bulk facility, former gas station, closed LUST site	Medium
6	Anoka Technical College	1353/1355 Highway 10	CESQG, tank site, multiple closed LUST sites	Medium
7	Quality Blending/Vinifera Imports	1030 McKinley St	CESQG, manufacturing	Low
8	DecoPac	3500 Thurston Ave	CESQG, air permit, manufacturing	Low
9	Midwest Fixture Group	900 McKinley St	CESQG, manufacturing	Low
10	Railroad	Railroad/Thurston Ave	Active railroad line	Low
11	Vista/Federal Premium	1 Vista Way	Former IMI Cornelius Inc, multiple VIC listings, RCRA CORRACTS, closed LUST, tank site	High
12	Kwik Trip	2900 Cutters Grove Ave	tank site, closed LUST site	Medium
13	Valvoline Oil Change	2902 Cutters Grove Ave	Minor auto repair, CESQG	Low
14	Office Building	2830 Cutters Grove Ave	medical service, CESQG	Low
15	Office Building	901 Highway 10	former auto repair, CESQG	Medium
16	Liquor Store/Fraser	809 Highway 10/2829 Verndale	former boat repair, CESQG	Medium
17	SuperAmerica	750 West Main St	Closed LUST and open LUST site, active gas station	High
18	Honest 1 Auto Care	2701 Fair Oak Ave	Former gas station, removed tank site, closed LUST site	Medium
19	Clark Station	710 West Main St	Auto repair and gas station, tank site, CESQG, Spill site	Medium
20	Great Plains Gas Co Spill	Hwy 10 & Fairoak Ave	Spill site, 500 gallons spilled into road ditch	Medium
21	Pawn America	701 West Main St	Closed in-place tank site	Medium
22	J and J Automotive Service	654 Jacob Lane	Auto repair	Medium
23	Anoka Park and Golf Maintenance	641 Jacob Lane	Vehicle repair and maintenance	Medium
24	Ward Park	Church St & Forest Ave	Old Anoka dump site	High
25	Tire Zoo	604 Church St	Auto repair	Medium
26	Sign Station Inc.	560 West Main St	Former gas station, closed LUST site	Medium
27	Anoka Shopping Center	500 West Main St	Dry cleaner, CESQG, former gas station and laundromats	High
28	Anoka Meat & Sausage	478 West Main St	Former gas station, two closed LUST sites	Medium
29	Military Memorial	Church St & Hwy 10	Undocumented fill with ash, cinders	Medium



Map Document: \\ArcServer1\GIS\ANOK\T44114009\ESRI\Maps\110250_PotentialSites_11x17L.mxd | Date Saved: 8/3/2018 3:08:49 PM

APPENDIX I

Agency Correspondence

1. MnDNR Natural Heritage Letter
2. MnDOT Cultural Resources Unit Response Letter
3. National Park Service Correspondence
4. Contaminated Materials Management Team Correspondence
5. Section 7 Federal Notification of Determination of Federal Threatened and Endangered Species
6. Section 6(f) Documentation
    a. Mississippi River Community Park
    b. John Ward Park

Minnesota Department of Natural Resources

500 Lafayette Road
St. Paul, Minnesota 55155-4010

May 24, 2008

Mark Lindeberg
MnDOT Metro District
1500 West County Road B2
Roseville, MN 55113

RE: Response to MnDOT Early Notification Memo Requesting Information and Early Coordination Regarding TH 10 Reconstruction (S.P. 0202-90), Anoka County

Dear Mr. Lindeberg:

The Minnesota Department of Natural Resources (DNR) has completed review of the information submitted in the MnDOT Early Notification Memo (submitted by Christina Berglund, SRF Consulting Group) regarding a possible expansion of TH 10 through the City of Anoka, Anoka County. The project would upgrade TH 10 to a freeway. There were no alignments in the attached document, just a general area where impacts could occur. The following comments were submitted to me during DNR field review of the project:

1. The Mississippi River (a Public Waters) runs along the project area, though it is not known if any associated work, such as a stormwater system, would require outfalls into the river. New or retrofitting stormwater outfalls may require a Public Waters Work Permit.

2. The area is within the Mississippi River Critical Area Boundary, though at this point we defer to the National Park Service for comment as the area is also under Mississippi National River and Recreation Area (MNRRA) jurisdiction.

3. The Minnesota Natural Heritage Information System has been queried to determine if any rare plant or animal species, native plant communities, or other significant natural features are known to occur within an approximate one-mile radius of the TH 10 Expansion (S.P. 0202-90) project area. Based on this query, several rare features have been documented within the search area (for details, please see cover email for attached database reports). The following rare features may be impacted by the proposed project:

   a. Blanding's turtles (Emydoidea blandingii), a state-listed threatened species, have been reported from the area and may be encountered on site. For your information, I have attached a Blanding's turtle fact sheet that describes the habitat use and life history of this species. The fact sheet also provides two lists of recommendations for avoiding and minimizing impacts to this rare turtle. Please refer to the first list of recommendations for your project. If greater protection for turtles is desired, the second list of additional recommendations can also be implemented. The attached flyer should be given to all contractors working in the area.

   b. T32N R25W Section 35 and T31N R25W Section 2 contain a Regionally Significant Ecological Area (RSEA). In 2003, the DNR Central Region, in partnership with the Metropolitan Council, conducted a landscape-scale assessment of the seven-county metro area that identified ecologically significant terrestrial and wetland areas. The mapping of RSEAs was done using two primary data sources. The first data source was native plant communities mapped by the Minnesota County Biological Survey. The remaining areas were derived using a modeling process that predicts the likelihood that high quality native animal habitats exist in a contiguous area. Shapefiles of the RSEAs are available on the DNR's data deli website at http://deli.dnr.state.mn.us (named "Twin Cities Metro Regionally Significant Ecological Areas"). To view pdf versions of the final maps, refer to http://www.dnr.state.mn.us/rsea/index.html . If you would like help interpreting the RSEA data, contact Hannah Texler, Regional Plant Ecologist for DNR's Central Region, at 651-772-7570 or hannah.texler@dnr.state.mn.us.

   The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist on the project area.

If you have questions regarding this letter, please e-mail me at peter.leete@dot.state.mn.us or call at (651) 366-3634.

On behalf of the DNR
Sincerely,

Peter Leete
DNR-MnDOT OES Liaison
Transportation Hydrologist
Office of Environmental Services, mail stop 620
Minnesota Department of Transportation
395 John Ireland Blvd.
St. Paul, MN 55155

C: ERDB file 20080689

Gina Aulwes

From:	Dalton, Richard (DOT) <richard.dalton@state.mn.us>
Sent:	Friday, September 15, 2017 2:48 PM
To:	Mary Gute
Cc:	Leete, Peter (DOT)
Subject:	FW: Preliminary DNR comments on SP0202-108 (TH 10/Fairoak/Thurston in Anoka) - MnDOT ENM (Early Notification Memo)
Attachments:	th10-Anoka-comlet (SP0202-90).pdf; TH10 SP0202-90 ENM.pdf; DNRbasemap(2017).pdf

Thanks Peter.

Mary –

- attached is DNR's response to the ENM for this project; note that the May 24, 2008 letter is a response to an ENM for an earlier project (SP 0202-90) that was not constructed.
- I'll write to Metro Traffic office about whether are an unusual number of deer collisions in the area.

Rick Dalton
651-234-7677

From: Leete, Peter (DOT)
Sent: Friday, September 15, 2017 2:30 PM
To: Dalton, Richard (DOT) <richard.dalton@state.mn.us>
Cc: alan_robbins_fenger@nps.gov; Spiegel, Jason (DNR) <jason.spiegel@state.mn.us>; Horton, Becky (DNR) <becky.horton@state.mn.us>
Subject: Preliminary DNR comments on SP0202-108 (TH 10/Fairoak/Thurston in Anoka) - MnDOT ENM (Early Notification Memo)

Rick,
My rusty memory comes through….. This is a familiar project, albeit from 2008 under SP0202-90. I've attached what I have in my files in regards to this project. I'll look through the new SP0202-108 ENM, though I suspect the comments will be fundamentally the same… I did look at the NHIS again, and there are new records for rare native mussels in the Mississippi River, though that comment would only include caution about the project not adding adverse conditions during construction or from permanent stormwater treatment facilities. Also I do now have the deer collision data from the state patrol. It looks like deer collisions are a regular occurrence in the area adjacent to King Island. Has MnDOT maintenance mentioned this? If there is a need for deer fencing in the area, we can work on recommendations.

Peter Leete
Transportation Hydrologist (DNR-MnDOT Liaison) | Division of Ecological & Water Resources

Minnesota Department of Natural Resources
Office location: MnDOT Office of Environmental Stewardship
395 John Ireland Blvd., MS 620
St. Paul, MN 55155
Phone: 651-366-3634
Email: peter.leete@state.mn.us

DEPARTMENT OF NATURAL RESOURCES

From: Dalton, Richard (DOT)
Sent: Wednesday, August 02, 2017 12:09 PM
To: Leete, Peter (DOT) <peter.leete@state.mn.us>; Robbins-Fenger, Alan <alan_robbins_fenger@nps.gov>; Smith, Christopher E (DOT) <christopher.e.smith@state.mn.us>; MN_DOT_CulturalResources <CulturalResources.dot@state.mn.us>; Boben, Carolyn (DOT) <carolyn.boben@state.mn.us>; Vogel, Mark (DOT) <mark.vogel@state.mn.us>; Hanson, David L (DOT) <david.l.hanson@state.mn.us>; Turner Bargen, Mackenzie M (DOT) <mackenzie.turnerbargen@state.mn.us>; Prather, Daniel (DOT) <dan.prather@state.mn.us>; Clyne, Timothy (DOT) <tim.clyne@state.mn.us>; Rice, Christopher (DOT) <chris.rice@state.mn.us>; Henricksen, Jim (DOT) <jim.henricksen@state.mn.us>; Ries, Natalie (DOT) <natalie.ries@state.mn.us>; Roup, Ashley (DOT) <ashley.roup@state.mn.us>; Heinz, Katherine (DOT) <katherine.heinz@state.mn.us>; Kelly, Brian (DOT) <brian.kelly@state.mn.us>; Gedstad, Gayle (DOT) <gayle.gedstad@state.mn.us>; Moynihan, Debra (DOT) <debra.moynihan@state.mn.us>; Hixson, Ryan (FHWA) <Ryan.Hixson@dot.gov>
Cc: Mary Gute (marygu@bolton-menk.com) <marygu@bolton-menk.com>; Jung, Paul (DOT) <paul.jung@state.mn.us>; Huebsch, Catherine (DOT) <cathy.huebsch@state.mn.us>; Roshell, Lynnette (DOT) <lynnette.roshell@state.mn.us>
Subject: 0202-108 (TH 10/Fairoak/Thurston in Anoka) - ENM (Early Notification Memo) for review and response by 09/15/2017

Hi - On behalf of Paul Jung, this Early Notification Memo notice is being sent to you by Metro's Environmental Documentation staff.

This project proposes an interchange at Thurston Avenue, a TH 10 overpass at Fairoak Avenue, and modifications at the Main Street interchange. The project also includes frontage roads and modifications to local streets.

View the project Area in Google Street at https://goo.gl/maps/oriEfDP9YUL2

The project is proposed by the City of Anoka. The project has received $7M in federal funds in FY 2021 (under SP 103-010-018); however, the project cost will be well over $30M. MnDOT is the Responsible Government Unit (RGU) for this project.

Please review and respond to the ENM for this project. The environmental document to be prepared is likely an Environmental Assessment/EAW. A copy of the ENM is attached to this e-mail. Within MnDOT, the ENM can be viewed at eDOCs 1938461.

Please respond by 09/15/2017 to me and Mary Gute (marygu@bolton-menk.com). The City has hired Bolton & Menk; Mary will be preparing the environmental review document for Bolton & Menk.

CRU: CRIS #XXX – CRIS didn't save my Undertaking.

Rick Dalton
Environmental Coordinator
MnDOT, Metro District
1500 West County Road B2
Roseville, MN 55113
Phone: 651-234-7677

DEPARTMENT OF TRANSPORTATION

Office of Environmental Stewardship
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155-1899

Office Tel: (651) 366-4291
Fax: (651) 366-3603

August 04, 2017

Paul Jung
Metro District
1500 W. Co. Rd. B2
Roseville, MN 55113

Re: S.P. 0202-108, TH 10 in Anoka at Thurston Ave, Fairoak Ave and Main Street, City of Anoka, Anoka County

Dear Mr. Jung,

We have reviewed the above-referenced undertaking pursuant to our FHWA-delegated responsibilities for compliance with Section 106 of the National Historic Preservation Act, as amended (36 CFR 800), and as per the terms of the applicable Programmatic Agreements between the FHWA and the Minnesota State Historic Preservation Office (SHPO). The Section 106 review fulfills MnDOT's responsibilities under the Minnesota Historic Sites Act (MS 138.665-.666), the Field Archaeology Act of Minnesota (MS 138.40); and the Private Cemeteries Act (MS 307.08, Subd. 9 and 10).

This project will reconstruct Highway 10/169 from Green Haven Road/Main St W to the Ramsey City limits, including grade separations and improvements to crossing locations and the local roadway network. The Main St interchange will include longer ramps to provide standard deceleration/acceleration lengths as well as roundabouts at the ramp terminals to improve traffic flows and increase safety. The eastbound exit ramp to Main St will be extended from 800' to 1200' for increased deceleration leading into the new south interchange roundabout. The acceleration lane for westbound Highway 10/169 entrance ramp will be extended from 300' to 1200.' The south frontage road, which will become an extension of Main St W, will be extended to Cutters Grove Ave. Due to the grade separation at the Fairoak Ave intersection along with the close spacing to the Main St W interchange, access to Highway 10/169 will be closed. A full interchange at Thurston Ave will maintain access to Highway 10/169 with use of entrance/exit ramps. Other local roadway improvements include connections to Reed Ave, Church St, and a frontage road on the north side of Highway 10 from Thurston Ave to the Ramsey city limits.

Highway 10/169 will be re-graded/reconstructed for approximately 6,500' and will be placed over Fairoak Ave (approximately 14' raised) and Thurston Ave (approximately 18' raised). Main St W will be re-constructed for approximately 1,000'; Fairoak Ave re-graded for approximately 900' and lowered 8'; and Thurston Ave regraded for approximately 2,400' and lowered approximately 4'. Both Fairoak Ave and Main St W will be maintained at two lanes and four lanes respectively. Thurston Ave will mainly become a two lane from a four lane roadway but will have additional turn lanes to better adapt to the traveling traffic and improve efficiency. Highway 10/169 will receive a median traffic barrier but will remain a four lane divided expressway.

The project will acquire right of way. At least one business (Wright Tire) in the southeast quadrant of the TH 10 / Fairoak intersection will be acquired
Based on our existing programmatic agreements with various tribal groups, there are no tribes that want to be consulted on projects in this area of the state and/or projects with the proposed scope of work.

The area of potential effects (APE) for direct effects of the project consists of the proposed construction limits. The project area has been previously surveyed. There are no known archaeological sites in the APE. Much of the APE has been disturbed by previous roadway construction. The APE has low potential for containing unidentified significant archaeological resources. The APE for indirect effects of the project consist of properties adjacent to the proposed project. There are no eligible or potentially- eligible buildings or structures in the APE.

The finding of this office is that there will be **no historic properties affected** by the project as currently proposed. If the project scope changes, please provide our office with the revised information and we will conduct an additional review.

Sincerely,

Renée Hutter Barnes

Renée Hutter Barnes, Historian
Cultural Resources Unit
renee.barnes@state.mn.us

cc: Rick Dalton, Metro District
Mary Gute, Metro District
MnDOT CRU Project File

United States Department of the Interior

NATIONAL PARK SERVICE
Mississippi National River and Recreation Area
111 E. Kellogg Blvd., Ste 105
St. Paul, Minnesota 55101-1256

IN REPLY REFER TO:
L3303

August 23, 2017

Richard Dalton
Environmental Coordinator
MnDOT, Metro District
1500 West County Road B2
Roseville, MN 55113

cc: Mary Gute, Bolton & Menk, Inc

RE: 0202-108 (TH10/Fairoak/Thurston in Anoka) Early Notification Memo

Dear Mr. Dalton:

The National Park Service (NPS) is pleased to provide comments on the Early Notification Memo for the proposed reconstruction of TH10 in Anoka. The proposed project would lie partly within the boundary of the Mississippi National River and Recreation Area (NRRA). The area south of the centerline on TH10 and west of the centerline on Cutters Grove Avenue is within the NRRA. Congress established the Mississippi NRRA in 1988 to preserve, protect, and enhance the significant values of the Mississippi River Corridor in the Twin Cities metropolitan area.

The project is in close proximity to a steep slope leading to a side channel of the Mississippi River that separates Kings Island from the mainland, TH10, and the proposed interchange at Thurston Avenue/Cutters Grove Avenue. For this reason, NPS discourages the staging of equipment and materials for this project within the boundary of the NRRA in order to protect the River from adverse effects. Measures should be taken to mitigate runoff and erosion in this area both during and after construction.

The Mississippi NRRA is collocated with the Mississippi River Corridor Critical Area (MRCCA), a land use management program regulated by the Minnesota Department of Natural Resources (DNR). Rules guiding development within the MRCCA were promulgated by the DNR and went into effect in January 2017. The project falls within the River Neighborhood (CA-RN) district of the MRCCA. Within the CA-RN district there exists setbacks including a Shore Impact Zone (SIZ) and Bluff Impact Zone (BIZ). Development, including roads and vegetation removal, is limited in the setback area with some exceptions. Care should be taken to avoid and protect the SIZ, BIZ, and Mississippi River to the greatest extent possible with this project. Maintaining a vegetated buffer to both physically and visually separate the River from the highway and exit ramp should be a high priority for this project.

If you any questions regarding these comments, please contact my staff, Alan Robbins-Fenger at alan_robbins_fenger@nps.gov or by calling 651-293-8438.

Sincerely,

Alan R Fenger

for John Anfinson
Superintendent

From:	Boben, Carolyn (DOT)
To:	Dalton, Richard (DOT); Jung, Paul (DOT)
Cc:	Mary Gute; Vogel, Mark (DOT); Eric Johnson; Carlson, Christine R (DOT)
Subject:	TH 10 SP 0202-108 - Cooperative Construction Project - CMMT ENM Response - More Work Needed
Date:	Wednesday, August 23, 2017 6:37:39 AM
Attachments:	image001.png

ENM Due Date: 9/15/2017
Letting Date: Spring 2021
T number: T9Y369
Report Writer: Rick Dalton, Mary Gute (Bolten and Menk, Inc.)
Project Manager: Paul Jung
Project Designer: Not Assigned

TH 10 SP 0202-108 Anoka ENM Response

Rick Dalton, Mary Gute (Bolten and Menk, Inc.) and Paul Jung

The Contaminated Materials Management Team (CMMT) reviewed the Minnesota Pollution Control Agency (MPCA) and Minnesota Department of Agriculture (MDA) databases to check for known contaminated sites in the project area. The databases searched included: leaking underground storage tank facilities, landfills, salvage yards, voluntary investigation and cleanup (VIC) sites, Superfund sites and dump sites. A review of these MPCA files is a component of a Phase I Environmental Site Assessment (Phase I ESA). A complete Phase I ESA includes at least two other components: research on historic land use, and site reconnaissance. It should be noted that the MPCA database files are continually being updated. Although this information is the most up-to-date available, some of the information may be incomplete or inaccurate. There is also a possibility that undiscovered contaminated and/or regulated materials exist in the project area.

Based on the database review, multiple petroleum and non-petroleum contaminated site are located within approximately 500 feet of the project area.

Given the nature and location of the project area, and based on the HPDP threshold criteria as summarized below, this project has a medium to high risk of impacting potentially contaminated sites. Therefore, additional evaluation of the project area for potential contamination is necessary:

1. The project involves acquisition of right-of-way. **Because right-of-way acquisition is proposed, please provide pertinent information by completing the EDD-1 form in REALMS. If, based on the project specifics, the EDD forms do not need to be completed, please notify the CMMT.**

2. Project excavation is extensive for construction activities. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way.

3. The project is in a commercial/industrial area. This increases the chances of encountering contaminants that may have originated from an off-site source and migrated into the right of way

4. The project may require groundwater dewatering.

A Phase I Environmental Site Assessment and Drilling Investigation need to be completed for the entire project corridor, do not only include certain parcels. It is expected that Phase II Drilling Environmental Assessment work will also need be completed. MnDOT CMMT would like to review draft reports and comment on any sections that will pertain to MnDOT. MnDOT should be listed as an entity that can rely on the report for liability purposes.

MnDOT will require and will want to be able to review and comment on the work plan prior to the site work being conducted. MnDOT will take special care and review with all work on MnDOT rights-of-way and on any parcels that will be coming to MnDOT after construction. Please identify early the type of construction work to be conducted on MnDOT property and any parcels that will be turned over to MnDOT at the end of construction. CMMT must be kept apprised of all work and obtain copies of all reports.

MnDOTs expectations for any parcels that will become MnDOT's is that if non-petroleum contamination is encountered that the city of Anoka include MnDOT on the request for No Association Determination letters from the MPCA. MnDOT would also like to review and comment on the special provisions prior to submitting to contracting team. Early and constant coordination will make this project flow much easier.

Please provide all excavation locations and depths through plan sheets as the areas are finalized. The project will be re-evaluated as we obtain the additional information. If new information obtained indicates the project may be impacted by a contaminated site, the project will be evaluated, and soil and groundwater testing completed, as appropriate. If necessary, a plan will be developed for properly handling and treating contaminated soil and/or groundwater during construction in accordance with all applicable state and federal requirements.

Carolyn L. Boben, MS, PG
Hydrogeologist
Office of Environmental Stewardship (MS 620)
Environmental Investigative Group
Minnesota Department of Transportation
395 John Ireland Blvd
St. Paul, MN 55155
Office: 651-366-3621
Cell: 651-226-1271
carolyn.boben@state.mn.us

July 19, 2018

Andrew Horton
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Minnesota-Wisconsin ES Field Office
4101 American Blvd East
Bloomington, MN 55425-1665

S.P. 0202-108, TH 10 / TH 169
Anoka County, Minnesota

Notification of Determination – May affect, NLAA – northern long-eared bat (*Myotis septentrionalis*)

Project Description:

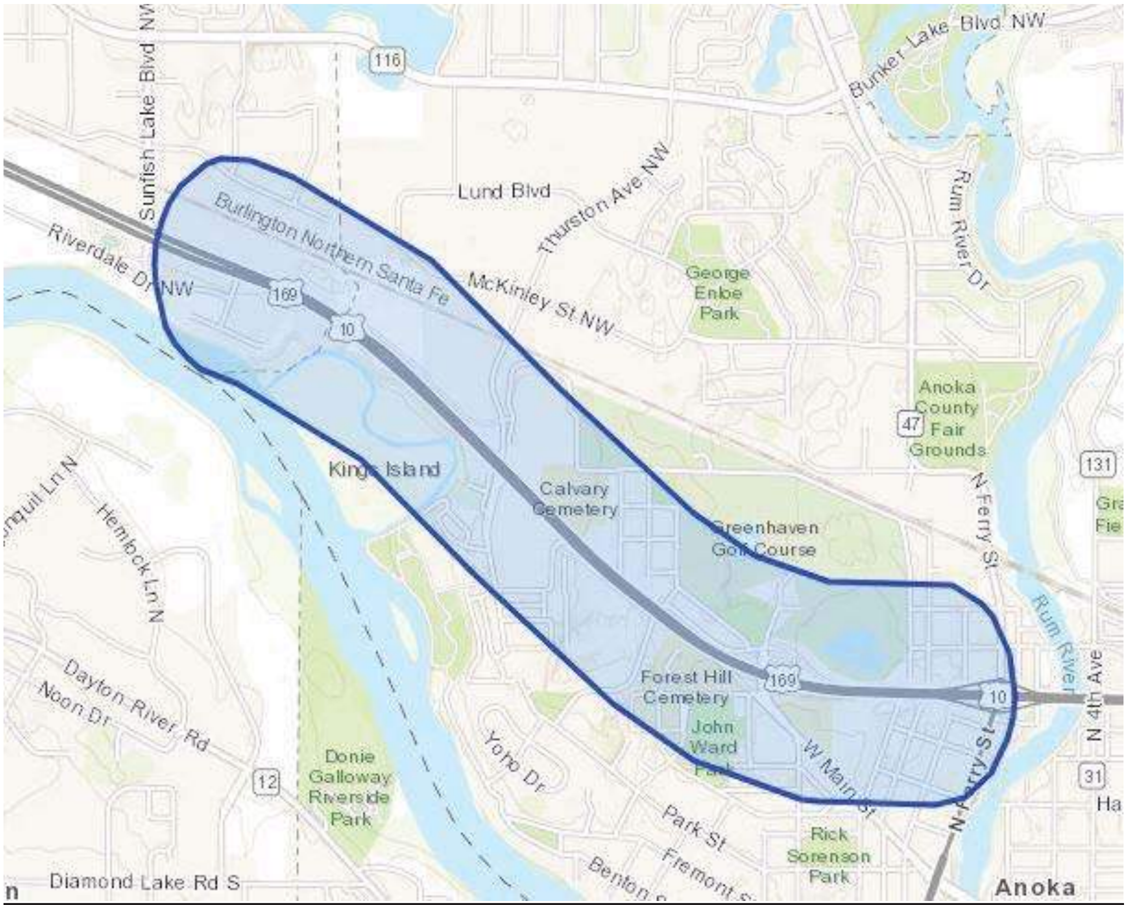
This project will reconstruct Highway 10/169 from Green Haven Road/Main St W to the Ramsey City limits, including grade separations and improvements to crossing locations and the local roadway network. The Main St interchange will include longer ramps to provide standard deceleration/acceleration lengths as well as roundabouts at the ramp terminals to improve traffic flows and increase safety. The eastbound exit ramp to Main St will be extended from 800' to 1200' for increased deceleration leading into the new south interchange roundabout. The acceleration lane for westbound Highway 10/169 entrance ramp will be extended from 300' to 1200.' The south frontage road, which will become an extension of Main St W, will be extended to Cutters Grove Ave. Due to the grade separation at the Fairoak Ave intersection along with the close spacing to the Main St W interchange, access to Highway 10/169 will be closed. A full interchange at Thurston Ave will maintain access to Highway 10/169 with use of entrance/exit ramps. Other local roadway improvements include connections to Reed Ave, Church St, and a frontage road on the north side of Highway 10 from Thurston Ave to the Ramsey city limits.

Highway 10/169 will be re-graded/reconstructed for approximately 6,500' and will be placed over Fairoak Ave (approximately 14' raised) and Thurston Ave (approximately 18' raised). Main St W will be re-constructed for approximately 1,000'; Fairoak Ave re-graded for approximately 900' and lowered 8'; and Thurston Ave regraded for approximately 2,400' and lowered approximately 4'. Both Fairoak Ave and Main St W will be maintained at two lanes and four lanes respectively. Thurston Ave will mainly become a two lane from a four lane roadway but will have additional turn lanes to better adapt to the traveling traffic and improve efficiency. Highway 10/169 will receive a median traffic barrier but will remain a four lane divided expressway.

Excavation will include topsoil and underlying soils. Filling operations will necessitate the use of various types of aggregate and sand to create a stable base for the roadway, bridge abutments, retaining walls and ramp/roundabout pavements. Storm water detention pond(s) will be constructed to allow sediments to settle out of the water prior to the water discharging to Loch Lake and eventually the Rum/Mississippi Rivers via the storm sewer system. Crossovers to the east and west of improvements depicted in the Project Location figure are anticipated to avoid closing Highway 10 for long periods of time. The configuration of the crossovers is unknown at this time; however, it is not anticipated that the crossovers will extend farther beyond the project area than what is depicted.

The northern project limits on Thurston Ave is adjacent to Bridge No. 02547 which travels over the Burlington Northern Santa Fe railroad line, a double track. The improvements on Thurston Ave are approximately 80' from the center of the railroad line. No improvements will be made to the bridge. Additionally, no improvements will be made to Bridge No. 02010 over Main St W.

The project will acquire right of way. Multiple building will be acquired and demolished. Building demolition will occur during the winter months. Up to five (5) acres of tree clearing may occur during the winter months.



Action Area identified for the proposed project.

Conservation Measures:

Required Avoidance and Minimization Measures (AMMs) - Northern long-eared bat:

- **General AMM 1**: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. *Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (651-366-3605).*
- **Lighting AMM 1 & AMM 2:** Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. *Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052 with questions about approved products.*
- **Tree Removal AMM 1:** Avoid tree clearing to the extent practicable to complete the proposed work. *Tree clearing may occur, but limit tree clearing to the maximum extent practicable.*
- **Tree Removal AMM 2:** Restrict all tree clearing activities to when NLEB are not likely to be present. *Winter tree clearing required – tree clearing allowed November 1 to March 31, inclusive.*

- **Tree Removal AMM 3**: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
- **Tree Removal AMM 4**: Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.
- **Misc. AMM 1:** Building demolition must be completed during the NLEB inactive season. *Winter building demolition required – building demolition allowed November 1 to March 31, inclusive.*

Additional Conservation Measures:

- If rolled erosion control products (EG erosion control blanket) are to be utilized, must be limited to 'bio-netting', 'natural-netting' (category 3N or 4N) woven type products, and specifically not allow welded plastic mesh netting. See Best Practices for Meeting GP 2004-0001 (page 25), at http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html and DNR's factsheet at http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.
- Revegetation of disturbed soils should follow Metro Vegetation Establishment Recommendations (http://www.dot.state.mn.us/environment/erosion/pdf/vegetation/Metro_2016.pdf), and use native mixes in areas that are not proposed for mowed turf grass. For additional information, visit: http://www.dot.state.mn.us/environment/erosion/seedmixes.html

Species List for the Project County

According to the official County Distribution of Minnesota's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list (revised in January 2018), maintained by the Service, the project county is within the range of the following:

Revised January 2018

County	Species	Status	Habitat
Anoka	Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.

MnDOT consults the Minnesota Department of Natural Resources Natural Heritage Information System (Copyright 2018 State of Minnesota, Department of Natural Resources), and other resources as available, to determine if proposed projects may affect listed species.

Endangered Species Act – Section 7 Consultation

Section 7 of Endangered Species Act of 1973, as amended (Act), requires each Federal agency to review any action that it funds, authorizes or carries out to determine whether it may affect threatened, endangered, proposed species or listed critical habitat. Federal agencies (or their designated representatives) must consult with the U.S. Fish and Wildlife Service (Service) if any such effects may occur as a result of their actions. Consultation with the Service is not necessary if the proposed action will not directly or indirectly affect listed species or critical habitat. If a federal agency finds that an action will have no effect on listed species or critical habitat, it should maintain a written record of that finding that includes the supporting rationale.

Notice of Determination

Northern long-eared bat – May affect, not likely to adversely affect

No documented NLEB hibernacula and/or roost trees are documented within the project Action Area (https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf).

This project review relies on the USFWS Programmatic Biological Opinion for FHWA, FRA, FTA Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under

Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.). The review was completed using the U.S. Fish and Wildlife Service's Information for Planning and Consultation (IPaC) system (Consultation Code: 03E19000-2018-I-1054). The U.S. Fish and Wildlife Service's concurrence verification letter is attached (Attachment 1).

Please contact me if there are questions or concerns.

Thank you,

Digitally signed by Christopher E Smith
Date: 2018.07.19 17:21:55 -05'00'

Christopher E. Smith, M.Sc., C.W.B.
Wildlife Ecologist | Protected Species Coordinator

Minnesota Department of Transportation
Office of Environmental Stewardship
395 John Ireland Blvd., M.S. 620
St. Paul, Minnesota 55155
O: 651-366-3605
mndot.gov

DEPARTMENT OF TRANSPORTATION

Attachment 1

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
Phone: (952) 252-0092 Fax: (952) 646-2873
http://www.fws.gov/midwest/Endangered/section7/s7process/step1.html

In Reply Refer To: July 19, 2018
Consultation Code: 03E19000-2018-I-1054
Event Code: 03E19000-2018-E-02430
Project Name: S.P. 0202-108, TH 10 / TH 169

Subject: Concurrence verification letter for the 'S.P. 0202-108, TH 10 / TH 169' project under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated to verify that the **S.P. 0202-108, TH 10 / TH 169** (Proposed Action) may rely on the concurrence provided in the February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action is within the scope and adheres to the criteria of the PBO, including the adoption of applicable avoidance and minimization measures, may affect, but is not likely to adversely affect (NLAA) the endangered Indiana bat (*Myotis sodalis*) and/or the threatened Northern long-eared bat (*Myotis septentrionalis*).

The Service has 14 calendar days to notify the lead Federal action agency or designated non-federal representative if we determine that the Proposed Action does not meet the criteria for a NLAA determination under the PBO. If we do not notify the lead Federal action agency or designated non-federal representative within that timeframe, you may proceed with the Proposed Action under the terms of the NLAA concurrence provided in the PBO. This verification period allows Service Field Offices to apply local knowledge to implementation of the PBO, as we may identify a small subset of actions having impacts that were unanticipated. In such instances, Service Field Offices may request additional information that is necessary to verify inclusion of the proposed action under the PBO.

For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities: If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or Northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA Section 7(a)(2) may be required. If the Proposed Action may affect any other federally-listed or proposed species, and/or any designated critical habitat, additional consultation is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please contact this Service Office.

Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

Name

S.P. 0202-108, TH 10 / TH 169

Description

This project will reconstruct Highway 10/169 from Green Haven Road/Main St W to the Ramsey City limits, including grade separations and improvements to crossing locations and the local roadway network. The Main St interchange will include longer ramps to provide standard deceleration/acceleration lengths as well as roundabouts at the ramp terminals to improve traffic flows and increase safety. The eastbound exit ramp to Main St will be extended from 800’ to 1200’ for increased deceleration leading into the new south interchange roundabout. The acceleration lane for westbound Highway 10/169 entrance ramp will be extended from 300’ to 1200.’ The south frontage road, which will become an extension of Main St W, will be extended to Cutters Grove Ave. Due to the grade separation at the Fairoak Ave intersection along with the close spacing to the Main St W interchange, access to Highway 10/169 will be closed. A full interchange at Thurston Ave will maintain access to Highway 10/169 with use of entrance/exit ramps. Other local roadway improvements include connections to Reed Ave, Church St, and a frontage road on the north side of Highway 10 from Thurston Ave to the Ramsey city limits.

Highway 10/169 will be re-graded/reconstructed for approximately 6,500’ and will be placed over Fairoak Ave (approximately 14’ raised) and Thurston Ave (approximately 18’ raised). Main St W will be re-constructed for approximately 1,000’; Fairoak Ave re-graded for approximately 900’ and lowered 8’; and Thurston Ave regraded for approximately 2,400’ and lowered approximately 4’. Both Fairoak Ave and Main St W will be maintained at two lanes and four lanes respectively. Thurston Ave will mainly become a two lane from a four lane roadway but will have additional turn lanes to better adapt to the traveling traffic and improve efficiency. Highway 10/169 will receive a median traffic barrier but will remain a four lane divided expressway.

Excavation will include topsoil and underlying soils. Filling operations will necessitate the use of various types of aggregate and sand to create a stable base for the roadway, bridge abutments, retaining walls and ramp/roundabout pavements. Storm water detention pond(s) will be constructed to allow sediments to settle out of the water prior to the water discharging to Loch Lake and eventually the Rum/Mississippi Rivers via the storm sewer system. Crossovers to the east and west of improvements depicted in the Project Location figure are anticipated to avoid closing Highway 10 for long periods of time. The configuration of the crossovers is unknown at this time; however, it is not anticipated that the crossovers will extend farther beyond the project area than what is depicted.

The northern project limits on Thurston Ave is adjacent to Bridge No. 02547 which travels over the Burlington Northern Santa Fe railroad line, a double track. The improvements on Thurston Ave are approximately 80’ from the center of the railroad line. No improvements will be made to the bridge. Additionally, no improvements will be made to Bridge No. 02010 over Main St W.

The project will acquire right of way. Multiple building will be acquired and demolished. Building demolition will occur during the winter months. Up to five (5) acres of tree clearing may occur during the winter months.

Determination Key Result

Based on your answers provided, this project(s) may affect, but is not likely to adversely affect the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required. However, also based on your answers provided, this project may rely on the concurrence provided in the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

Qualification Interview

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the Northern long-eared bat[1]?

   [1] See Northern long-eared bat species profile

   Automatically answered
   Yes

3. Which Federal Agency is the lead for the action?
   A) Federal Highway Administration (FHWA)

4. Are *all* project activities limited to non-construction[1] activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

   [1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

   No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces[1]?

   [1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

   No

6. Does the project include *any* activities **within** 0.5 miles of an Indiana bat and/or NLEB hibernaculum[1]?

   [1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

   No

7. Is the project located **within** a karst area?

   No

8. Is there *any* suitable[1] summer habitat for Indiana Bat or NLEB **within** the project action area[2]? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   [2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the national consultation FAQs.

   Yes

9. Will the project remove *any* suitable summer habitat[1] and/or remove/trim any existing trees **within** suitable summer habitat?

   [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

   Yes

10. Will the project clear more than 20 acres of suitable habitat per 5-mile section of road/rail?

    No

11. Have presence/probable absence (P/A) summer surveys[1][2] been conducted[3][4] **within** the suitable habitat located within your project action area?

    [1] See the Service's summer survey guidance for our current definitions of suitable habitat.

    [2] Presence/probable absence summer surveys conducted within the fall swarming/spring emergence home range of a documented Indiana bat hibernaculum (contact local Service Field Office for appropriate distance from hibernacula) that result in a negative finding requires additional consultation with the local Service Field Office to determine if clearing of forested habitat is appropriate and/or if seasonal clearing restrictions are needed to avoid and minimize potential adverse effects on fall swarming and spring emerging Indiana bats.

    [3] For projects within the range of either the Indiana bat or NLEB in which suitable habitat is present, and no bat surveys have been conducted, the transportation agency will assume presence of the appropriate species. This assumption of presence should be based upon the presence of suitable habitat and the capability of bats to occupy it because of their mobility.

    [4] Negative presence/probable absence survey results obtained using the summer survey guidance are valid for a minimum of two years from the completion of the survey unless new information (e.g., other nearby surveys) suggest otherwise.

    No

12. Does the project include activities **within documented NLEB habitat**[1][2]?

    [1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

    [2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

    No

13. Will the removal or trimming of habitat or trees occur **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors?

    Yes

14. What time of year will the removal or trimming of habitat or trees **within** suitable but **undocumented NLEB** roosting/foraging habitat or travel corridors occur?

    B) During the inactive season

15. Will *any* tree trimming or removal occur **within** 100 feet of existing road/rail surfaces?

    Yes

16. Will the tree removal alter *any* **documented** Indiana bat or NLEB roosts and/or alter any surrounding summer habitat **within** 0.25 mile of a documented roost?

    No

17. Will *any* tree trimming or removal occur **between** 100-300 feet of existing road/rail surfaces?

    No

18. Are *all* trees that are being removed clearly demarcated?

    Yes

19. Will the removal of habitat or the removal/trimming of trees include installing new or replacing existing **permanent** lighting?

    No

20. Does the project include maintenance of the surrounding landscape at existing facilities (e.g., rest areas, stormwater detention basins)?

    No

21. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

    No

22. Does the project include slash pile burning?

    No

23. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

    No

24. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

    Yes

25. Is there *any* suitable habitat[1] for Indiana bat or NLEB **within** 1,000 feet of the structure? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

    [1] See the Service's current summer survey guidance for our current definitions of suitable habitat.

    No

26. Will the project involve the use of **temporary** lighting *during* the active season?

    Yes

27. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **temporary** lighting will be used?

    Yes

28. Will the project install new or replace existing **permanent** lighting?

    Yes

29. Is there *any* suitable habitat **within** 1,000 feet of the location(s) where **permanent** lighting will be installed or replaced?

    Yes

30. Does the project include percussives or other activities (**not including tree removal/ trimming or bridge/structure work**) that will increase noise levels above existing traffic/ background levels?

    Yes

31. Will the activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the active season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

32. Will *any* activities that use percussives (**not including tree removal/trimming or bridge/ structure work**) and/or increase noise levels above existing traffic/background levels be conducted *during* the inactive season[1]?

    [1] Coordinate with the local Service Field Office for appropriate dates.

    Yes

33. Are *all* project activities that are **not associated with** habitat removal, tree removal/ trimming, bridge or structure removal, replacement, and/or maintenance, lighting, or use of percussives, limited to actions that DO NOT cause any stressors to the bat species, including as described in the BA/BO (i.e. activities that do not involve ground disturbance, percussive noise, temporary or permanent lighting, tree removal/trimming, nor bridge/ structure activities)?

    Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

    Yes

34. Will the project raise the road profile **above the tree canopy**?

    No

35. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and are not within documented habitat

36. Are the project activities that use percussives (not including tree removal/trimming or bridge/structure work) and/or increase noise levels above existing traffic/background levels consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the activities are within 300 feet of the existing road/rail surface, greater than 0.5 miles from a hibernacula, and conducted during the inactive season

37. Is the habitat removal portion of this project consistent with a Not Likely to Adversely Affect determination in this key?

    Automatically answered
    Yes, because the tree removal/trimming that occurs outside of the active season occurs greater than 0.5 miles from the nearest hibernaculum, is less than 100 feet from the existing road/rail surface, includes clear demarcation of the trees that are to be removed, and does not alter documented roosts and/or surrounding summer habitat within 0.25 miles of a documented roost

38. Is the structure removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

    Automatically answered
    Yes, because the structure is more than 1,000 feet from the nearest suitable habitat and is therefore considered unsuitable for use by bats

39. **General AMM 1**

Will the project ensure *all* operators, employees, and contractors working in areas of known or presumed bat habitat are aware of *all* FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable Avoidance and Minimization Measures?

Yes

40. **Tree Removal AMM 1**

Can *all* phases/aspects of the project (e.g., temporary work areas, alignments) be modified, to the extent practicable, to avoid tree removal[1] in excess of what is required to implement the project safely?

Note: Tree Removal AMM 1 is a minimization measure, the full implementation of which may not always be practicable. Projects may still be NLAA as long as Tree Removal AMMs 2, 3, and 4 are implemented and LAA as long as Tree Removal AMMs 3, 5, 6, and 7 are implemented.

[1] The word "trees" as used in the AMMs refers to trees that are suitable habitat for each species within their range. See the USFWS' current summer survey guidance for our latest definitions of suitable habitat.

No

41. **Tree Removal AMM 2**

Can *all* tree removal activities be restricted to when Northern long-eared bats are not likely to be present (e.g., the inactive season)[1]?

[1] Coordinate with the local Service Field Office for appropriate dates.

Automatically answered
Yes

42. **Tree Removal AMM 3**

Can tree removal be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits)?

Yes

43. **Tree Removal AMM 4**

Can the project avoid cutting down/removal of *all* (1) **documented**[1] Indiana bat or NLEB roosts[2] (that are still suitable for roosting), (2) trees **within** 0.25 miles of roosts, and (3) documented foraging habitat any time of year?

[1] The word documented means habitat where bats have actually been captured and/or tracked.

[2] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

Yes

44. **Lighting AMM 1**

Will *all* **temporary** lighting used during the removal of suitable habitat and/or the removal/trimming of trees within suitable habitat be directed away from suitable habitat during the active season?

Yes

45. **Lighting AMM 1**

Will *all* **temporary** lighting be directed away from suitable habitat during the active season?

Yes

46. **Lighting AMM 2**

Does the lead agency use the BUG (Backlight, Uplight, and Glare) system developed by the Illuminating Engineering Society[1][2] to rate the amount of light emitted in unwanted directions?

[1] Refer to Fundamentals of Lighting - BUG Ratings

[2] Refer to The BUG System—A New Way To Control Stray Light

Yes

47. **Lighting AMM 2**

Will the **permanent** lighting be designed to be as close to 0 for all three BUG ratings as possible, with a priority of "uplight" of 0 and "backlight" as low as practicable?

Yes

Project Questionnaire

1. Have you made a No Effect determination for *all* other species indicated on the FWS IPaC generated species list?

   Yes

2. Have you made a May Affect determination for *any* other species on the FWS IPaC generated species list?

   No

3. How many acres[1] of trees are proposed for removal between 0-100 feet of the existing road/rail surface?

   [1] If described as number of trees, multiply by 0.09 to convert to acreage and enter that number.

   5

4. Please describe the proposed structure work:

   Demolition.

5. Please state the timing of all proposed structure work:

   Winter months (Nov. 1 to March 31)

Avoidance And Minimization Measures (AMMs)

These measures **were accepted** as part of this determination key result:

GENERAL AMM 1

Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs.

LIGHTING AMM 1

Direct temporary lighting away from suitable habitat during the active season.

LIGHTING AMM 2

When installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable.

TREE REMOVAL AMM 2

Apply time of year restrictions for tree removal when bats are not likely to be present, or limit tree removal to 10 or fewer trees per project at any time of year within 100 feet of existing road/ rail surface and **outside of documented** roosting/foraging habitat or travel corridors; visual emergence survey must be conducted with no bats observed.

TREE REMOVAL AMM 3

Ensure tree removal is limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).

TREE REMOVAL AMM 4

Do not remove **documented** Indiana bat or NLEB roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or
documented foraging habitat any time of year.

Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat

This key was last updated in IPaC on March 16, 2018. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

From: Mularie, Audrey L (DNR)
To: Gina Aulwes
Subject: RE: City of Anoka parks
Date: Monday, May 07, 2018 1:21:31 PM
Attachments: image002.png
image003.png
image004.png
image005.png
image006.png
OR-8810_M.PDF

Gina,

Yes, Mississippi River Park is the same as Mississippi River Community Park. Our park boundary is smaller than shown on your map. Attached is the boundary map subject to our grant restrictions for Mississippi River Community Park.

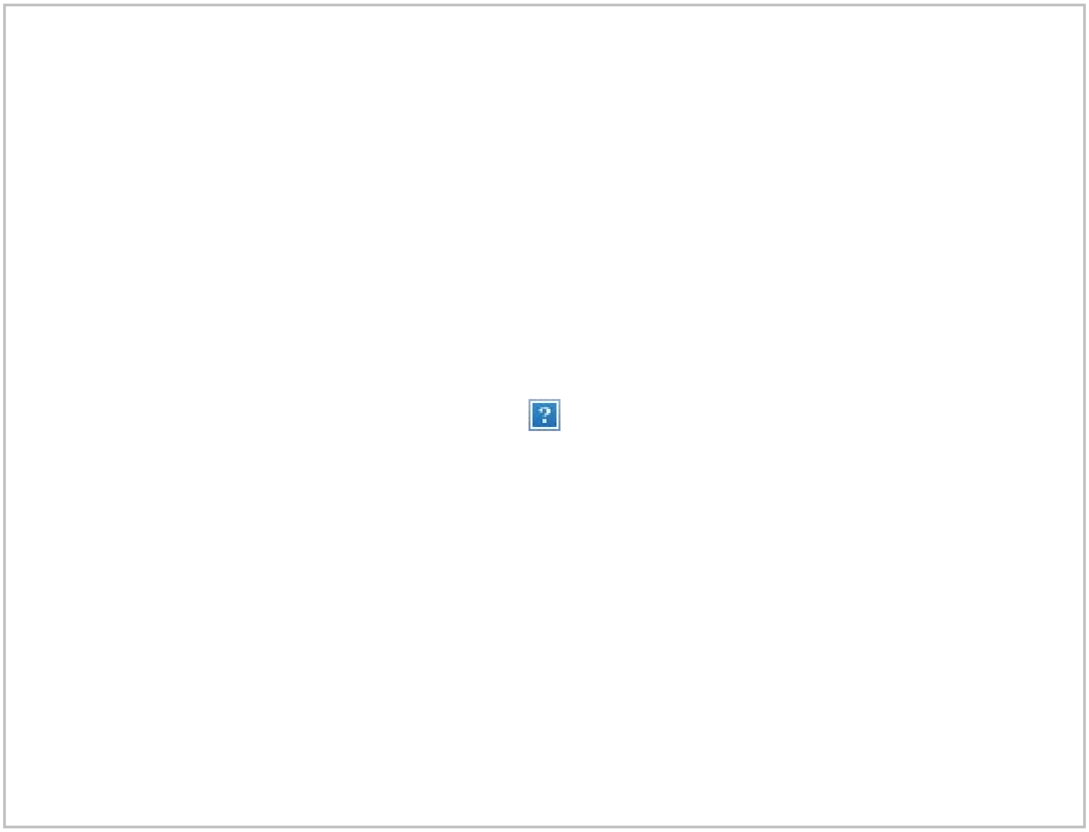
Audrey

Audrey Mularie
Park Grant Coordinator | Parks and Trails

Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4039
Phone: 651-259-5549
Email: audrey.mularie@state.mn.us
mndnr.gov

From: Gina Aulwes <ginaau@bolton-menk.com>
Sent: Monday, May 7, 2018 1:13 PM
To: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Subject: City of Anoka parks

Hi Audrey,
I'm working on a transportation project in Anoka County on Highway 10. I want to confirm the 6(f) properties near the project area. I am aware Ward Park is a 6(f) resource, and it is near our project. In looking at the pdf list of parks, is "Mississippi River Park" the same park as below, Mississippi River Community Park?



Thanks!

Gina M Aulwes
Environmental Specialist
Bolton & Menk, Inc.
12224 Nicollet Avenue
Burnsville, MN 55337-1649
Phone: 952-890-0509 ext. 2863
Mobile: 612-390-1150
Bolton-Menk.com

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For more information please visit http://www.symanteccloud.com

From: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Sent: Thursday, February 07, 2019 6:16 AM
To: Gina Aulwes
Subject: RE: Anoka Ward Park improvements

Gina,

Thank you. The curve in the road in not an concern since the original grant did not close until 1984 so the road was clearly in place.

For the proposed TH 10 project, removing the parking and sidewalk within the park boundary does not violate the existing federal Land and Water Conservation Fund contract. The original park boundary will not be impacted by non-recreational use.

Audrey

Audrey Mularie
Park Grant Coordinator | Parks and Trails

Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4039
Phone: 651-259-5549
Email: audrey.mularie@state.mn.us
mndnr.gov

DEPARTMENT OF NATURAL RESOURCES

From: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Sent: Wednesday, February 6, 2019 2:40 PM
To: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Subject: RE: Anoka Ward Park improvements

Audrey,
We are putting together an EA/EAW for the work on TH 10, which includes the parking removal and sidewalk along/within the northern boundary of the park. I'm planning on writing that up in the document and stating it does not require a 6(f) conversion because it's for recreational use. In other projects, have you ever provided a letter stating this for inclusion in environmental documents?

Did you view the attached aerials through the Borchert map library? I do not yet have a year for any road work, however the 1979 figure clearly shows the curve in the road as it is today. It does not appear the same in 1971.

Thanks,

Gina M. Aulwes
Bolton & Menk, Inc.
P: (952) 890-0509 ext. 2863
M: (612) 390-1150

From: Mularie, Audrey L (DNR) [mailto:audrey.mularie@state.mn.us]
Sent: Monday, February 4, 2019 9:43 AM
To: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Subject: RE: Anoka Ward Park improvements

Gina,

I have been looking at the maps and aerial photos this morning. If the curve in the road was within the original right of way for Forest and Church there would be no conversion. If it is in the boundary, I would need a map showing the area and amount of road that is within the park boundary also when the road shift was made to make a final determination.

Audrey

Audrey Mularie
Park Grant Coordinator | Parks and Trails

Minnesota Department of Natural Resources
500 Lafayette Road
St. Paul, MN 55155-4039
Phone: 651-259-5549
Email: audrey.mularie@state.mn.us
mndnr.gov

DEPARTMENT OF
NATURAL RESOURCES

From: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Sent: Monday, February 4, 2019 9:35 AM
To: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Subject: RE: Anoka Ward Park improvements

Audrey,
I'm pretty sure the road has been constructed post 1978 on park property. If this is true, what is the process that would need to be followed? I'm only aware of a federally funded Section 6(f) process.

Thanks,

Gina M. Aulwes
Bolton & Menk, Inc.

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M: (612) 390-1150

From: Mularie, Audrey L (DNR) [mailto:audrey.mularie@state.mn.us]
Sent: Monday, February 4, 2019 8:08 AM
To: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Subject: RE: Anoka Ward Park improvements

Gina,

Yes, there is no concern with sidewalk and parking removal. The road may be an issue if has been constructed within the designated park area.

Audrey

Audrey Mularie
Park Grant Coordinator | Parks and Trails

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Email: audrey.mularie@state.mn.us
mndnr.gov

DEPARTMENT OF NATURAL RESOURCES

From: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Sent: Friday, February 1, 2019 2:28 PM
To: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Subject: RE: Anoka Ward Park improvements

Audrey,
From looking at the proposed layout, the changes within the parcel boundary include the road curve (which was done post 1978), sidewalk, and parking space removal. So considering non-recreational uses, that would just include the road curve which may have not been done properly. Is my interpretation correct?

Thanks,

Gina M. Aulwes
Bolton & Menk, Inc.
P: (952) 890-0509 ext. 2863
M: (612) 390-1150

From: Mularie, Audrey L (DNR) [mailto:audrey.mularie@state.mn.us]
Sent: Friday, February 1, 2019 1:13 PM
To: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Subject: RE: Anoka Ward Park improvements

Gina,

Below is the property description for Ward Park from our federal grant awarded in 1978 and I have attached the park boundary map submitted with the application. The boundary map and legal description is the area subject to the federal restriction. This area must be maintained and operated solely for public outdoor recreation. Any non-recreation use would require a federal 6(f) conversion process.

Location -Section 1, Township 31, Range 25, Anoka County, Minnesota
Size -13.81 acres

If any road changes have impacted the park since 1978 or will impact the park with this future project a conversion may be required.

Audrey

Audrey Mularie
Park Grant Coordinator | Parks and Trails

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mndnr.gov

DEPARTMENT OF NATURAL RESOURCES

From: Gina Aulwes <Gina.Aulwes@bolton-menk.com>
Sent: Friday, February 1, 2019 12:23 PM
To: Mularie, Audrey L (DNR) <audrey.mularie@state.mn.us>
Subject: Anoka Ward Park improvements

Hi Audrey,
I am working with the City of Anoka on improvements they're proposing for TH 10. Part of the project includes improvements at Ward Park in Anoka, mostly with the parking area and constructing a sidewalk.

I've included a google screen shot of the existing park, and a pdf of the proposed improvements. The City would like to include this work with the present project, or take it on later. They're not anticipating any federal $.

The City/park has been having issues with the parking areas. Balls from the playing field hit the cars, and backing up onto the present Church Street is difficult. Cars backing up can't see cars coming around the corner, and the cars driving around the corner can't see the cars backing up. The City would like to close Church Street and adjust the parking. A sidewalk would connect the parking area to the present bleachers behind the backstop.

We have also been looking at the GIS layers from Anoka County, the park parcel boundary in the northwest corner appears to overlap with the road. I'm not sure what will need to happen because of that.

I did speak with Joe earlier, thanks for forwarding my previous email to him. Will this project in Anoka need to follow the same process as a 6(f) with federal funding?

Thanks,

Gina M Aulwes
Environmental Specialist
Bolton & Menk, Inc.
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APPENDIX J

Air Quality

Appendix J

Hwy 10/169 Safety and Mobility Improvement Project

Air Quality Analysis Report

A. Introduction to the Transportation Air Quality Analysis

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality as the number of vehicles and the congestion levels in a given area change. The adverse impacts this project could have on air quality have been analyzed by addressing criteria air pollutants, a group of common air pollutants that are regulated by the U.S. Environmental Protection Agency (EPA) on the basis of specific criteria that reflect the effects of pollution on public health and the environment. The criteria air pollutants identified by the EPA are ozone, particulate matter, carbon monoxide, nitrogen dioxide, lead, and sulfur dioxide. Potential impacts resulting from these pollutants are assessed by comparing the project's projected concentrations to National Ambient Air Quality Standards (NAAQS).

In addition to the criteria air pollutants, the EPA also regulates a category of pollutants known as air toxics, which are generated by emissions from mobile sources. The Federal Highway Administration (FHWA) provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the National Environmental Policy Act (NEPA) process.

The following sections describe the health effects of criteria air pollutants, current criteria air pollutant monitoring data in the region, and likely project impacts on both criteria air pollutants and MSATs for the no-build vs. build alternatives.

B. NAAQS Criteria Pollutants

Ozone

Ground-level ozone is a primary constituent of smog and is a pollution problem throughout many areas of the United States. Exposures to ozone can make people more susceptible to respiratory infection, resulting in lung inflammation, and aggravate preexisting respiratory diseases such as asthma. Ozone is not emitted directly from vehicles but is formed as volatile organic compounds (VOCs) and nitrogen oxides (NOx) that react in the presence of sunlight. Transportation sources emit NOx and VOCs and can therefore affect ozone concentrations. However, due to the phenomenon of atmospheric formation of ozone from chemical precursors, concentrations are not expected to be elevated near a particular roadway.

The Minnesota Pollution Control Agency (MPCA), in cooperation with various other agencies, industries, and groups, has encouraged voluntary control measures for ozone and has begun developing a regional ozone modeling effort. Ozone concentrations in the lower atmosphere are influenced by a complex relationship of precursor concentrations, meteorological conditions, and regional influences on background concentrations. MPCA states in *The Air We Breathe: The State of Minnesota's Air Quality* (2019) that:

Ozone and fine-particle levels in Minnesota have been improving since 2003. However, progress in reducing both pollutants has been affected by year-to-year variability in the weather. Moreover, climate change may cause future challenges, both from increased local temperatures causing more ozone to form, and from longer and more frequent droughts resulting in more fine-particle pollution from wildfires.

In 2012, the MPCA enrolled in EPA's voluntary Advance Programs for ozone. This program help the states achieve voluntary emission reductions to lower concentrations of this pollutant. The program aims at helping state and local governments reduce air pollution in areas that currently meet federal standards for ozone. As researchers better understand the health impacts of air pollutants, EPA reviews and strengthens national air quality standards. These programs help the states stay ahead of changes to the national standards. Without continued improvements in air quality, Minnesota is at risk for violating air quality standards in the future. Partners in the Clean Air Minnesota program, including MnDOT, have committed to reducing ozone precursor emissions by 10% from 2011 levels.

Additionally, the State of Minnesota is classified by the EPA as an "ozone attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for ozone levels. Because of these factors, a quantitative ozone analysis was not conducted for this project.

Particulate Matter

Particulate matter (PM) is the term for particles and liquid droplets suspended in the air. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the particle in micrometers. $PM_{2.5}$, or fine particulate matter, refers to particles that are 2.5 micrometers or less in diameter. PM_{10} refers to particulate matter that is 10 micrometers or less in diameter.

Motor vehicles (i.e., cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. Vehicle dust from paved and unpaved roads may be re-entrained, or re-suspended, in the atmosphere. In addition, $PM_{2.5}$ can be formed in the atmosphere from gases such as sulfur dioxide, nitrogen oxides, and VOCs. $PM_{2.5}$ can penetrate the human respiratory system's natural defenses and damage the respiratory tract when inhaled. Numerous scientific studies have linked particle pollution exposure to a variety of problems, including[1]:

- Premature death in people with heart or lung disease;
- Nonfatal heart attacks;
- Irregular heartbeat;

[1] Source**:** https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm

- Aggravated asthma;
- Decreased lung function; and,
- Increased respiratory symptoms, such as irritation of the airways, coughing or difficulty breathing.

In January 2013, the EPA issued a final rule revising the annual health NAAQS for fine particles ($PM_{2.5}$) to be 12.0 micrograms per cubic meter (µg/m^3*)* as the annual $PM_{2.5}$ standard. The EPA retained the 24-hour $PM_{2.5}$ standard at a level of 35 µg/m^3 (the EPA issued the 24-hour standard in 2006). The agency also retained the existing standards for coarse particle pollution (PM_{10}). The NAAQS 24-hour standard for PM_{10} is 150 µg/m^3, which is not to be exceeded more than once per year on average over three years. [2]

In 2012, the MPCA enrolled in EPA's voluntary Advance Programs for particulate matter. This program helps the states achieve voluntary emission reductions to lower concentrations of this pollutant. The program aims at helping state and local governments reduce air pollution in areas that currently meet federal standards for fine particles. As researchers better understand the health impacts of air pollutants, EPA reviews and strengthens national air quality standards. These programs help the states stay ahead of changes to the national standards. Without continued improvements in air quality, Minnesota is at risk for violating air quality standards in the future. Partners in the Clean Air Minnesota Program, including MnDOT, have committed to reducing man-made fine particulate matter (PM2.5) by 10% from 2011 levels.

The Clean Air Act conformity requirements include the assessment of localized air quality impacts of federally-funded or federally-approved transportation projects that are deemed to be projects of air quality concern located within $PM_{2.5}$ nonattainment and maintenance areas. This project is not considered one of air quality concern. This is supported, in part, by the designation of the State of Minnesota as an unclassifiable/ attainment area for PM. This means that Minnesota has been identified as a geographic area that meets or exceeds the national standards for the reduction of PM levels, and therefore is exempt from performing PM analyses.

Nitrogen Dioxide (Nitrogen Oxides)

Nitrogen oxides, or NOx, are the generic term for a group of highly reactive gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides form when fuel is burned at high temperatures, as in a combustion process. The primary sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels. In addition to being a precursor to ozone, NOx can worsen bronchitis, emphysema and asthma and increase risk of premature death from heart or lung disease.[3]

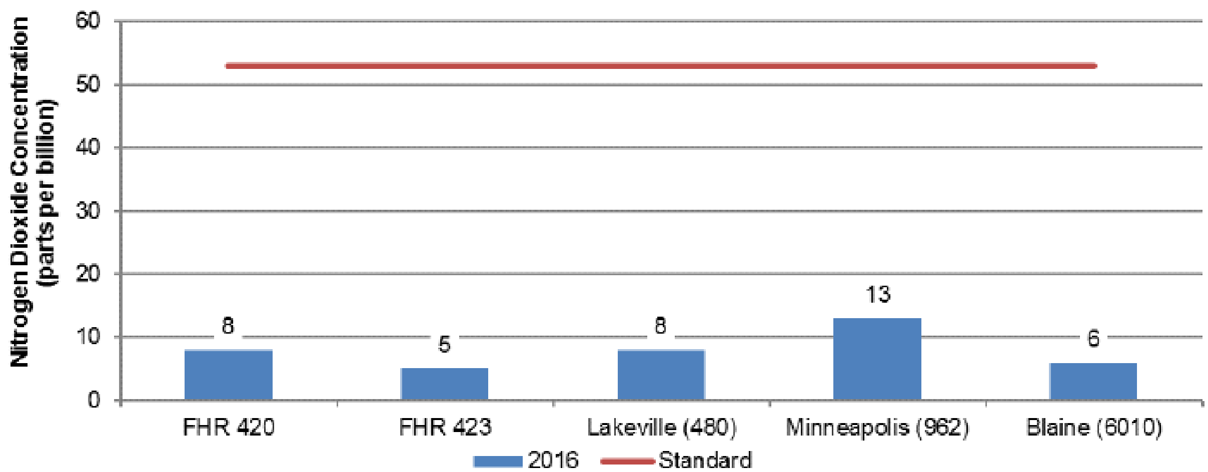
[2] Source: https://www.epa.gov/pm-pollution/2012-national-ambient-air-quality-standards-naaqs-particulate-matter-pm

[3] Source: *The Air We Breathe: The State of Minnesota's Air Quality 2019*, MPCA, January 2019

Minnesota currently meets federal nitrogen dioxide standards, as shown in **Exhibit 1** from *Annual Air Monitoring Network Plan for Minnesota 2018* (July 2017)[4]. This document states:

> *A monitoring site meets the annual NAAQS for NO2 if the annual average is less than or equal to 53 ppb. Minnesota averages ranged from 5 ppb at Flint Hills Refinery 423 to 13 ppb at the Near Road I-35/I-94 site (962); therefore, Minnesota currently meets the annual NAAQS for NO2 (Figure 21).*

Exhibit 1. **Average Annual NO_2 Concentrations Compared to the NAAQS**



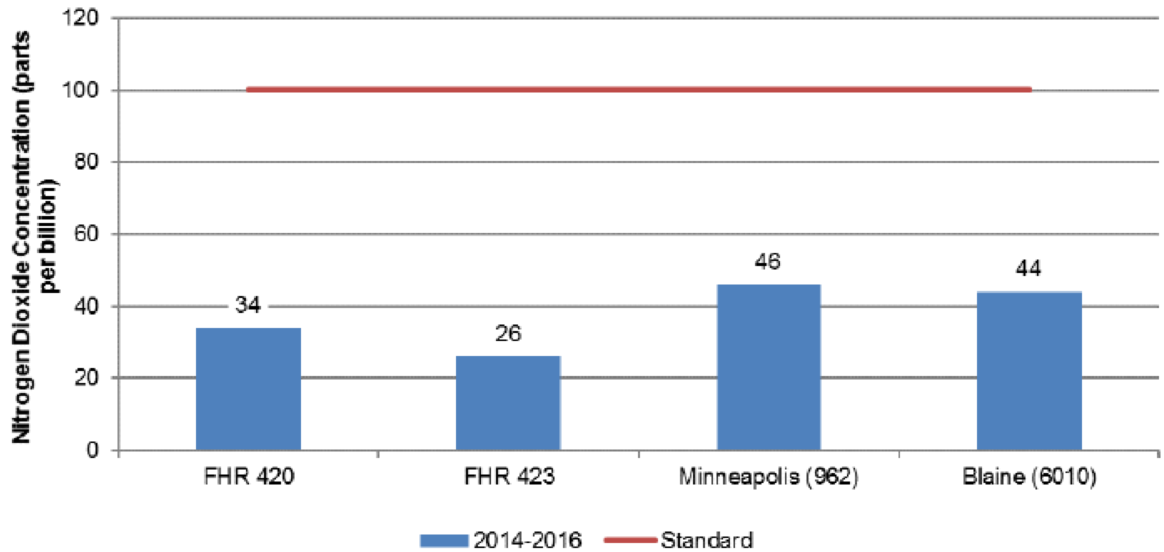
In the *Annual Air Monitoring Network Plan for Minnesota 2018* (July 2017), it states the following with regard to the 1-hour NO_2 standard:

> *On January 22, 2010 the EPA finalized revisions to the NO2 NAAQS. As part of the standard review process, the EPA retained the existing annual NO2 NAAQS, but also created an additional one-hour standard. The new one-hour NAAQS is intended to protect against adverse health effects associated with short-term exposures to elevated NO2. To meet this standard, the three-year average of the annual 98th percentile daily maximum one-hour NO2 concentration must not exceed 100 ppb. Minnesota averages ranged from 26 ppb at Flint Hills Refinery 423 to 46 ppb at Blaine (6010); therefore, all Minnesota sites currently meet the one-hour NAAQS for NO2 (Figure 22).*

Exhibit 2 depicts the 2014-2016 1-hour NO_2 concentrations at Minnesota sites compared to the 1-hour NO_2 NAAQS.[5]

[4] Source: *Annual Air Monitoring Network Plan for Minnesota 2018*, MPCA, July 2017.
[5] Source: *Annual Air Monitoring Network Plan for Minnesota 2018*, MPCA, July 2017.

Exhibit 2. 1-hour NO2 Concentrations Compared to the NAAQS



The EPA's regulatory announcement, EPA420-F-99-051 (December 1999), describes the Tier 2 standards for tailpipe emissions, and states:

> *The new tailpipe standards are set at an average standard of 0.07 grams per mile for nitrogen oxides for all classes of passenger vehicles beginning in 2004. This includes all light-duty trucks, as well as the largest SUVs. Vehicles weighing less than 6,000 pounds will be phased-in to this standard between 2004 and 2007.*
>
> *As newer, cleaner cars enter the national fleet, the new tailpipe standards will significantly reduce emissions of nitrogen oxides from vehicles by about 74 percent by 2030. The standards also will reduce emissions by more than 2 million tons per year by 2020 and nearly 3 million tons annually by 2030.*

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_x emissions. Because of these factors, a specific analysis of NO_2 was not conducted for this project.

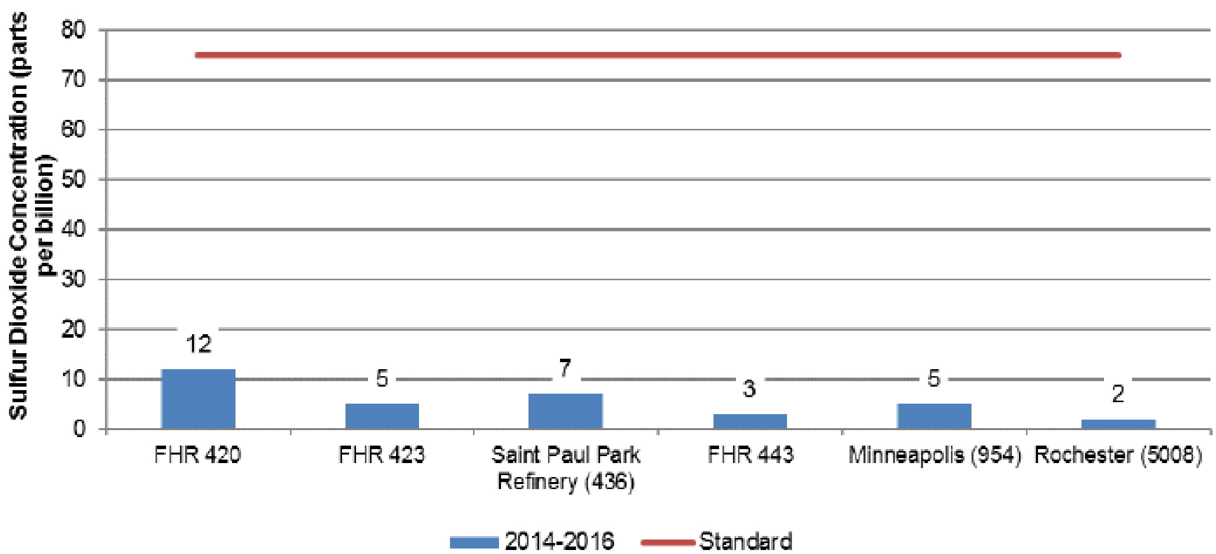
Sulfur Dioxide

Sulfur dioxide (SO_2) and other sulfur oxide gases (SO_x) are formed when fuel containing sulfur, such as coal, oil, and diesel fuel, is burned. Sulfur dioxide is a heavy, pungent, colorless gas. Elevated levels can impair breathing, can lead to other respiratory symptoms, and at very high levels, can aggravate heart disease. People with asthma are most at risk when SO_2 levels increase. Once emitted into the atmosphere, SO_2 can be further oxidized to sulfuric acid, a component of acid rain.

MPCA monitoring shows that ambient SO_2 concentrations were at less than 15 percent of the federal standards over the 3-year period from 2013 through 2015, as shown in **Exhibit 3** below.[6] In the *Annual Air Monitoring Network Plan for Minnesota 2018*, it states the following with regard to SO_2:

> *On June 2, 2010, the EPA finalized revisions to the primary SO2 NAAQS. EPA established a new one-hour standard, which is met if the three-year average of the annual 99th percentile daily maximum one-hour SO2 concentration is less than 75 ppb. Previous standards were revoked under the new rule. Minnesota averages from 2014-2016 ranged from 2 ppb at Rochester (5008) to 12 ppb at Flint Hills Refinery (420); therefore, all Minnesota sites currently meet the one-hour NAAQS for SO2 (Figure 24).*

Exhibit 3. One-hour SO2 Concentration Compared to the NAAQS



Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, the project area is classified by the EPA as a "sulfur dioxide attainment area," which means that the project area has been identified as a geographic area that meets the national health-based standards for sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

Lead

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

[6] Source: *Annual Air Monitoring Network Plan for Minnesota 2018*, MPCA, July 2017.

Carbon Monoxide

Carbon monoxide (CO) is the traffic-related pollutant that has been of concern in the Twin Cities Metropolitan area. In 1999, the EPA re-designated all of Hennepin, Ramsey, Anoka, and portions of Carver, Scott, Dakota, Washington, and Wright Counties as a maintenance area for CO. This means the area was previously classified as a nonattainment area but has now been found to be in attainment. This area includes the project area, which is located in Anoka County. Evaluation of CO for assessment of air quality impacts is required for environmental approval in National Environmental Policy Act (NEPA) documents.

Air Quality Conformity

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate State Implementation Plan (SIP) compliance for transportation projects. It requires that transportation projects meeting criteria to be classified as regionally significant be included in a regional emissions analysis approved as part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP). This project is included in the Metropolitan Council's *2019-2022 TIP for the Twin Cities Metropolitan Area*. It is therefore compliant with the SIP. The project IS listed as a Regionally Significant Project in the Metropolitan Council's current TIP.[7]

On November 8, 2010, the EPA approved a limited maintenance plan request for the Twin Cities maintenance area. Under a limited maintenance plan, the EPA has determined that there is no requirement to project emissions over the maintenance period and that "an emission budget may be treated as essentially not constraining for the length of the maintenance period. The reason is that it is unreasonable to expect that our maintenance area will experience so much growth within this period that a violation of CO National Ambient Air Quality Standard (NAAQS) would result.[8]" Therefore, no regional modeling analysis for the LRTPP and TIP is required; however federally funded and state funded projects are still subject to "hot-spot" analysis requirements. The limited maintenance plan adopted in 2010 determines that the level of CO emissions and resulting ambient concentrations will continue to demonstrate attainment of the CO NAAQS. This project does not interfere with implementation of any transportation control measure included in the SIP. The TIP was determined to conform to the requirements of the 1990 CAAA by MPCA. The project's design concept and scope are not significantly different from that used in the TIP conformity analysis. As demonstrated by the above information, this project conforms to the requirements of the CAAA and to the Conformity Rules, 40 CFR 93.

[7] The *2019-2022 Transportation Improvement Program (TIP)* can be viewed at: https://metrocouncil.org/Transportation/Publications-And-Resources/Transportation-Planning/Transportation-Improvement-Program-(TIP)/2019-2022-TIP.aspx

[8] Source: US EPA Limited Maintenance Plan Option for Nonclassifiable CO Nonattainment Areas, October 6, 1995.

Hot-Spot Analysis

CO evaluation is performed by evaluating the worst-operating (hot-spot) intersections in the project area. The EPA has approved a screening method to determine which intersections need hot-spot analysis. The hot-spot screening method uses a traffic volume threshold of 82,300 entering vehicle per day. Intersections with traffic volumes above this threshold must be evaluated using EPA-approved emission and dispersion models. Intersections with traffic volumes below this threshold are not expected to result in CO concentrations that exceed state or federal standards, and detailed modeling is not required.

Based on MnDOT's on-line traffic data (http://www.dot.state.mn.us/traffic/data/data-products.html), the 2017 AADT value on Hwy 10/169 was approximately 60,600 vehicles/day. If this traffic level grows approximately proportional to the projected growth rates for the Hwy 10/169, the 2041 design year traffic would be about to 40% above this level, and far below the 82,300 vehicles/day hot spot screening threshold. Therefore, the screening criteria indicate no potential for CO hot spots that could approach or exceed the NAAQS, and no quantitative hot-spot analysis is required for this project.

Improvements in vehicle technology and in motor fuel regulations continue to result in reductions in vehicle emission rates. The EPA MOVES2014 emissions model estimates that emission rates will continue to fall from existing rates through year 2030. Consequently, year 2030 vehicle-related CO concentrations in the study area are likely to be lower than existing concentrations even considering the increase in development-related and background traffic.

C. Mobile Source Air Toxics

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA assessed this expansive list in its rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007), and identified a group of 93 compounds emitted from mobile sources that are part of EPA's Integrated Risk Information System (IRIS).[9]

In addition, EPA identified nine compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers or contributors and non-cancer hazard contributors from the 2011 National Air Toxics Assessment (NATA).[10] These are 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter (diesel PM), ethylbenzene,

[9] http://www.epa.gov/iris/
[10] http://www.epa.gov/ttn/atw/nata1999/

formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

Motor Vehicle Emissions Simulator (MOVES)

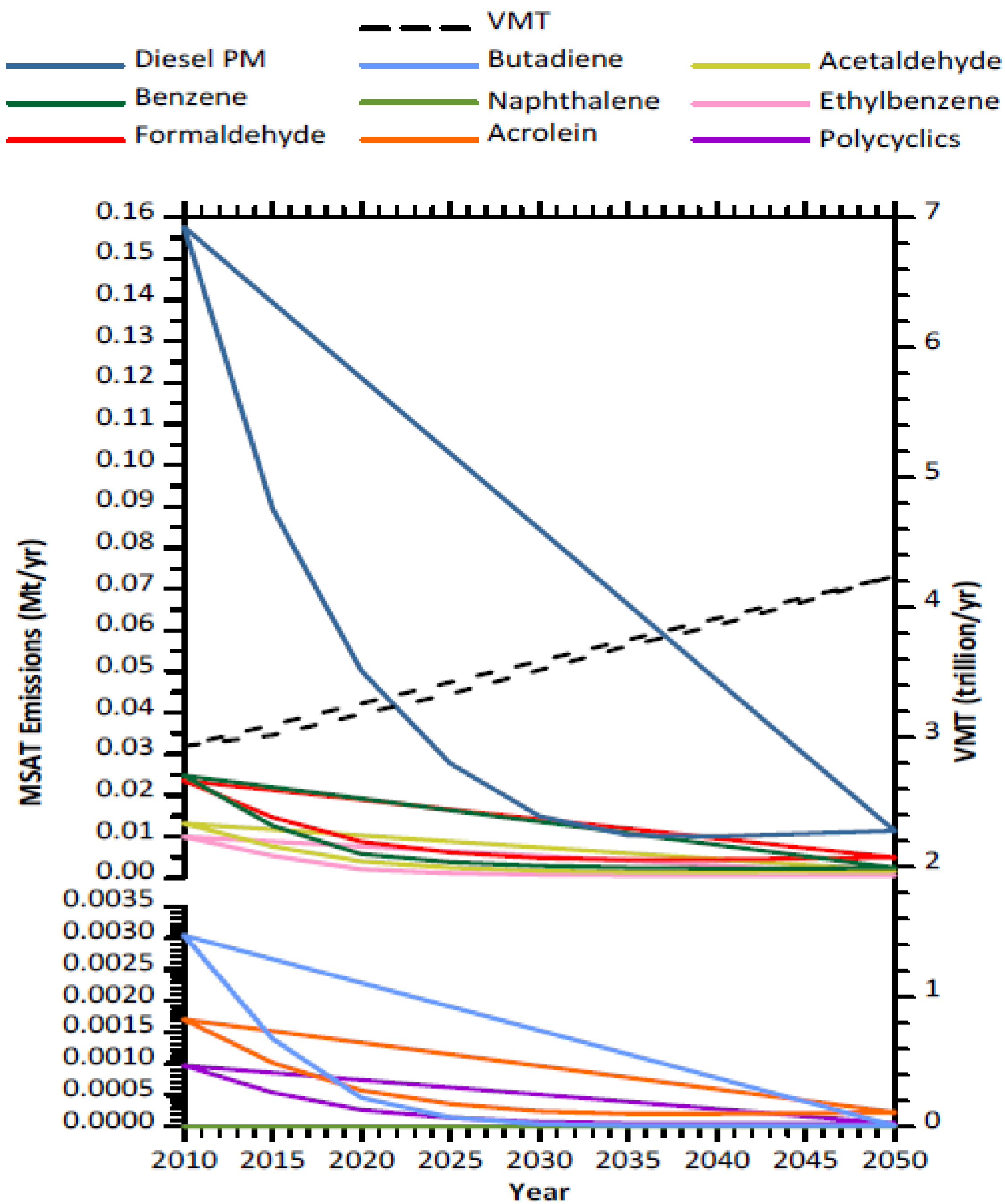
According to EPA, MOVES2014 is a major revision to MOVES2010 and improves upon it in many respects. MOVES2014 includes new data, new emissions standards, and new functional improvements and features. It incorporates substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. These new emissions data are for light- and heavy-duty vehicles, exhaust and evaporative emissions, and fuel effects. MOVES2014 also adds updated vehicle sales, population, age distribution, and vehicle miles travelled (VMT) data. MOVES2014 incorporates the effects of three new Federal emissions standard rules not included in MOVES2010. These new standards are all expected to impact MSAT emissions and include Tier 3 emissions and fuel standards starting in 2017 (79 FR 60344), heavy-duty greenhouse gas regulations that phase in during model years 2014-2018 (79 FR 60344), and the second phase of light duty greenhouse gas regulations that phase in during model years 2017-2025 (79 FR 60344). Since the release of MOVES2014, EPA has released MOVES2014a. In the November 2015 MOVES2014a Questions and Answers Guide,[11] EPA states that for on-road emissions, MOVES2014a adds new options requested by users for the input of local VMT, includes minor updates to the default fuel tables, and corrects an error in MOVES2014 brake wear emissions. The change in brake wear emissions results in small decreases in PM emissions, while emissions for other criteria pollutants remain essentially the same as MOVES2014.

Using EPA's MOVES2014a model, as shown in **Exhibit 4**, FHWA estimates that even if VMT increases by 45 percent from 2010 to 2050 as forecast, a combined reduction of 91 percent in the total annual emissions for the priority MSAT is projected for the same time period.

Diesel PM is the dominant component of MSAT emissions, making up 50 to 70 percent of all priority MSAT pollutants by mass, depending on calendar year. Users of MOVES2014a will notice some differences in emissions compared with MOVES2010b. MOVES2014a is based on updated data on some emissions and pollutant processes compared to MOVES2010b, and also reflects the latest Federal emissions standards in place at the time of its release. In addition, MOVES2014a emissions forecasts are based on lower VMT projections than MOVES2010b, consistent with recent trends suggesting reduced nationwide VMT growth compared to historical trends.

[11] https://www3.epa.gov/otaq/models/moves/documents/420b15095.pdf

Exhibit 4. FHWA Projected National MSAT Emission Trends 2010-2050 for Vehicles Operating on Roadways Using EPA's MOVES2014a Model



Note: Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: EPA MOVES2014a model runs conducted by FHWA, September 2016.

MSAT Research

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how potential public health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA.

Nonetheless, air toxics concerns continue to arise on highway projects during the NEPA process. Even as the science emerges, the public and other agencies expect FHWA to address MSAT impacts in its environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this field.

MSAT Analysis

The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the federal government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires, and FHWA is committed to the examination and avoidance of adverse impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, FHWA must also take into account the need for safe and efficient transportation for reaching a decision that is in the best overall public interest. FHWA policies and procedures for implementing NEPA are contained in regulation at 23 CFR Part 771.

FHWA developed a tiered approach with three categories for analyzing MSAT in NEPA documents, depending on specific project circumstances:

1. No analysis for projects without potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential for MSAT effects; or,
3. Quantitative analysis to differentiate alternatives for projects with higher potential for MSAT effects.

According to FHWA guidance for MSAT analysis, in order for a project to fall into category three (quantitative analysis), the project should: 1) Create new capacity or add significant capacity to urban highways, such as interstates, urban arterials, or urban collector-distributor routes, and should have traffic volumes where the AADT is projected to range from 140,000 to 150,000 or greater by the design year; and the project should: 2) Be located in proximity of populated areas.

This project proposes to remove two traffic signals on the mainline, replacing these with one interchange and one local underpass. The project will also eliminate all other at-grade Highway 10/169 access points within the Project area. Projected AADTs for the project for design year 2040 are below the threshold of 140,000 to 150,000 by the design year (2040).

Based on the information above, this project meets the criteria for the second category, thus calling for a qualitative MSAT emissions assessment. A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at: www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm.

For both the build and the no build alternative discussed in this EA, the amount of mobile source air toxics (MSAT) emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for of the build alternative is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions for the build alternative, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to the Environmental Protection Agency's (EPA) MOVES2014 model, emissions of all of the priority MSAT decrease as speed increases.

Because the estimated VMT for the build and the no build alternatives are nearly the same, varying by less than 6 percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, Federal Highway Administration, October 12, 2016). Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

MSAT Emission Trends

Regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050, as shown in Exhibit 4. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

Based on the downward trend in MSAT emissions shown in Exhibit 4, build alternative ambient concentrations of MSAT are expected to decrease from current levels over the next decade or more. Also, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

APPENDIX K

Noise Technical Memo

A. INTRODUCTION

This report presents the noise analysis and mitigation assessment for the proposed reconstruction of Trunk Highway 10 (Hwy 10) in the City of Anoka, Minnesota. The project, which involves Hwy 10/169 from the Anoka/Ramsey city limits to east of the Main St interchange (1.5 miles), will result in removal of two traffic signals – at Thurston Ave/Cutters Grove Ave and at Fairoak Ave - on the mainline, replacing these with an interchange and a local underpass, respectively. The project will also eliminate all other at-grade access points on Hwy 10/169 within the project area. Improvements to the local frontage road system within the city will also encourage local travelers to use local roadways, removing this traffic from Hwy 10/169. The overall project location is depicted in **Figures 1.1** and **1.2**.

The analysis has been completed consistent with the guidance and requirements of the Minnesota Department of Transportation (MnDOT) traffic noise requirements.[1] The report includes results of the monitoring of the existing noise levels as well as the modeling of existing, no-build, and build scenario noise levels. The analysis also includes a cost-reasonableness assessment of noise barrier mitigation.

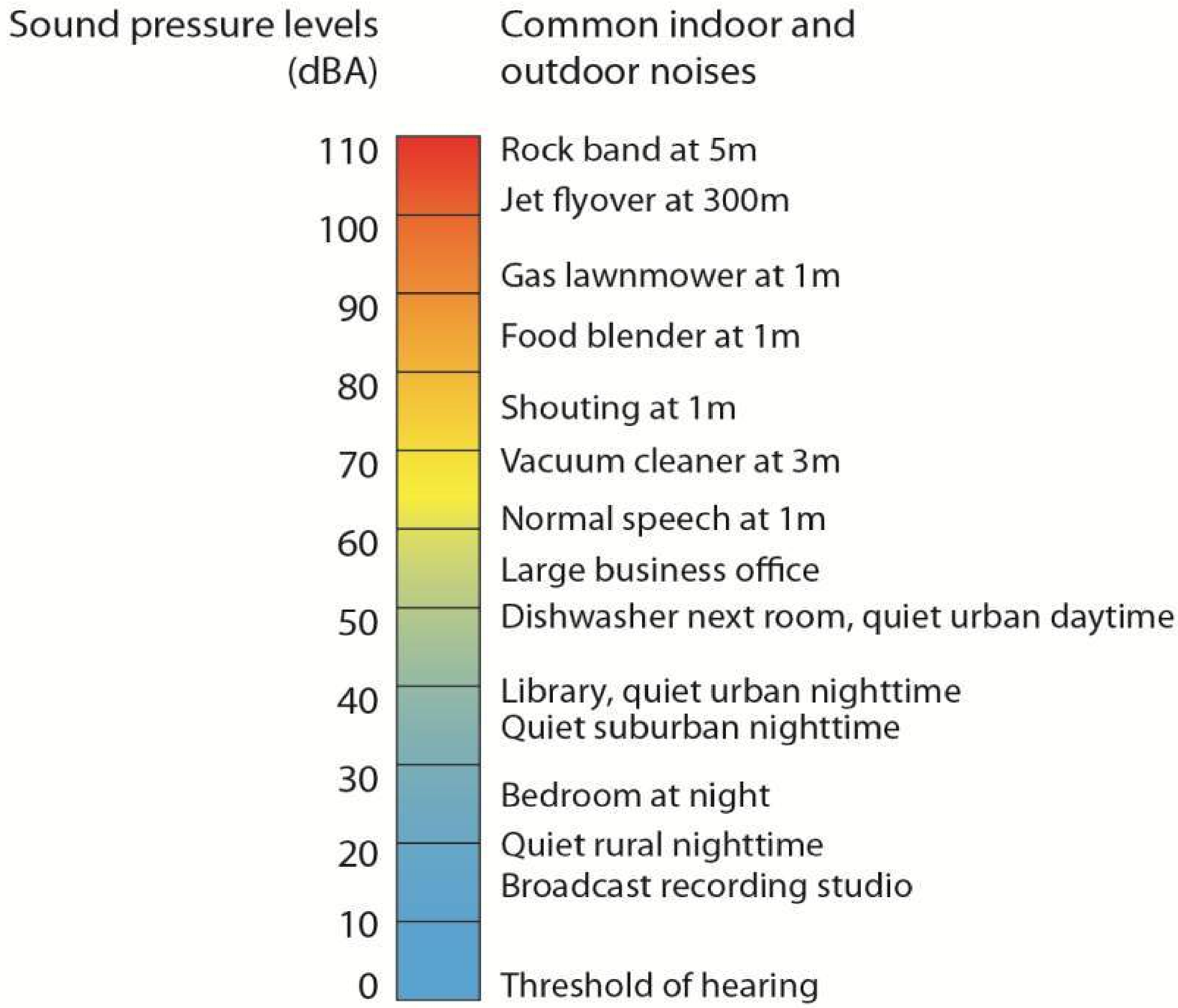
B. NOISE AND NOISE DESCRIPTORS

Noise is defined as any unwanted sound. Sound travels in a wave motion and produces a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithmic measure of sound energy relative to a reference energy level. For highway traffic noise, an adjustment, or weighting, of the high- and low-pitched sounds is made to approximate the way that an average person hears sounds. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of three dBA is barely perceptible to the human ear, a five dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (e.g. the amount of traffic doubles), there is a three dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases to where there is 10 times the sound energy level over a reference level, then there is a 10 dBA increase and it is heard as twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and/or modeling the traffic noise levels during the loudest traffic hour of the day. This is expressed in terms of the L_{eq} noise level for a one-hour period. The L_{eq} is defined as “the equivalent steady-state sound level which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period.” The L_{eq} is compared to FHWA noise abatement criteria.

The following chart (Minnesota Pollution Control Agency, https://www.pca.state.mn.us/air/noise-pollution) provides a rough comparison of the noise levels of some common noise sources.

[1] MnDOT Noise Requirements for Type 1 Federal-aid Projects as per 23 CFR 772, effective July 10, 2017, http://www.dot.state.mn.us/environment/noise/pdf/2017-noise-requirements.pdf



Source: Minnesota Pollution Control Agency, "A Guide to Noise Control in Minnesota", November 2015.

Along with the volume of traffic and other factors (i.e., topography of the area and vehicle speed) that contribute to the loudness of traffic noise, the distance of a receptor from a sound's source is also an important factor. Sound levels decrease as distance from a source increases. The following rule of thumb regarding how sound decreases with distance is commonly used. Beyond approximately 50 feet, each time the distance between a line source (such as a road) and a receptor is doubled, sound levels decrease by three decibels over hard ground, such as pavement or water, and by four and one-half decibels over vegetated areas (soft ground).

C. REGULATORY CONTEXT

The following rules and regulations govern highway noise impacts for this project:

- A traffic noise impact analysis is required for all Type I Federal-aid projects. Type I projects are defined in 23 CFR 772.5. The proposed project meets the definition of a Type I project because it involves the addition and relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange.

- FHWA Noise Standards 23 CFR 772 and 23 CFR 774: includes requirements for traffic noise modeling, noise analysis, noise abatement criteria, and informing local officials.
- Minnesota Statute 116.076 Subd. 2a: lists the following exemptions from the state noise standards: “No standards adopted by any state agency for limiting levels of noise in terms of sound pressure level which may occur in the outdoor environment shall apply to (1) segments of trunk highways constructed with federal interstate substitution money, provided that all reasonably available noise mitigation measures are employed to abate noise, (2) an existing or newly constructed segment of a highway, provided that all reasonably available noise mitigation measures, as approved by the commissioners of the department of transportation and pollution control agency, are employed to abate noise and (3) except for the cities of Minneapolis and St. Paul, an existing or newly constructed segment of a road, street, or highway under the jurisdiction of a road authority of a town, statutory or home rule charter city, or county, except for roadways for which full control of access has been acquired."
- In 2016, the Commissioners of the MPCA and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of highway projects, under MnDOT's jurisdiction, are statutorily exempt from Minnesota State Noise Standards (MN Rule 7030). As a result, any required noise analysis will follow FHWA criteria and regulations only. Projects will no longer directly address Minnesota Rule 7030.
- Therefore, noise impacts of this project will be addressed using the Federal Noise Abatement Criteria and regulations.

Federal Noise Abatement Criteria (NAC)

In the Federal NAC, for residential and recreational uses (Federal Land Use Categories B and C, respectively), the Federal L_{eq} standard is 67 dBA. For commercial areas (Federal Land Use Category E), the Federal L_{eq} standard is 72 dBA. Locations where noise levels are “approaching” (defined in Minnesota as being within one decibel of the criterion threshold, i.e. 66/71 dBA) or exceeding the criterion level must be evaluated for noise abatement feasibility and reasonableness. The Federal NAC are shown in **Table 1**.

In addition to the identified noise criteria, the FHWA also defines a noise impact as a “substantial increase” in the future noise levels over the existing noise levels. MnDOT considers an increase of five dBA or greater a substantial noise level increase.

Table 1 - Federal Noise Abatement Criteria

Activity Category	Activity Criteria(1,2) Leq(h) dBA	Evaluation Location	Activity Description
A	57	Exterior	Exterior Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(3)	67	Exterior	Residential
C(3)	67	Exterior	Exterior active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E(3)	72	Exterior	Exterior Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-----	-----	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	-----	-----	Undeveloped lands that are not permitted

Notes
(1)The one-hour Leq shall be used for impact assessment.
(2) The L eq(h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
(3) Includes undeveloped lands permitted for this activity category.

D. PROJECT IMPACTS ASSESSMENT – METHODOLOGY

Land uses along the project corridor include residential areas, office and retail buildings, churches, industrial buildings, cemeteries, a child care business, and a golf course. Existing and future (2041) build and no-build noise levels were modeled at receptor locations using the noise analysis software TNM 2.5. Traffic noise impacts were assessed by modeling peak and 2041 build and no-build noise levels at receptor sites located within the project study area. Peak noise hour traffic was based on a modeling analysis of the impacts of expected hourly total traffic and heavy truck volumes.

In addition to the noise modeling, noise monitoring was also conducted at locations along the project corridor. The monitoring was conducted to confirm existing noise levels and to assist in validating the model results. Noise modeling receptors were selected at commercial, recreational, institutional, and residential sites along the corridor. Receptor locations were chosen based on guidance provided in the 2017 MnDOT Noise Policy. Receptor locations are shown in the figures in **Attachment A**. As depicted in **Figures 1.1** and **1.2**, the receptors along the project corridor were divided into eight areas for analysis as follows:

- **Area A – South of Hwy 10 and West of Cutters Grove Pkwy**
- **Area B – South of Hwy 10 Between Cutters Grove Pkwy and Fairoak Ave**
- **Area C – South of Hwy 10 Between Fairoak Ave and Main St**
- **Area D – South of Hwy 10 Main St and Hwy 10**
- **Area E – North of Hwy 10 and East of Greenhaven Rd.**
- **Area F1 – North of Hwy 10 Between Fairoak Ave and Thurston Ave**
- **Area F2 – North of Hwy 10 Between Greenhaven Rd and Fairoak Ave**
- **Area G – North of Hwy 10 West of Thurston Ave**

In addition to these areas, noise impacts were also evaluated at locations representing two recreational trail crossings. One is along Cutter's Grove and Thurston, and the other is along Fairoak.

E. HIGH NOISE HOUR EVALUATION

In general, higher traffic speeds, higher traffic volumes, and higher numbers of heavy trucks, increase traffic noise impacts. The worst traffic noise hour typically occurs when traffic is free flowing and heavy truck volumes are at their highest. Based on an analysis of the traffic volume and classification data for Hwy 10, traffic from three one-hour periods (9:00 am – 10:00 am, 1:00 pm – 2:00 pm, and 2:00 pm - 3:00 pm) was used to compare modeled noise impacts at selected receptor locations along the project corridor. The model results showed that traffic during the 2:00 pm – 3:00 pm hour generated the highest noise impacts at the most locations. This is the hour used for the impact analysis in this report. Model results for the selected receptor locations are shown in **Table 2**.

Table 2 - Loudest Hour Noise Assessment

Receptor ID	Modeled Level (dBA) by Time Period [1]		
	9:00-10:00 AM	1:00-2:00 PM	2:00-3:00 PM
	Leq	Leq	Leq
R7	69.8	70.1	**70.7**
R57	67.4	67.7	**68.3**
R105	70.4	70.4	**70.9**
R129	70.5	70.4	**70.9**
R149	62.1	62.0	**62.4**
R832	67.1	67.6	**68.2**

[1] Bolded value is the highest modeled noise level for each receptor location for each of the three modeled hours.

F. NOISE MONITORING

Noise monitoring was conducted at four locations along the project corridor. The noise monitoring locations are shown in **Figures 1.1** and **1.2**. Noise levels were monitored at each location twice; once during the morning and again during the afternoon. A trained noise monitoring technician was present at each session for the entire monitoring session to ensure correct operation of the sound level meter (SLM). The monitoring results were compared with modeling results for traffic conditions encountered during the monitoring. The modeling used either traffic counts conducted during the monitoring, or traffic counts conducted on a different day for a similar time period. The following table presents the results of this comparison.

Table 3 - Noise Monitoring Results Compared to Modeling Results

Monitoring Point	Time	Monitored Noise Level	Modeled Noise Level	Modeled v. Monitored
		L_{eq} (dBA)	L_{eq} (dBA)	L_{eq} (dBA)
M1	9:41 AM	56.4	55.3	1.1
M2A	10:37 AM	64.4	62.9	1.5
M3	11:21 AM	67.3	66.5	0.8
M4	11:56 AM	70.0	70.1	-0.1
M1	1:45 PM	58.3	56.1	2.2
M2B	2:21 PM	65.6	64.6	1.0
M3	3:03 PM	66.4	67.8	-1.4
M4	3:45 PM	69.5	71.3	-1.8

Generally, the L_{eq} monitored noise levels show good agreement (within about 3 dBA) with the modeling results.

G. NOISE IMPACTS ASSESSMENT

Existing and 2041 no-build and build noise impacts were modeled at receptor locations in eight different areas along the project corridor. Following is a discussion of the modeling results for each of these areas.

Area A – South of Hwy 10 and West of Cutters Grove Pkwy
Residential Receptors R85-R104, R170-R177, R179-R183

This is a residential area. The model results for each of the 34 modeled receptor locations are provided in **Table A-1** in **Appendix A**. The modeled receptor locations are shown in **Figure 1.1**.

The modeled noise levels do not approach the Federal Noise Abatement Criteria at any of the 33 modeled locations under existing, no-build, or build conditions.

Area B – South of Hwy 10 Between Cutters Grove Pkwy Fairoak Ave

Residential Receptors R110-R122, R125-R128, R130-R133, R140, R130-2nd, R130-3rd, R131-2nd, R131-3rd, R132-2nd, R133-2nd, R133-3rd

Commercial Receptors R105-R109, R124, R129, R134, R135, R1352, R141

Church Receptor R123, R130-Church

This area includes residential and commercial receptors, as well as a church. The model results for each of the 40 modeled receptor locations are provided in **Table A-2** in **Appendix A**. The modeled receptor locations are shown in **Figures 1.1** and **1.2**

Under the existing scenario, no modeled receptor locations approach or exceed the Federal Noise Abatement Criteria, under the no-build scenario, six modeled receptor locations (representing 16 residences and two businesses) approach or exceed the Federal Noise Abatement Criteria, and under the build scenario, three modeled receptor locations (representing five residences and a church) approach or exceed the Federal Noise Abatement Criteria

Due to the barriers provided by the Hwy 10 overpasses certain receptor locations have lower modeled noise levels under the build scenario than under the no-build and existing scenarios.

Area C – South of Hwy 10 Between Fairoak Ave and Main St

Residential Receptors R142-R147, R153-R157, R147-1, R147-2, R147-3, R147-4
Commercial Receptors R141, R150-R152, R158, R160, R162
Recreational Receptors (Ballfield) R149-1 and R149-2
Memorial Receptor R149 (Relocated by City)

This area includes residences on the east side of Fairoak Ave, a cemetery, ballfields, a memorial, and additional residences near Main St. The model results for each of the 26 modeled receptor locations are provided in **Table A-3** in **Appendix A**. The modeled receptor locations are shown in **Figure 1.2**.

The modeled noise levels do not approach the Federal Noise Abatement Criteria at any modeled location.

Area D – South of Hwy 10 Main St and Hwy 10
Commercial Receptor R161
Cemetery Receptor R159

The area includes a cemetery and a commercial facility.

The model results for the two receptor locations are provided in **Table A-4** in **Appendix A**. The modeled receptor locations are shown in **Figure 1.2**.

The modeled noise levels do not approach the Federal Noise Abatement Criteria at either modeled location.

Area E – North of Hwy 10 and East of Greenhaven Rd
Residential Receptors R1, R2, R202, R203, R204, R1-2nd, R1-3rd, R2-2nd, R202-2nd, R203-2nd, R204-2nd

This area contains an apartment building and an apartment/office building represented by 11 receptor locations.
The model results for the 11 receptor locations are provided in **Table A-5** in **Appendix A**. The modeled receptor locations are shown in **Figure 1.2**.

No receptors exceed the Federal Noise Abatement Criteria under the existing conditions, no build or build conditions.

Area F2 – North of Hwy 10 Between Greenhaven Rd and Fairoak Ave
Healthcare Receptor R5
Commercial Receptors R3, R4, R6-R11

The area contains commercial locations, including a golf course, as well as a healthcare facility.

The model results for these nine receptor locations are provided in **Table A-6** in **Appendix A**. The modeled receptor locations are shown in **Figure 1.2**.

One receptor approaches the Federal Noise Abatement Criteria under the existing conditions, three receptors approach or approach or exceed the Federal Noise Abatement Criteria under the no-build condition, and three receptor locations exceed the Federal Noise Abatement Criteria under the build condition.

Area F1 – North of Hwy 10 Between Fairoak and Thurston Ave
Residential Receptors R12-R16, R18-R26, R28-R68, R72-R80, R771, R772
Commercial Receptors R17, R27, R69-R71, R82
Cemetery Receptor R81

The area is represented by 72 receptors and contains single and multi-family residences as well as commercial properties bordering Hwy 10. Additionally, there is a cemetery on the west end of this area.

The model results for these receptor locations are provided in **Table A-7** in **Appendix A**. The modeled receptor locations are shown in **Figures 1.1** and **1.2**.

One receptor exceeds the Federal Noise Abatement Criteria under the existing conditions, three receptors exceed the Federal Noise Abatement Criteria under the no-build condition, and four receptors exceed the Federal Noise Abatement Criteria under the build condition.

Area G – North of Hwy 10 West of Thurston Ave
Educational Receptors R84, R163
Commercial Receptor R83, R822
Daycare Receptor R832

This area includes commercial properties, a daycare center, and an educational facility.

The model results for these receptor locations are provided in **Table A-8** in **Appendix A**. The modeled receptor locations are shown in **Figures 1.2**.

One receptor exceeds the Federal Noise Abatement Criteria under the existing conditions, two receptors exceed the Federal Noise Abatement Criteria under the no-build condition, and two receptors exceed the Federal Noise Abatement Criteria under the build condition.

Recreational Trail Crossings

Trail Receptors T1, T2, T3, and T4

Two recreational trails cross Hwy 10 on the project corridor. One is along Cutters Grove and Thurston and the other will be along Fairoak under the build condition. Both will pass under Hwy 10 and are immediately next to the crossing roadways under the build condition. Each of the four modeled locations exceeds the Federal Noise Abatement Criteria under the existing, no-build, and build conditions. Because they are immediately next to the crossing roadways, it is not feasible to try to mitigate the noise at these trail locations.

Areas Beyond the Project Limits

Noise impacts due to this project area expected to be insignificant beyond the project area.

H. MITIGATION ASSESSMENT

Because the Federal Noise Abatement Criteria would be approached or exceeded at modeled receptor sites in Areas B, E, F1, F2, and G, mitigation measures have been analyzed. Because they are immediately next to the crossing roadways, it is not feasible to try to mitigate the noise at the trail locations.

In order for a noise wall to be proposed as part of a project, it must be both feasible and reasonable. Feasibility refers to physical constraints and engineering considerations (i.e., can a noise wall be constructed at this location). For noise barriers to be considered reasonable, it must meet the following three criteria:

1) It must be acoustically effective by providing a substantial reduction in noise, defined as a five-decibel reduction or more. Additionally, one receiver must receive a seven-decibel reduction or greater to meet the reasonableness reduction design goal.
2) It must meet MnDOT’s cost effectiveness criteria of $78,500 per benefitted receptor (based on a barrier construction cost of $36/square foot), and
3) It must consider the viewpoint of the benefited residences and owners.

Benefited receptors (i.e., residences, commercial entities, industrial entities) are those that are predicted to experience noise level reductions of 5 dBA or more with the analyzed noise barrier.

The noise barriers analyzed for the project are shown in **Figures 1.1** and **1.2**.

Following is a description of the mitigation assessment for each of the Areas.

Area B – South of Hwy 10 Between Cutters Grove Pkwy Fairoak Ave

Residential Receptors R110-R122, R125-R128, R130-R133, R140, R130-2nd, R130-3rd, R131-2nd, R131-3rd, R132-2nd, R133-2nd, R133-3rd

Commercial Receptors R105-R109, R124, R129, R134, R135, R1352, R141

Church Receptor R123, R130-Church

Under the build scenario, three modeled receptor locations (representing five residences and a church) approach or exceed the Federal Noise Abatement Criteria. In order for a barrier to be effective at this location, it must be mounted on the elevated highway structure. The only MnDOT approved barrier for this situation is an acrylic barrier, which comes at a cost of $134 per square foot, not including other substantial additional construction costs required to provide an adequate base for the barrier.

The mitigation analysis demonstrated the lowest cost/benefited residence barrier would be a 20-foot-high, 1,515-foot-long barrier with a cost/benefited receiver of $156,162, not including any additional costs beyond the $134 per square foot for the acrylic wall. This does not meet the MnDOT $78,500/residence cost-effectiveness requirement. Therefore, a barrier is not proposed for this location.

The analyzed barrier is shown in **Figure 1.2**. Detailed mitigation analysis results for this location are provided in **Table B-1** in **Appendix B**.

Area F2 – North of Hwy 10 Between Greenhaven Rd and Fairoak Ave
Healthcare Receptor R5
Commercial Receptors R3, R4, R6-R11

The area contains commercial locations, including a golf course, as well as a healthcare facility.

Three receptor locations exceed the Federal Noise Abatement Criteria under the build condition.

The mitigation analysis demonstrated the lowest cost/benefited residence barrier would be a 15-foot-high, 895-foot-long barrier with a cost/benefited receiver of $96,660. This does not meet the MnDOT $78,500/residence cost-effectiveness requirement. Therefore, a barrier is not proposed for this location.

The analyzed barrier is shown in **Figure 1.2**. Detailed mitigation analysis results for this location are provided in **Table B-2** in **Appendix B**.

Area F1 – North of Hwy 10 Between Fairoak and Thurston Ave
Residential Receptors R12-R16, R18-R26, R28-R68, R72-R80, R771, R772
Commercial Receptors R17, R27, R69-R71, R82
Cemetery Receptor R81

The area is represented by 72 receptors and contains single and multi-family residences as well as commercial properties bordering Hwy 10. Additionally, there is a cemetery on the west end of this area.

Four receptor locations exceed the Federal Noise Abatement Criteria under the build condition. The mitigation analysis demonstrated the lowest cost/benefited residence barrier would be a 19-foot-high, 1050-foot-long barrier with a cost effectiveness of $80,664. This does not meet the MnDOT $78,500/residence cost-effectiveness requirement. Therefore, a barrier is not proposed for this location.

The costs for this wall include additional costs for acquisition of temporary easement parcels, drainage structure and common embankment soils. Bolton and Menk estimated the additional costs for these items to be $169,100. Detailed cost estimate is attached in **Appendix C**.

The analyzed barrier is shown in **Figure 1.2**. Detailed mitigation analysis results for this location are provided in **Table B-3** in **Appendix B**.

Area G – North of Hwy 10 West of Thurston Ave
Educational Receptors R84, R163
Commercial Receptor R83, R822
Daycare Receptor R832

This area includes commercial properties, a daycare center, and an educational facility.

One receptor exceeds the Federal Noise Abatement Criteria under the existing conditions, two receptors exceed the Federal Noise Abatement Criteria under the no-build condition, and two receptors exceed the Federal Noise Abatement Criteria under the build condition.

A 20-foot-high, 500-foot-long wall did not achieve the minimum required 7dBA reduction at the receptor location. Therefore, a barrier is not proposed for this location.

The analyzed barrier is shown in **Figure 1.1**. Detailed mitigation analysis results for this location are provided in **Table B-4** in **Appendix B**.

I. Other Noise Mitigation Techniques

Noise abatement measures other than noise barriers may be considered for transportation projects. Potential measures are summarized below.

- Traffic Management Measures: These measures include such items as prohibition of certain vehicle types and time-use restrictions for certain vehicle types. These traffic management measures are not reasonable for Hwy 10 because this would be inconsistent with the need for the proposed project and the functional classification of these roadways, which is to provide flexibility to travelers and increase highway capacity.

- Modified Speed Limits: Reducing speed limits would reduce noise levels adjacent to project area roadways. Reduced speed limits are not reasonable because this would be inconsistent with the need of the proposed project and the functional classification of these roadways. In addition, reductions of speed limits, although acoustically beneficial, are seldom practical unless the design speed of the proposed improvement is also reduced.
- Landscaping/Natural Noise Screening: The use of vegetation as a noise screen can be effective only if at least 75 to 100 feet of dense, evergreen vegetation (evergreen vegetation maintains its foliage year around) is provided between the source and receptor. It is not feasible to plant enough vegetation within the right of way to achieve substantial noise level reductions. As such, vegetation is not a reasonable noise mitigation measure.
- Exclusive Land Use Designations: Buffer zones are undeveloped, open spaces adjacent to a highway corridor. The project corridor does not have such undeveloped land along the corridor.
- Noise Insulation of Activity Category D Land Use: There are no impacts to Category D facilities within the project area.

J. CONSTRUCTION NOISE

The construction activities associated with implementation of the proposed project will result in increased noise levels relative to existing conditions. These impacts will primarily be associated with construction equipment and pile driving.

Table 4 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading/site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Table 4 - Typical Construction Equipment Noise Levels at 50 feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction may/will/will not sometimes be required to minimize traffic impacts and to improve safety. However, construction will be limited to daytime hours as much as possible. This project is expected to be under construction for approximately 24 months. If necessary, a detailed nighttime construction mitigation plan will be developed during the project final design stage.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile-driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. While pile-driving equipment results in the highest peak noise level, as shown in **Table 4**, it is limited in duration to the activities noted above (e.g., bridge construction). The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours.

K. CONCLUSION

Modeled noise levels exceed or approach Federal Noise Abatement Criteria at receptor locations in four of the eight analyzed areas adjacent to the project. Barriers protecting these four areas along the corridor were analyzed to determine their cost reasonableness per MnDOT/FHWA requirements. No noise barriers met the MnDOT cost reasonableness threshold of $78,500 per residence. Therefore, no noise barriers are proposed for this project.

L. STATEMENT OF LIKELIHOOD

Traffic noise analysis completed to date have resulted in the determination that no highway traffic noise abatement measures are required along Hwy 10 between Thurston Ave and Main St. Noise analyses were conducted based on preliminary design studies. Final mitigation decisions will be subject to final design considerations and if applicable, the viewpoint of benefited residents and property owners.

If it subsequently develops during final design that conditions have substantially changed, noise abatement measures may be provided. In this case, affected benefited receptors and local officials will be notified of plans to consider noise abatement measure prior to the completion of the final design process. This notification would explain changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and an explanation of noise barrier feasibility and reasonableness. Any final decision regarding installation of the proposed abatement measure will be made upon completion of the project's final design and the public involvement process.

Table A-1
TH 10 Improvement Project
Area A - South of TH 10 and West of Cutters Grove Parkway

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R85	B	R	61.5	62.5	1	64.1	2.7
R86	B	R	61.1	62.1	1	63.6	2.7
R87	B	R	60.9	61.9	1	63.3	2.5
R88	B	R	60.8	61.8	1	63	2.2
R89	B	R	60	61	1	62.1	2.2
R90	B	R	57.4	58.4	1	59.6	2.2
R91	B	R	56.8	57.8	1	58.6	1.8
R92	B	R	56	57	1	57.5	1.4
R93	B	R	54.8	55.8	1	56	1.3
R94	B	R	53.7	54.7	1	55.1	1.4
R95	B	R	52.8	53.8	1	55.5	2.7
R96	B	R	51.7	52.7	1	54.4	2.6
R97	B	R	52	53	1	54.2	2.2
R98	B	R	50.8	51.8	1	53.6	2.7
R99	B	R	51.2	52.1	0.9	53.2	1.9
R100	B	R	53.8	54.8	1	56.1	2.3
R101	B	R	51.5	52.5	1	54.1	2.6
R102	B	R	56.9	58.1	1.2	59.2	2.3
R103	B	R	57.9	59.3	1.4	59.7	1.8
R104	B	R	58.1	59.5	1.4	59.5	1.4
R170	B	R	57.8	58.9	1.1	60.9	3.1
R171	B	R	56.6	57.6	1	59.6	2.9
R172	B	R	54.8	55.8	1	56.8	2
R173	B	R	55.1	56.1	1	59	3.9
R174	B	R	55.3	56.3	1	58.6	3.3
R175	B	R	55.2	56.2	1	58.7	3.4
R176	B	R	56.5	57.6	1.1	60.1	3.6
R177	B	R	55.2	56.2	1	58.1	2.9
R179	B	R	56.8	57.9	1.1	59.3	2.5
R180	B	R	56	57.1	1.1	58.2	2.2
R181	B	R	56.2	57.3	1.1	58.5	2.3
R182	B	R	55.6	56.6	1	57.7	2
R183	B	R	55.7	56.8	1.1	58	2.3

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-2
TH 10 Improvement Project
Area B - South of TH 10 Between Cutters Grove Parkway and Fairoak Avenue

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R105	E	C	70.1	71.2	1.1	67.7	-2.4
R106	F	C	70.9	71.9	1	68.4	-2.5
R107	B	C	60.8	61.8	1	64.6	3.8
R108	B	C	60.7	61.6	0.9	63.7	3
R109	B	C	60	61	1	62.3	2.3
R110	B	R	63	64	1	66.5	3.5
R111	B	R	61	62	1	64.5	3.5
R112	B	R	59.8	60.8	1	62.7	2.9
R113	B	R	58.6	59.7	1.1	61.5	2.9
R114	B	R	58.9	60	1.1	61.3	2.4
R115	B	R	51.6	52.7	1.1	53.2	1.6
R116	B	R	55.3	56.3	1	57.1	1.8
R117	B	R	53.5	54.5	1	55.1	1.6
R118	B	R	58.1	59.2	1.1	60.4	2.3
R119	B	R	56.9	57.9	1	59	2.1
R120	B	R	55.9	57	1.1	58	2.1
R121	B	R	54.2	55.2	1	56.1	1.9
R122	B	R	53.6	54.6	1	54.8	1.2
R123	C	Church	62.2	63.2	1	66.1	3.9
R124	B	C	63.9	65	1.1	65.2	1.3
R125	B	R	56.8	57.8	1	58.8	2
R126	B	R	55.4	56.4	1	57.3	1.9
R127	B	R	53.8	54.9	1.1	55.3	1.5
R128	B	R	53	54.1	1.1	54.4	1.4
R129	E	C	70.2	71.4	1.2	68.4	-1.8
R130	B	R	62.9	64	1.1	63.6	0.7
R131	B	R	63.3	64.4	1.1	63.8	0.5
R132	B	R	64	65.2	1.2	59.9	-4.1
R133	B	R	59	60.2	1.2	57.8	-1.2
R134	E	C	69	70.2	1.2	67.4	-1.6
R135	E	C	67.5	68.6	1.1	66.9	-0.6
R1352	E	C	61.5	62.5	1	62.5	1
R140	B	R	48.7	49.8	1.1	50.2	1.5
R130 - 2nd Floor	B	R	64.9	66	1.1	64.7	-0.2
R130 - 3rd Floor	B	R	65.2	66.4	1.2	65.6	0.4
R131 - 2nd Floor	B	R	65.2	66.4	1.2	65	-0.2
R131 - 3rd Floor	B	R	65.6	66.8	1.2	66	0.4
R132 - 2nd Floor	B	R	63	64.1	1.1	61.3	-1.7
R133 - 2nd Floor	B	R	61.1	62.3	1.2	61	-0.1
R133 - 3rd Floor	B	R	61.7	62.8	1.1	62.6	0.9
R130 – Church	C	Church	49.4	50.4	1	51.1	1.7

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-3
TH 10 Improvement Project
Area C - South of TH 10 Between Fairoak Avenue and Main Street

Receptor	Federal NAC	Receptor Type[1]	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R141	F	C	68.4	69.6	1.2	66.5	-1.9
R142	B	R	61.6	62.6	1	63.1	1.5
R143	B	R	60.6	61.7	1.1	61.2	0.6
R144	B	R	59	60.1	1.1	59.9	0.9
R145	B	R	60.3	61.3	1	62.2	1.9
R146	B	R	58	59.2	1.2	59.1	1.1
R147	B	R	59.8	60.8	1	62.1	2.3
R149	C	Memorial	62.4	63.6	1.2	62.6	0.2
R150	F	C	61.6	62.8	1.2	62	0.4
R151	F	C	64.7	65.9	1.2	65.6	0.9
R152	F	C	65.7	66.9	1.2	65.3	-0.4
R153	B	R	62.2	63.4	1.2	64	1.8
R154	B	R	61.7	63	1.3	63.3	1.6
R155	B	R	61.5	62.7	1.2	63.1	1.6
R156	B	R	60.5	61.8	1.3	62.3	1.8
R157	B	R	59.4	60.7	1.3	61.4	2
R158	F	C	62.6	63.8	1.2	65.2	2.6
R160	F	C	59.7	60.9	1.2	60.2	0.5
R162	F	C	56.9	58.1	1.2	57	0.1
R1471	B	R	56.4	57.5	1.1	57.4	1
R1472	B	R	58.7	59.6	0.9	62.3	3.6
R1473	B	R	55.7	56.9	1.2	56.5	0.8
R1474	B	R	57.5	58.4	0.9	61	3.5
R1491	C	Recreational	57.8	59	1.2	58.4	0.6
R1492	C	Recreational	56.6	57.8	1.2	56.7	0.1

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-4
TH 10 Improvement Project
Area D - South of TH 10 Between Main Street and TH 10

Receptor	Federal NAC	Receptor Type[1]	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R159	C	Cemetery	64.1	65.4	1.3	62.5	-1.6
R161	F	C	60.3	61.5	1.2	59.6	-0.7

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-5
TH 10 Improvement Project
Area E - North of TH 10 and East of Greenhaven Blvd.

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R1	B	R	58.7	59.8	1.1	59.6	0.9
R2	B	R	60.8	61.7	0.9	62.3	1.5
R202	B	R	59.7	60.5	0.8	61.2	1.5
R203	B	R	59.3	60.4	1.1	59.9	0.6
R204	B	R	57	58.2	1.2	57.9	0.9
R1 - 2nd Floor	B	R	62.2	63.3	1.1	63.1	0.9
R1 - 3rd Floor	B	R	63.9	65	1.1	64.2	0.3
R2 - 2nd Floor	B	R	63	64	1	63.8	0.8
R202 - 2nd Floor	B	R	61.6	62.5	0.9	62.6	1
R203 - 2nd Floor	B	R	62.6	63.7	1.1	63.1	0.5
R204 - 2nd Floor	B	R	60.7	61.9	1.2	61.5	0.8

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-6
TH 10 Improvement Project
Area F2 - North of TH 10 Between Greenhaven Blvd and Fairoak Avenue

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R3	E	C	68.6	69.8	1.2	70.6	2
R4	E	C	70.4	71.5	1.1	72.4	2
R5	B	R	65	66.1	1.1	67.1	2.1
R6	E	C	60	61.2	1.2	61.7	1.7
R7	E	C	69.7	70.9	1.2	70.4	0.7
R8	E	C	71.5	72.6	1.1	71.6	0.1
R9	E	C	66.2	67.3	1.1	68.3	2.1
R10	F	C	70	71.1	1.1	69.7	-0.3
R11	F	C	69.1	70.1	1	69	-0.1

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-7
TH 10 Improvement Project
Area F1 - North of TH 10 Between Fairoak Avenue and Thurston Avenue

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R12	B	R	62.5	63.6	1.1	63.8	1.3
R13	B	R	59.9	61	1.1	61.5	1.6
R14	B	R	58.2	59.4	1.2	59.9	1.7
R15	B	R	56.3	57.4	1.1	58	1.7
R16	B	R	55.4	56.5	1.1	57.4	2
R17	F	C	68.9	69.8	0.9	68.7	-0.2
R18	B	R	62.2	63.4	1.2	63.6	1.4
R19	B	R	59.1	60.2	1.1	60.9	1.8
R20	B	R	57.2	58.3	1.1	59.4	2.2
R21	B	R	55.7	56.8	1.1	57.5	1.8
R22	B	R	55.2	56.5	1.3	57.4	2.2
R23	B	R	54.9	56	1.1	57.1	2.2
R24	B	R	54.2	55.3	1.1	56.4	2.2
R25	B	R	53.5	54.6	1.1	55.8	2.3
R26	B	R	53.5	54.5	1	55.8	2.3
R27	E	C	69.9	70.7	0.8	68.9	-1
R28	B	R	63.9	65	1.1	66.4	2.5
R29	B	R	60.7	62	1.3	63.2	2.5
R30	B	R	59.9	61	1.1	62.1	2.2
R31	B	R	58.8	60.1	1.3	61.2	2.4
R32	B	R	57.4	58.6	1.2	59.1	1.7
R33	B	R	57.8	59.3	1.5	60.1	2.3
R34	B	R	56.2	57.4	1.2	57.9	1.7
R35	B	R	57.1	58.5	1.4	58.9	1.8
R36	B	R	55.1	56.4	1.3	56.9	1.8
R37	B	R	55.6	58.1	2.5	57.9	2.3
R38	B	R	53.3	54.8	1.5	55.5	2.2
R39	B	R	54.5	56.2	1.7	56.7	2.2
R40	B	R	51.9	53.3	1.4	54.2	2.3
R41	B	R	54	55.7	1.7	55.9	1.9
R42	B	R	53.3	55.1	1.8	55.3	2
R43	B	R	53.1	54.8	1.7	55	1.9
R44	B	R	62.1	63.1	1	64.5	2.8
R45	B	R	59.3	60.5	1.2	61.8	2.5
R46	B	R	58.1	59.3	1.2	60.3	2.2
R47	B	R	57.3	58.6	1.3	59.6	2.3
R49	B	R	56.6	57.9	1.3	58.5	1.9
R50	B	R	55.7	57.2	1.5	57.7	2
R51	B	R	57.2	59.8	2.6	59.5	2.3
R52	B	R	52.9	54.8	1.9	54.6	1.7
R53	B	R	54.3	57	2.7	56.6	2.3
R54	B	R	51.1	52.6	1.5	52.5	1.4

R55	B	R	50.8	52.2	1.4	52.3	1.5
R56	B	R	50.3	51.6	1.3	51.9	1.6
R57	B	R	67.7	68.6	0.9	68.6	0.9
R58	B	R	65.7	66.7	1	67.6	1.9
R59	B	R	64.3	65.5	1.2	66.2	1.9
R60	B	R	63.3	64.5	1.2	65	1.7
R61	B	R	62.1	63.7	1.6	63.5	1.4
R62	B	R	60.9	63	2.1	62.4	1.5
R63	B	R	59.5	62	2.5	61.2	1.7
R64	B	R	58.2	60.8	2.6	60	1.8
R65	B	R	56.2	58.5	2.3	57.7	1.5
R66	B	R	55.3	57.6	2.3	57	1.7
R67	B	R	53.3	55.4	2.1	55.1	1.8
R68	B	R	52.5	54.4	1.9	54	1.5
R69	F	C	69.6	70.8	1.2	71.3	1.7
R70	E	C	67.1	68.5	1.4	68.4	1.3
R71	E	C	70.2	71	0.8	70.9	0.7
R72	B	R	59.9	62.2	2.3	61.6	1.7
R73	B	R	57.4	59.6	2.2	59.1	1.7
R74	B	R	56.9	58.9	2	57.8	0.9
R75	B	R	56.4	58.2	1.8	56.9	0.5
R76	B	R	56.2	57.9	1.7	56.2	0
R77	B	R	55.4	57.1	1.7	55.5	0.1
R78	B	R	52.8	54.5	1.7	54.1	1.4
R79	B	R	52.2	53.9	1.7	53.5	1.4
R80	B	R	54.1	56.9	2.8	55.8	1.6
R81	C	Cemetery	59.9	61.3	1.4	62	2.1
R82	E	C	65.9	66.8	0.9	67.5	1.5
R771	B	R	54.8	56.4	1.6	54.3	-0.5
R772	B	R	52.1	54.1	2	54.1	2.1

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-8
TH 10 Improvement Project
Area G - North of TH 10 and West of Thurston Avenue

Receptor	Federal NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
R83	E	C	62.1	63.1	1	64.4	2.3
R84	C	Educational	59.6	60.6	1	60.6	1
R163	C	Educational	66.2	67.1	0.9	67.3	1.1
R822	E	Hotel	65.7	66.7	1	66.3	0.6
R832	C	Daycare	65.7	66.7	1	66.9	1.2

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table A-9
TH 10 Improvement Project
Trail Crossings - Fairoak and Cutter's Grove

Receptor	NAC	Receptor Type(1)	Modeled Existing	Modeled 2041 No Build	Difference - Existing and No Build	Modeled 2041 Build	Difference - Existing and Build
ID		Criteria	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)	Leq (dBA)
T1	E	C	70.9	71.9	1	70.6	-0.3
T2	C	Educational	71.9	73	1.1	70.6	-1.3
T3	C	Educational	68.2	68.2	0	69.3	69.4
T4	E	Hotel	70	71.1	1.1	69.8	-0.2

XX Approaches or Exceeds FHWA Noise Abatement Criteria

(1) R identifies a residential receptor, C identifies a commercial receptor

Table B-1
Noise Wall Analysis - Area B
South of TH 10 Between Cutters Grove Parkway and Fairoak Avenue

Receptor	NAC	Number of Residences Represented	Noise Level (L_{eq}) No Wall (2041)	Noise Level (L_{eq}) 20' Wall (2041)	Reduction 20' Wall	Noise Level (L_{eq}) 19' Wall (2041)	Reduction 19' Wall	Noise Level (L_{eq}) 18' Wall (2041)	Reduction 18' Wall
ID			dBA	dBA	dBA	dBA	dBA	dBA	dBA
R105	B	1	67.7	67.7	0	67.7	0	67.7	0
R106	B	1	68.4	68.4	0	68.4	0	68.5	-0.1
R107	B	1	64.6	64.0	0.6	64.0	0.6	64.1	0.5
R108	B	1	63.7	62.3	1.4	62.4	1.3	62.4	1.3
R109	B	1	62.3	60.5	1.8	60.6	1.7	60.6	1.7
R110	B	1	66.5	59.8	6.7	60.0	6.5	60.2	6.3
R111	B	1	64.5	58.2	6.3	58.4	6.1	58.6	5.9
R112	B	1	62.7	57.1	5.6	57.3	5.4	57.4	5.3
R113	B	1	61.5	56.4	5.1	56.5	5	56.6	4.9
R114	B	1	61.3	56.5	4.8	56.6	4.7	56.7	4.6
R115	B	1	53.2	49.5	3.7	49.6	3.6	49.7	3.5
R116	B	1	57.1	55.3	1.8	55.3	1.8	55.4	1.7
R117	B	1	55.1	52.2	2.9	52.3	2.8	52.3	2.8
R118	B	1	60.4	55.5	4.9	55.6	4.8	55.7	4.7
R119	B	1	59.0	53.1	5.9	53.2	5.8	53.4	5.6
R120	B	1	58.0	52.3	5.7	52.4	5.6	52.6	5.4
R121	B	1	56.1	51.0	5.1	51.1	5	51.2	4.9
R122	B	1	54.8	50.0	4.8	50.1	4.7	50.2	4.6
R123	C	1	66.1	59.4	6.7	59.5	6.6	59.7	6.4
R124	B	1	65.2	58.0	7.2	58.2	7	58.4	6.8
R125	B	1	58.8	53.3	5.5	53.4	5.4	53.6	5.2
R126	B	1	57.3	51.8	5.5	51.9	5.4	52.0	5.3
R127	B	1	55.3	50.0	5.3	50.1	5.2	50.3	5
R128	B	1	54.4	50.6	3.8	50.6	3.8	50.7	3.7
R129	B	1	68.4	62.1	6.3	62.2	6.2	62.3	6.1
R130	B	4	63.6	58.2	5.4	58.3	5.3	58.4	5.2
R131	B	4	63.8	58.9	4.9	59.0	4.8	59.1	4.7
R132	B	1	59.9	56.3	3.6	56.4	3.5	56.4	3.5
R133	B	1	57.8	55.4	2.4	55.4	2.4	55.4	2.4

R134	B	1	67.4	61.7	5.7	61.8	5.6	61.9	5.5
R135	B	1	66.9	63.7	3.2	63.7	3.2	63.8	3.1
R1352	B	1	62.5	60.3	2.2	60.4	2.1	60.4	2.1
R140	B	1	50.2	48.7	1.5	48.7	1.5	48.7	1.5
R1301	B	4	64.7	59.5	5.2	59.6	5.1	59.7	5
R1302	B	4	65.6	60.6	5.0	60.7	4.91	60.8	4.81
R1311	B	4	65.0	60.4	4.6	60.5	4.5	60.6	4.4
R1312	B	4	66.0	61.4	4.6	61.5	4.5	61.6	4.4
R1322	B	1	61.3	58.7	2.6	58.7	2.6	58.7	2.6
R1331	B	1	61.0	58.8	2.2	58.8	2.2	58.8	2.2
R1332	B	1	62.6	60.6	2	60.6	2	60.6	2
R130-church	Church	1	51.1	47.9	3.2	48.0	3.1	48.1	3
Number of receivers achieving 5 dBA					**26**		**22**		**14**
Does wall achieve a 7 dBA reduction					**Yes**		**Yes**		**No**
Length of Wall (feet)					**1515**		**1515**		**1515**
Cost of Wall per 5 dBA receiver					**$156,162**		**$175,327**		**NA**
Does wall meet cost criteria					**No**		**No**		**No**

Table B-2
Noise Wall Analysis - Area F2
North of TH 10 Between Greenhaven Blvd and Fairoak Avenue

Receptor	NAC	Noise Level (L_{eq}) No Wall (2041)	Noise Level (L_{eq}) 20' Wall (2041)	Reduction 20' Wall (2041)	Noise Level (L_{eq}) 15' Wall (2041)	Reduction 15' Wall (2041)	Noise Level (L_{eq}) 10' Wall (2041)	Reduction 10' Wall (2041)
ID	Criteria	Level	Level	Reduction	Level	Reduction	Level	Reduction
R3	E	70.6	66.5	4.1	66.9	3.7	67.9	2.7
R4	E	72.4	62.5	9.9	63.7	8.7	67	5.4
R5	B	67.1	63.5	3.6	64	3.1	65.5	1.6
R6	E	61.7	58.5	3.2	58.8	2.9	59.9	1.8
R7	E	70.4	62.2	8.2	63.3	7.1	66.2	4.2
R8	E	71.6	62.4	9.2	63.2	8.4	65.5	6.1
R9	E	68.3	62.6	5.7	63.3	5	66	2.3
R10	F	69.7	63.5	6.2	64	5.7	64.8	4.9
R11	F	69	65.9	3.1	66.1	2.9	66.4	2.6
Number of receivers achieving 5 dBA				5		5		2
Does wall achieve a 7 dBA reduction				Yes		Yes		No
Length of Wall				895		895		895
Cost of Wall per 5 dBA receiver				$128,880		$96,660		NA
Does wall meet cost criteria				No		No		No

Table B-3
Noise Wall Analysis - Area F1
North of TH 10 Between Fairoak Avenue and Thurston Avenue

Receptor	NAC	Noise Level (L_{eq}) No Wall (2041)	Noise Level (L_{eq}) 20' Wall (2041)	Reduction 20' Wall (2041)	Noise Level (L_{eq}) 19' Wall (2041)	Reduction 19' Wall (2041)	Noise Level (L_{eq}) 14' Wall (2041)	Reduction 14' Wall (2041)	Noise Level (L_{eq}) 13' Wall (2041)	Reduction 13' Wall (2041)
ID		Criteria	Level	Reduction	Level	Reduction	Level	Reduction	Level	Reduction
R12	B	63.8	63.2	0.6	63.2	0.6	63.3	0.5	63.3	0.5
R13	B	61.5	60.7	0.8	60.7	0.8	60.8	0.7	60.8	0.7
R14	B	59.9	58.8	1.1	58.8	1.1	59	0.9	59	0.9
R15	B	58	56.3	1.7	56.4	1.6	56.5	1.5	56.6	1.4
R16	B	57.4	55.5	1.9	55.6	1.8	55.8	1.6	55.9	1.5
R17	F	68.7	67.7	1	67.7	1	67.8	0.9	67.8	0.9
R18	B	63.6	62.3	1.3	62.3	1.3	62.4	1.2	62.5	1.1
R19	B	60.9	59.4	1.5	59.4	1.5	59.6	1.3	59.7	1.2
R20	B	59.4	57.5	1.9	57.5	1.9	57.7	1.7	57.8	1.6
R21	B	57.5	55.8	1.7	55.8	1.7	56	1.5	56	1.5
R22	B	57.4	54.8	2.6	54.9	2.5	55.2	2.2	55.3	2.1
R23	B	57.1	54.4	2.7	54.5	2.6	54.8	2.3	54.9	2.2
R24	B	56.4	53.7	2.7	53.8	2.6	54.1	2.3	54.3	2.1
R25	B	55.8	53.3	2.5	53.3	2.5	53.6	2.2	53.8	2
R26	B	55.8	53.5	2.3	53.5	2.3	53.7	2.1	53.9	1.9
R27	E	68.9	64.9	4	64.9	4	65.2	3.7	65.2	3.7
R28	B	66.4	62.4	4	62.4	4	62.8	3.6	62.9	3.5
R29	B	63.2	59.4	3.8	59.4	3.8	59.8	3.4	60	3.2
R30	B	62.1	59.3	2.8	59.3	2.8	59.6	2.5	59.7	2.4
R31	B	61.2	57.1	4.1	57.2	4	57.6	3.6	57.8	3.4
R32	B	59.1	57.4	1.7	57.5	1.6	57.6	1.5	57.7	1.4
R33	B	60.1	56	4.1	56	4.1	56.5	3.6	56.6	3.5
R34	B	57.9	56.3	1.6	56.3	1.6	56.5	1.4	56.5	1.4
R35	B	58.9	55.1	3.8	55.1	3.8	55.5	3.4	55.7	3.2
R36	B	56.9	55.3	1.6	55.3	1.6	55.5	1.4	55.5	1.4
R37	B	57.9	54.1	3.8	54.1	3.8	54.6	3.3	54.8	3.1
R38	B	55.5	53.8	1.7	53.9	1.6	54	1.5	54.1	1.4
R39	B	56.7	53.3	3.4	53.3	3.4	53.7	3	53.8	2.9
R40	B	54.2	52.5	1.7	52.5	1.7	52.7	1.5	52.7	1.5

R41	B	55.9	52.8	3.1	52.8	3.1	53.2	2.7	53.3	2.6
R42	B	55.3	52.4	2.9	52.4	2.9	52.7	2.6	52.8	2.5
R43	B	55	52.5	2.5	52.5	2.5	52.8	2.2	52.9	2.1
R44	B	64.5	59.3	5.2	59.3	5.2	59.8	4.7	60	4.5
R45	B	61.8	58.1	3.7	58.1	3.7	58.5	3.3	58.7	3.1
R46	B	60.3	57	3.3	57.1	3.2	57.5	2.8	57.6	2.7
R47	B	59.6	56.5	3.1	56.5	3.1	56.9	2.7	57	2.6
R49	B	58.5	55.5	3	55.5	3	55.9	2.6	56	2.5
R50	B	57.7	54.7	3	54.7	3	55.2	2.5	55.3	2.4
R51	B	59.5	55.6	3.9	55.6	3.9	56.2	3.3	56.4	3.1
R52	B	54.6	52.4	2.2	52.4	2.2	52.8	1.8	52.9	1.7
R53	B	56.6	52.8	3.8	52.8	3.8	53.3	3.3	53.5	3.1
R54	B	52.5	50.9	1.6	51	1.5	51.2	1.3	51.3	1.2
R55	B	52.3	50.7	1.6	50.7	1.6	50.9	1.4	51	1.3
R56	B	51.9	50.4	1.5	50.4	1.5	50.7	1.2	50.7	1.2
R57	B	68.6	59.6	9	59.7	8.9	60.8	7.8	61.1	7.5
R58	B	67.6	58.4	9.2	58.5	9.1	59.7	7.9	60.1	7.5
R59	B	66.2	57.7	8.5	57.8	8.4	59	7.2	59.4	6.8
R60	B	65	57.5	7.5	57.6	7.4	58.7	6.3	59	6
R61	B	63.5	56.9	6.6	57	6.5	58	5.5	58.3	5.2
R62	B	62.4	56.4	6	56.5	5.9	57.4	5	57.7	4.7
R63	B	61.2	56.4	4.8	56.5	4.7	57.2	4	57.4	3.8
R64	B	60	55.2	4.8	55.3	4.7	55.9	4.1	56.2	3.8
R65	B	57.7	53.7	4	53.7	4	54.3	3.4	54.5	3.2
R66	B	57	53.5	3.5	53.5	3.5	53.9	3.1	54.1	2.9
R67	B	55.1	52.7	2.4	52.7	2.4	52.9	2.2	53	2.1
R68	B	54	52.1	1.9	52.1	1.9	52.2	1.8	52.3	1.7
R69	F	71.3	60.9	10.4	61.1	10.2	62.5	8.8	62.9	8.4
R70	E	68.4	60.3	8.1	60.4	8	61.3	7.1	61.6	6.8
R71	E	70.9	65.8	5.1	65.8	5.1	66.4	4.5	66.6	4.3
R72	B	61.6	56.5	5.1	56.5	5.1	57.2	4.4	57.4	4.2
R73	B	59.1	54.5	4.6	54.6	4.5	55.2	3.9	55.4	3.7
R74	B	57.8	54.3	3.5	54.4	3.4	54.9	2.9	55	2.8
R75	B	56.9	54	2.9	54	2.9	54.5	2.4	54.6	2.3
R76	B	56.2	53.7	2.5	53.7	2.5	54.1	2.1	54.2	2
R77	B	55.5	53.5	2	53.5	2	53.8	1.7	53.9	1.6

R78	B	54.1	52.7	1.4	52.8	1.3	52.9	1.2	53	1.1
R79	B	53.5	52.3	1.2	52.3	1.2	52.4	1.1	52.5	1
R80	B	55.8	54.1	1.7	54.1	1.7	54.3	1.5	54.4	1.4
R81	C	62	60.9	1.1	60.9	1.1	61.1	0.9	61.2	0.8
R82	E	67.5	67.4	0.1	67.4	0.1	67.5	0	67.5	0
R771	B	54.3	52.4	1.9	52.4	1.9	52.6	1.7	52.7	1.6
R772	B	54.1	52.4	1.7	52.4	1.7	52.6	1.5	52.7	1.4
Number of receivers achieving 5 dBA				**11**		**11**		**8**		**7**
Does wall achieve a 7 dBA reduction				**Yes**		**Yes**		**Yes**		**Yes**
Length of Wall (feet)				**1050**		**1050**		**1050**		**1050**
Cost of Wall per 5 dBA receiver				**$68,727**		**$65,291**		**$66,150**		**$70,200**
Additional Costs per 5 dBA Receiver(1)				**$15,373**		**$15,373**		**$21,138**		**$24,157**
Total Cost per 5 dBA Receiver				**$84,100**		**$80,664**		**$87,288**		**$94,357**
Does wall meet cost criteria				**No**		**No**		**No**		**No**

(1) Construction of a noise barrier at this location would require additional costs for temporay easement parcel acquisition, drainage structure, and soil. Bolton and Menk has estimated the total additional costs to be $169,100.

Table B-4
Noise Wall Analysis - Area G
North of TH 10 West of Thurston Avenue

Receptor	NAC	Receptor Type[1]	Noise Level (L_{eq}) No Wall (2041)	Noise Level (L_{eq}) 20' Wall (2041)	Reduction 20' Wall (2041)
ID		Criteria	Criteria	Level	Reduction
R83	E	C	64.4	63.9	0.5
R84	C	Educational	60.6	56.7	3.9
R163	C	Educational	67.3	63.1	4.2
R822	E	Hotel	66.3	64.3	2
R832	C	Daycare	66.9	62.9	4

Number of receivers achieving 5 dBA	0
Does wall achieve a 7 dBA reduction	No
Length of Wall	900
Cost of Wall per 5 dBA receiver	NA
Does wall meet cost criteria	No

TH 10 Noise Wall F

ENGINEERS OPINION OF PROBABLE COST

1/10/2019

TH 10 Noise Wall (Base Cost)				
DESCRIPTION	**UNIT**	**UNIT COST**	**TOTAL EST QTY**	**TOTAL EST COST**
NOISE WALL*	SQ FT	$36.00	19,950	$718,200.00
TOTAL ESTIMATED COST (Noise Wall Base Cost)				**$718,200.00**
TH 10 Noise Wall (Costs to Implement)				
TEMP. EAS. PARCEL: 01-31-25-23-0005	ACRE	$127,300.00	0.06	$29,447.50
TEMP. EAS. PARCEL: 01-31-25-23-0006	ACRE	$384,000.00	0.04	$36,782.29
DRAINAGE STRUCTURE	EACH	$3,000.00	2	$6,000.00
COMMON EMBANKMENT/TOPSOIL	CU YD	$5.00	19,364	$96,820.00
TOTAL ESTIMATED COST (Costs to Implement)				**$169,100.00**
TOTAL ESTIMATED COST				**$887,300.00**

Summary		
DESCRIPTION	**QUANTITY**	
# OF RECEPTORS	11	
COST BENEFIT OF RECEPTOR	$80,663.64	**($78,500 THRESHOLD)**

* Based on wall length of 1050' (20' in Height)

APPENDIX L

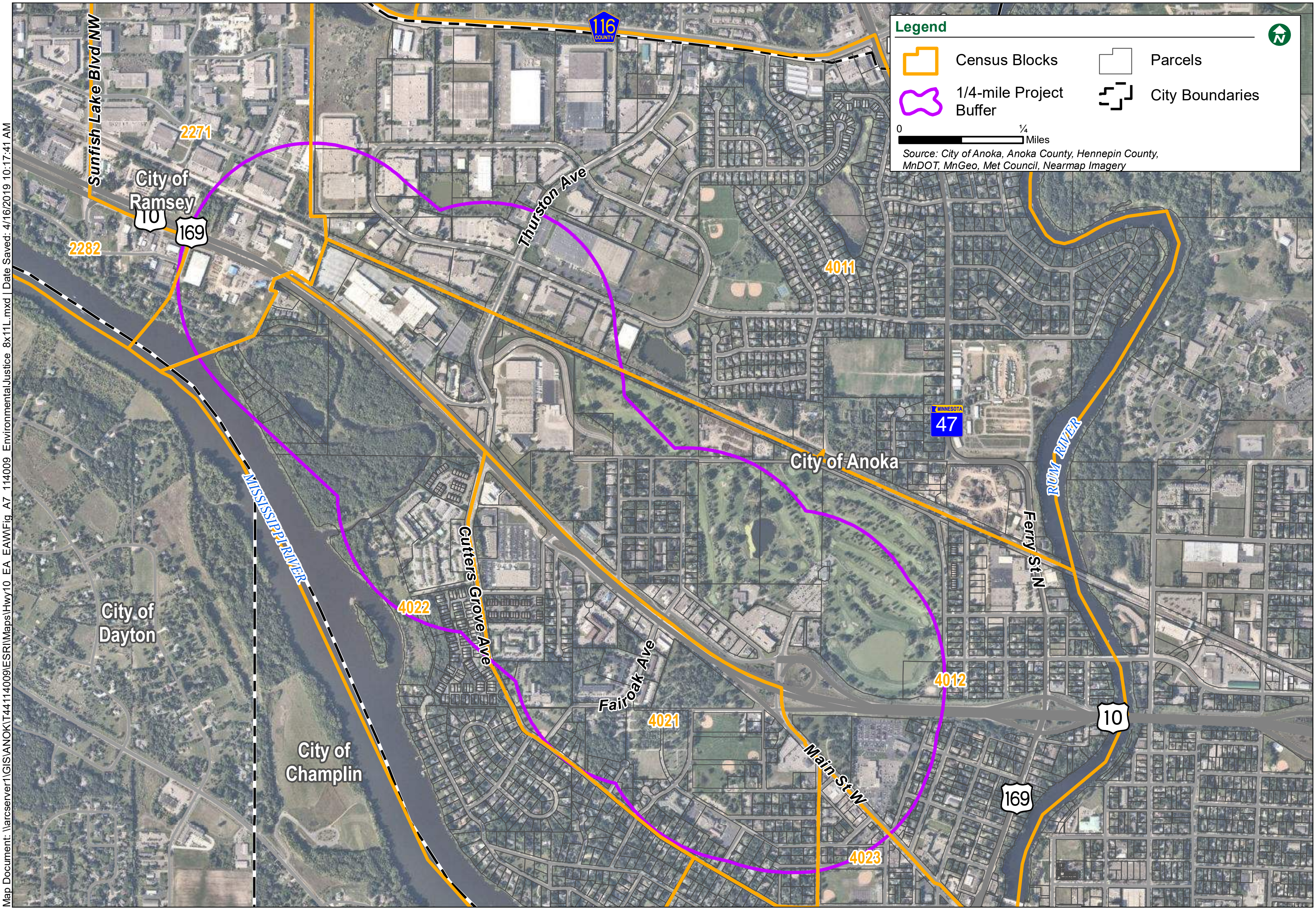
Environmental Justice Data

HWY 10/169 Safety and Mobility Improvements Project

Environmental Assessment

Figure L-1 Environmental Justice

April 2019



Map Document: \\arcserver1\GIS\ANOK\T44114009\ESRI\Maps\Hwy10_EA_EAWFig_A7_114009_EnvironmentalJustice_8x11L.mxd | Date Saved: 4/16/2019 10:17:41 AM

Table A: Minority Populations in City of Anoka Census Block Groups within Project Area Buffer

City of Anoka Block Group (BG) Comparison							
	Tract 504.01 BG 1 (4011)	**Tract 504.01 BG 2 (4012)**	**Tract 504.02 BG 1 (4021)**	**Tract 504.02 BG 2 (4022)**	**Tract 504.02 BG 3 (4023)**	**City of Anoka**	**Anoka County**
Total Population	1,441	1,223	941	1,599	1,010	17,325	341,249
White	1,269 (88%)	1,054 (86%)	843 (90%)	1,411 (88%)	914 (90.5%)	14,571 (84%)	284,385 (83%)
Minorities	172 (12%)	169 (14%)	98 (10%)	188 (12%)	96 (9.5%)	2,754 (15.9%)	56,864 (16.6%)
African American	92 (6.4%)	46 (3.8%)	21 (2%)	158 (9.9%)	46 (4.6%)	1,194 (6.9%)	17,374 (5%)
Asian	0 (0%)	0 (0%)	0 (0%)	11 (0.7%)	37 (3.7%)	291 (1.7%)	14,074 (4%)
American Indian/Alaskan Native	0 (0%)	27 (2.2%)	9 (1%)	0 (0%)	10 (1%)	130 (0.7%)	1,977 (0.6%)
Native Hawaiian/Pacific Islander	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	6 (0%)	101 (0.03%)
Some Other Race	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	443 (0.13%)
Two or More Races	51 (3.5%)	44 (3.6%)	29 (3.1%)	19 (1.2%)	0 (0%)	545 (3%)	9,048 (2.6%)
Hispanic or Latino	29 (2%)	52 (4.3%)	39 (4.1%)	0 (0%)	3 (0.3%)	588 (3.4%)	13,847 (4%)

Table B: Minority Populations in City of Ramsey Census Block Groups within Project Area Buffer

City of Ramsey Block Group Comparison				
	Tract 502.27 Block Group 1 (2271)	**Tract 502.28 Block Group 2 (2282)**	**City of Ramsey**	**Anoka County**
Total Population	1,382	3,179	25,329	341,249
White	1,205 (87%)	2,530 (80%)	22,892 (90%)	284,385 (83%)
Minorities	177 (12.8%)	649 (20%)	2,437 (10%)	56,864 (16.6%)
African American	127 (9.2%)	227 (7%)	459 (1.8%)	17,374 (5%)
Asian	20 (1.5%)	223 (7%)	708 (2.8%	14,074 (4%)
American Indian/Alaskan Native	0 (0%)	11 (0.4%)	35 (0.001%)	1,977 (0.6%)
Native Hawaiian/Pacific Islander	0 (0%)	0 (0%)	0 (0%)	101 (0.03%)
Some Other Race	0 (0%)	0 (0%)	0 (0%)	443 (0.13%)
Two or More Races	15 (1.1%)	65 (2%)	631 (2.5%)	9,048 (2.6%)
Hispanic or Latino	15 (1.1%)	123 (3.9%)	604 (2.4%)	13,847 (4%)

Table C: Low-Income Populations in Census Block Groups within Project Area Buffer

	Tract 502.27 Block Group 1 (2271)	Tract 502.28 Block Group 2 (2282)	Tract 504.01 Block Group 1 (4011)	Tract 504.01 Block Group 2 (4012)	Tract 504.02 Block Group 1 (4021)	Tract 504.02 Block Group 2 (4022)	Tract 504.02 Block Group 3 (4023)	City of Anoka	City of Ramsey	Anoka County
Percent of Individuals at or Below Poverty	1.7%	3.7%	5.2%	19.9%	12.7%	2.6%	31%	11.8%	3.5%	7.4%

APPENDIX M

Section 4(f) Documentation for John Ward Park

MnDOT Metro District
1500 W. County Road B-2
Roseville, MN 55113-3174

March 18, 2019

Mr. Greg Lee
City Manager
City of Anoka
2015 First Avenue North
Anoka, MN 55303-2270

Subject: S.P. 0202-108; 103-010-018
Highway 10/169 Safety and Mobility Improvement Project
Anoka, Minnesota
Section 4(f) Temporary Occupancy of John Ward Park

Dear Mr. Lee:

The Minnesota Department of Transportation (MnDOT) is preparing plans for Highway 10/169 in the City of Anoka from the western city limit to Main Street. The proposed project will result in temporary occupancy of the existing John Ward Park (Ward Park), a Section 4(f) resource.

The Highway 10/169 project includes realigning Church Street on the south side of the highway, adding a sidewalk on the north side of Church Street, creating a parking lot within the former Church Street alignment, removing existing parking spaces along the northwest edge of the park, paving an existing gravel parking lot, and constructing a multi-use path. The improvements within the boundary of Ward Park include converting approximately 20 parking spaces to green space and constructing a 10' multi-use path from the proposed parking lot to existing bleachers and the ball field in the northwest corner of the park. A temporary easement in the park will be used during construction of these project elements (see attached map).

As per the Federal Register Rules and Regulations 23 CFR 774.13(d), reconfiguring and paving parking lots and constructing a multi-use path may be considered a temporary occupancy of Section 4(f) lands. A temporary occupancy may not constitute a Section 4(f) use when all of the conditions listed below are satisfied:

- The duration of the occupancy will be temporary in nature (i.e., less than the time needed for the construction of the project).

  The Highway 10/169 Project is anticipated to be completed over two construction seasons. The duration of work within Ward Park will not be longer than the time needed for overall project construction. The park will be used at various times during construction to realign Church Street, reconfigure and pave parking lots and build a multi-use path in Ward Park.

- There will be no change in ownership of the land.

  Ward Park will continue to be owned by and under the jurisdiction of the City of Anoka. No real property interest (e.g. permanent easement, fee title acquisition) of right of way will be acquired from the City of Anoka at Ward Park. A temporary easement will be obtained from the City of Anoka for the temporary access to the Ward Park for realignment of Church Street and reconfiguring and paving parking lots and building a multi-use path.

- The scope of work to be performed will be minor (i.e., both the nature and magnitude of the changes to the Section 4(f) property are minimal).

  The proposed project includes realignment of Church Street from the existing curve east of Forest Avenue, to tie into the extended West Main Street. A sidewalk will be constructed on the north side of the realigned Church Street. To accommodate the realignment of this street, a portion of the existing Church Street will be vacated. This will allow for construction of a multi-use path that will connect the parking area to bleachers near a ball field located in the northwest corner of the park. Parking will also be reconfigured within the existing Church Street corridor. Within the park boundaries, the parking spaces along the north side of the existing Church Street alignment and a small portion of the grass just to the south of the parking spaces will be affected. An existing gravel parking lot within the northeast corner of Ward Park will also be paved.

  The temporary easement will affect approximately 0.57 acres of Ward Park land. Temporary access to Ward Park will occur within a temporary easement. The area within Ward Park that is accessed during construction will be restored prior to the end of construction.

- There are no anticipated permanent adverse physical impacts nor any interference with the activities or purposes of the property, on either a permanent or temporary basis.

  John Ward Park is located at 2400 Forest Avenue in Anoka. This 14-acre park includes multiple playground structures, playing fields for adult softball and youth football, a skate park, a picnic shelter, and off-street parking on Church Street and within a gravel parking lot. The temporary easement will be located on the north side of the park, along the existing Church Street alignment, and in the northeast corner. Affected land will be restored to its pre-construction condition or better. The temporary easement and proposed reconfiguration and paving of parking lots and construction of a multi-use path will not interfere with access to any uses or facilities at Ward Park, on either a permanent or temporary basis. Ward Park will remain open and accessible during Hwy 10 construction. The existing parking along the north side of existing Church Street and within the existing gravel lot will be temporarily unavailable at times during construction. However, commensurate parking is available on the surrounding streets to accommodate park users.

- The land being used will be fully restored to a condition that is at least as good as the condition that existed prior to the project.

  The temporary easement area will be restored to a condition at least as good as the area prior to the project. The temporary easement in the northeast corner of Ward Park will allow for the paving of an existing gravel parking lot. The temporary easement along the north edge of existing Church Street will accommodate construction of the new Church Street alignment, the multi-use path, and the reconfigured parking area. The vacated parking spaces will be converted to the multi-use path and a strip of green *space, which may be considered an improvement to existing conditions. Realigning Church Street and removing parking at the northwest corner of Forest Avenue and Church Street will improve safety conditions at the park. Currently, vehicles backing out of perpendicular spots on Church Street have difficulty seeing vehicles traveling north on Forest Avenue and turning east onto Church Street. This creates potential for conflicts.*

- There must be documented agreement of the official(s) with jurisdiction over the Section 4(f) resource regarding the above conditions.

  Your signature on this document concurring as outlined above constitute your concurrence with the assessment of impacts to Ward Park in your role as an official with jurisdiction over this resource.

Please review the attached figures and indicate your concurrence with the work proposed and that the above conditions are met by signing below. Please forward the signed original back to me for our records. If you have any questions regarding this matter, please contact me at your earliest convenience at 651-234-7716 or Melissa.barnes@state.mn.us. If you do not concur with our assessment of impacts to Ward Park, please respond in writing with a reference to this letter.

Sincerely,

Melissa Barnes, PE
North Area Engineer
MnDOT Metro District

I concur with the assessment of proposed impacts to John Ward Park property as described above.

Greg Lee ______________________ 3/19/19 ______________

Greg Lee, City of Anoka Manager Date

Attachments:

- Figure 1: Section 4(f) Temporary Occupancy John Ward Park
- Figure 2: Aerial Image of Ward Park with Proposed Project Layout
- Figure 3: Existing Ward Park Photo Looking Southeast along Church Street, with Proposed Improvements
- Figure 4 - Existing Ward Park Photo Looking Northeast along Forest Avenue & Church Street, with Proposed Improvements

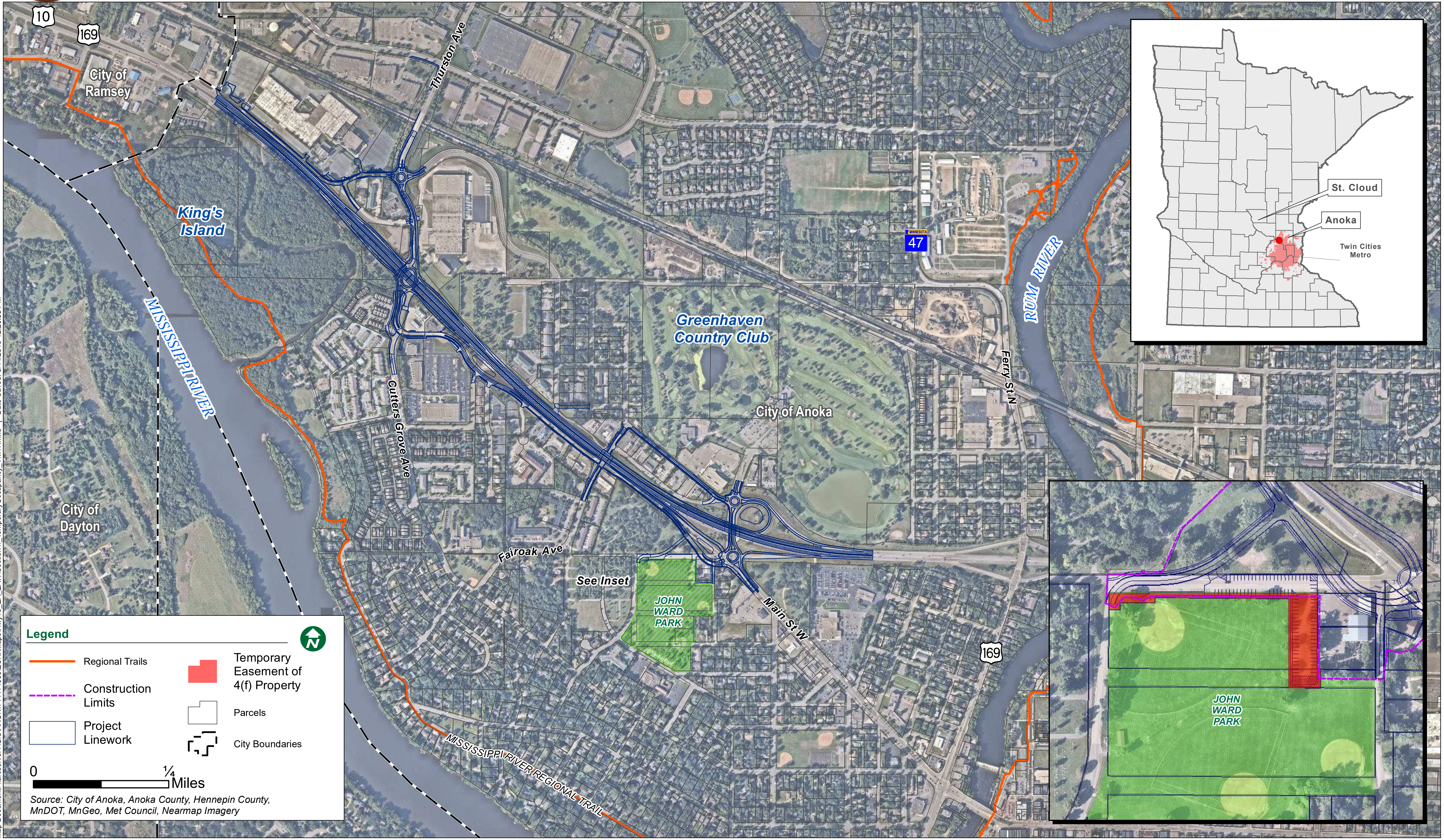
CC: Deb Moynihan, MnDOT Office of Environmental Stewardship
Rick Dalton. MnDOT Metro District (Project Documentation)

HWY 10/169 Safety and Mobility Improvements Project

Environmental Assessment

Figure 1: Section 4(f) Temporary Occupancy John Ward Park

March 2019



Map Document: \\arcserver1\GIS\ANOKT\4114009\ESRI\Maps\Hwy10_EA_EAW\Section4f_TemporaryOccupancy_11x17.mxd | Date Saved: 3/14/2019 12:26:58 PM

Figure 2: Aerial Image of Ward Park with Proposed Project Layout

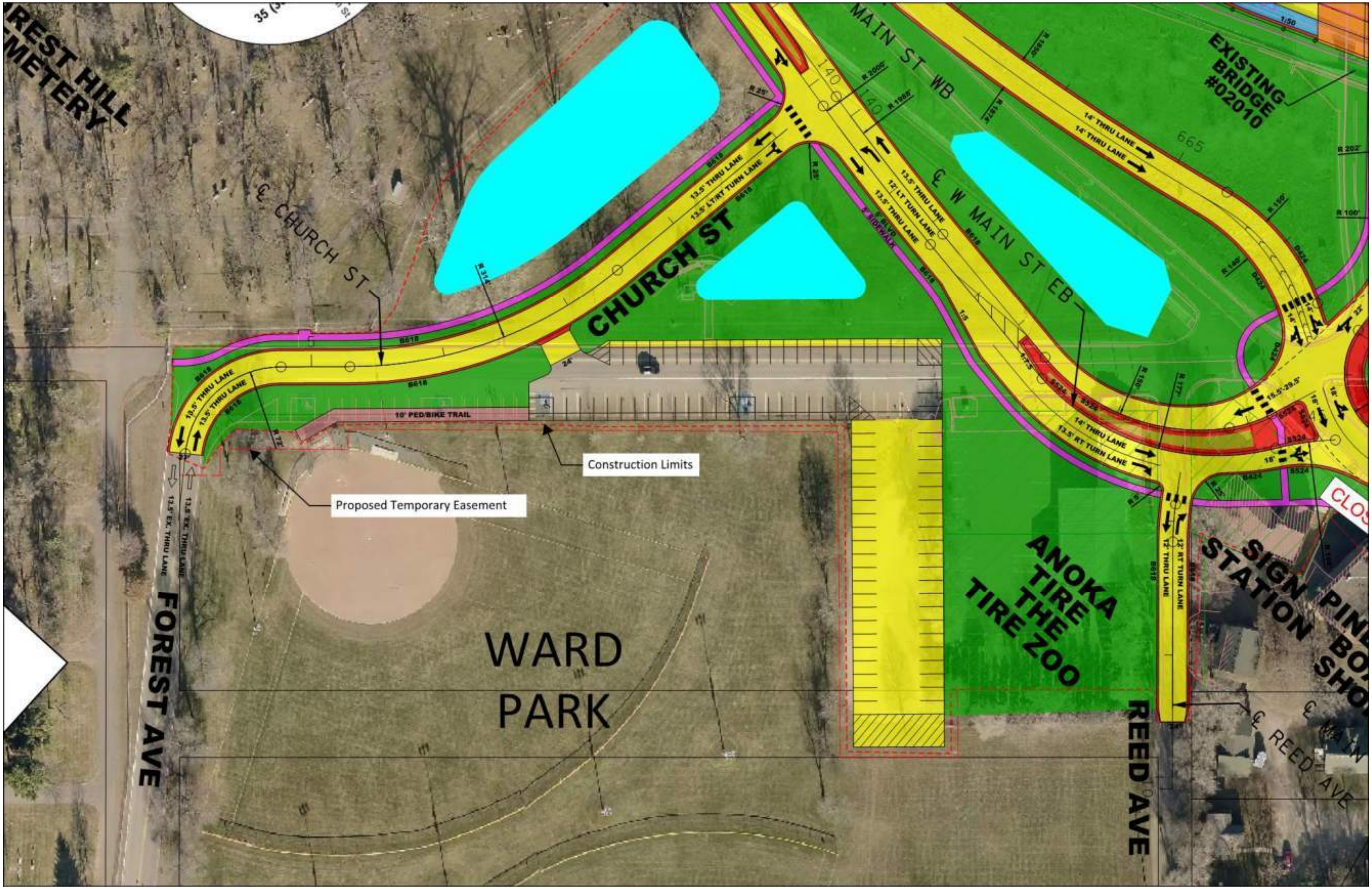
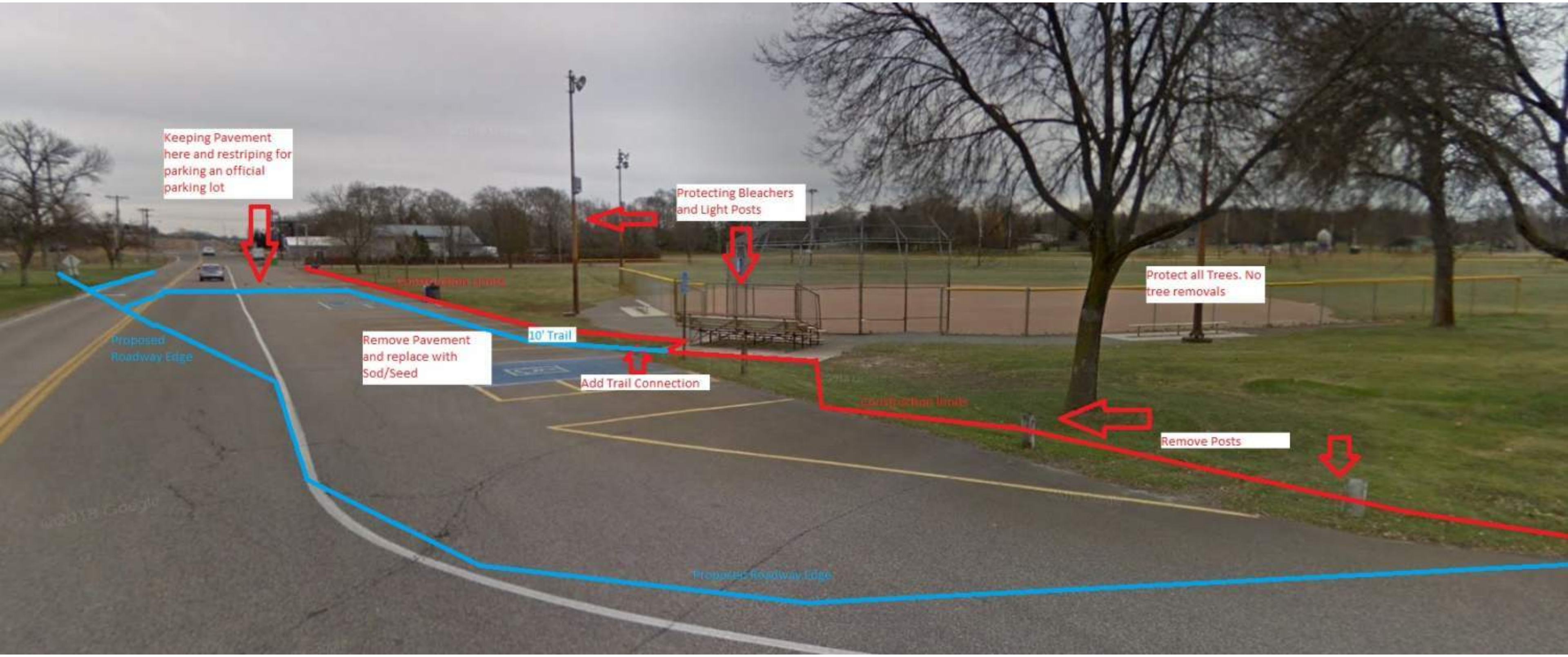


Figure 3: Existing Ward Park Photo Looking Southeast along Church Street, with Proposed Improvements



Source: Google

Figure 4: Existing Ward Park Photo Looking Northeast along Forest Avenue & Church Street, with Proposed Improvements

Source: Google

APPENDIX N

List of Commitments

List of Commitments

Topic	Commitment
Land Use, Section 4(f)/6(f)	The proposed project will maintain a vegetated buffer to physically and visually separate the Mississippi River from the reconstruction Hwy 10/169 and the exit ramp in the southwest quadrant of the interchange with Thurston Ave/Cutters Grove Ave. During construction, no staging will occur within and no equipment or materials will be placed within the boundary of the Mississippi River and Recreation Area (NRAA).
Land Use, Section 4(f)/6(f)	Measures will be taken to mitigate runoff and erosion within the NRAA boundary both during and after construction.
Vegetation, Erosion Control, Water Quality	The proposed project will install non-native seed mixes on the inslopes, medians, and boulevards. Native seed mixes will be planted on ditch bottoms and backslopes. There may be unique sites that require unique seed mixes, such as infiltration basins, frequently mowed sites, etc.
Conservation Measures	If rolled erosion control products (EG erosion control blanket) are to be utilized, must be limited to 'bio-netting', 'natural-netting' (category 3N or 4N) woven type products, and specifically not allow welded plastic mesh netting. See Best Practices for Meeting GP 2004-0001 (page 25), at http://www.dnr.state.mn.us/waters/watermgmt_section/pwpermits/gp_2004_0001_manual.html and DNR's factsheet at http://files.dnr.state.mn.us/eco/nongame/wildlife-friendly-erosion-control.pdf.
Conservation Measures - Vegetation	Revegetation of disturbed soils should follow Metro Vegetation Establishment Recommendations (http://www.dot.state.mn.us/environment/erosion/pdf/vegetation/Metro_2016.pdf) and use native mixes in areas that are not proposed for mowed turf grass. For additional information, visit: http://www.dot.state.mn.us/environment/erosion/seedmixes.html
Stormwater Control	The project will comply with all Lower Rum River Watershed Management Organization's (LRRWMO) stormwater control requirements which includes volume control (a volume equal to one inch of run-off from impervious surfaces), rate control looking at 2-year, 10-year, and 100-year 24-hour duration events, and water quality (meeting the identified volume and rate control requirements through infiltration measures will provide the required water quality control performance). The project will also meet requirements of the NPDES permit.
Contaminated Materials	A Phase II drilling plan will be prepared to describe the soil boring locations within the project's planned excavation areas that should be evaluated for potential of encountering impacted soil and/or groundwater. If contaminated materials are encountered during construction, materials will be managed in accordance with all applicable local, state, and federal regulatory requirements.
Noise, Construction Impacts	It is MnDOT's practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. The contractor will provide advanced notice to affected communities of any planned abnormally loud construction activities. Night construction may be required. Noisy work during night time hours will be limited as much as possible, but may be periodically required. Construction or maintenance activities that are

List of Commitments	
Topic	**Commitment**
	generally prohibited during the period from 8:30 p.m. to 7:00 a.m. include pile driving/removal, concrete pavement demolition, pavement sawing, concrete crushing, and jack hammering. Federal NAC would be approached or exceeded at modeled receptor sites, and mitigation measures have been analyzed. None of the potential noise barrier locations meet the MnDOT/FHWA cost-reasonableness requirements for noise barrier construction, and therefore no noise walls are proposed for this project.
Transit	MnDOT will coordinate with the Metropolitan Council Transit Operations to inform them of changes in Highway 10 traffic control as the project proceeds, and of all roadway closures and posted detours.
Historic Properties	A professional archaeologist will monitor any earthmoving activities done near an in-kind replacement of a culvert within Forest Hill Cemetery and at selected areas near Calvary Cemetery in response to the potential for unmarked burials at these locations.
Section 7, Threatened Species: Northern long-eared bat	General AMM 1: Ensure all operators, employees, and contractors working in areas of known or presumed bat habitat are aware of all FHWA/FRA/FTA (Transportation Agencies) environmental commitments, including all applicable AMMs. Notify contractor(s) during the pre-construction meeting. Bat sightings (including sick, injured, and/or dead bats) on the project must be reported to OES wildlife ecologist (651-366-3605).
Section 7, Threatened Species: Northern long-eared bat	Lighting AMM 1 & AMM 2: Direct temporary lighting, if used, away from wooded areas during the bat active season (April 1 to Oct 31, inclusive). If installing new or replacing existing permanent lights, use downward-facing, full cut-off lens lights (with same intensity or less for replacement lighting); or for those transportation agencies using the BUG system developed by the Illuminating Engineering Society, be as close to 0 for all three ratings with a priority of "uplight" of 0 and "backlight" as low as practicable. Please contact Susan Zarling (MnDOT Lighting Engineer) at 651-234-7052with questions about approved products.
Section 7, Threatened Species: Northern long-eared bat	Tree Removal AMM 1: Avoid tree clearing to the extent practicable to complete the proposed work. Tree clearing may occur, but limit tree clearing to the maximum extent practicable.
Section 7, Threatened Species: Northern long-eared bat	Tree Removal AMM 2: Restrict all tree clearing activities to when NLEB are not likely to be present. Winter tree clearing required – tree clearing allowed November 1 to March 31, inclusive.
Section 7, Threatened Species: Northern long-eared bat	Tree Removal AMM 3: Tree removal must be limited to that specified in project plans and ensure that contractors understand clearing limits and how they are marked in the field (e.g., install bright colored flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits).
Section 7, Threatened Species: Northern long-eared bat	Tree Removal AMM 4: Tree removal must not remove documented NLEB roosts, or trees within 0.25 miles of roosts; or documented foraging habitat any time of the year.
Section 7, Threatened Species: Northern long-eared bat	Misc. AMM 1: Building demolition must be completed during the NLEB inactive season. Winter building demolition required – building demolition allowed November 1 to March 31, inclusive.

List of Commitments	
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Section 4(f), John Ward Park	Temporary Occupancy of Ward Park: duration of the occupancy will be temporary in nature, there will be no change in ownership of the land, the scope of work to be performed will be minor, there are no anticipated permanent adverse physical impacts nor any interference with the activities or purposes of the property, on either a temporary or permanent basis, the land being used will be fully restored to a condition that is at least as good as the condition that exists prior to the project, and there is a documented agreement with the official with jurisdiction over the resource.