



**City Council - Worksession**  
**Monday, March 16, 2015 - 5:00 p.m.**  
**Council Worksession Room**  
*(meeting will not be cablecast)*

1. **CALL TO ORDER**
2. **ROLL CALL**
3. **COUNCIL BUSINESS and/or DISCUSSION ITEMS**
  - 3.1 Update; Hwy 10 - Fair Oak Connection, Riverdale Extension & Green Haven Parkway.
  - 3.2 Discussion; Entrance Monuments.
  - 3.3 Discussion; Traffic Sign Maintenance Policy.
4. **ADJOURNMENT**

# COUNCIL WORKSESSION MEMO

3.1

Meeting Date	March 16, 2015
Agenda Section	Council Discussion
Item Description	Update; Hwy 10 – Fair oak 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.

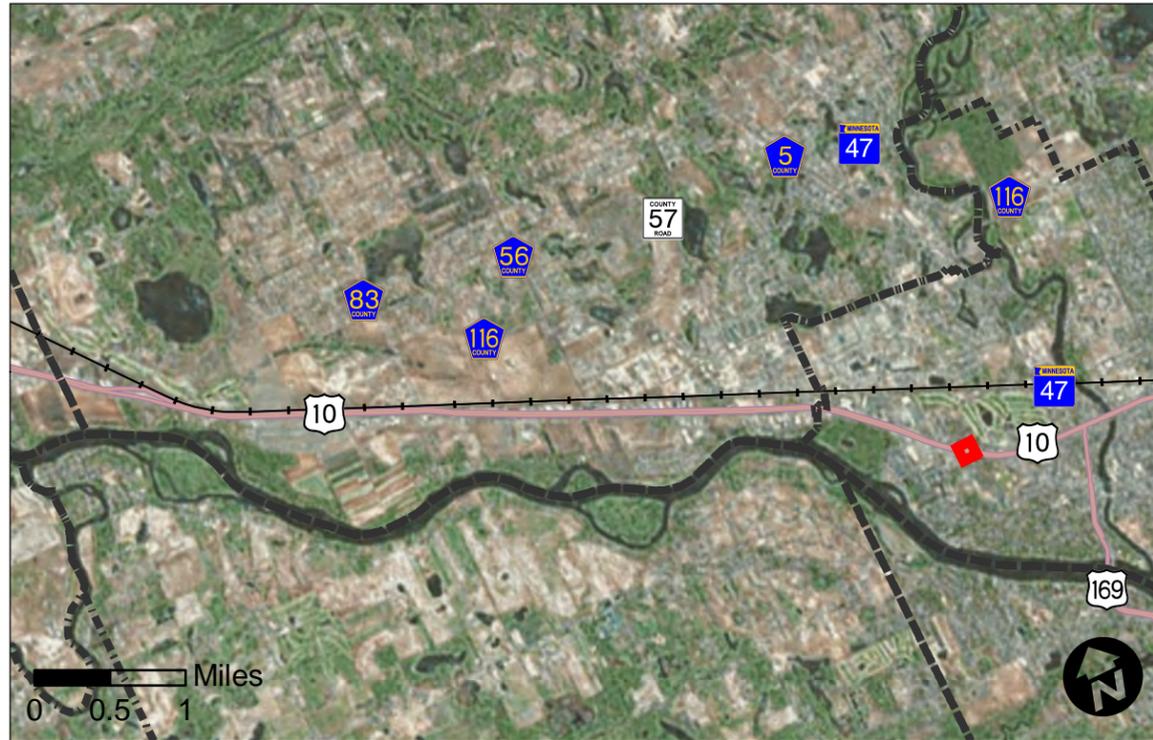
**Riverdale Drive Extension –**

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.

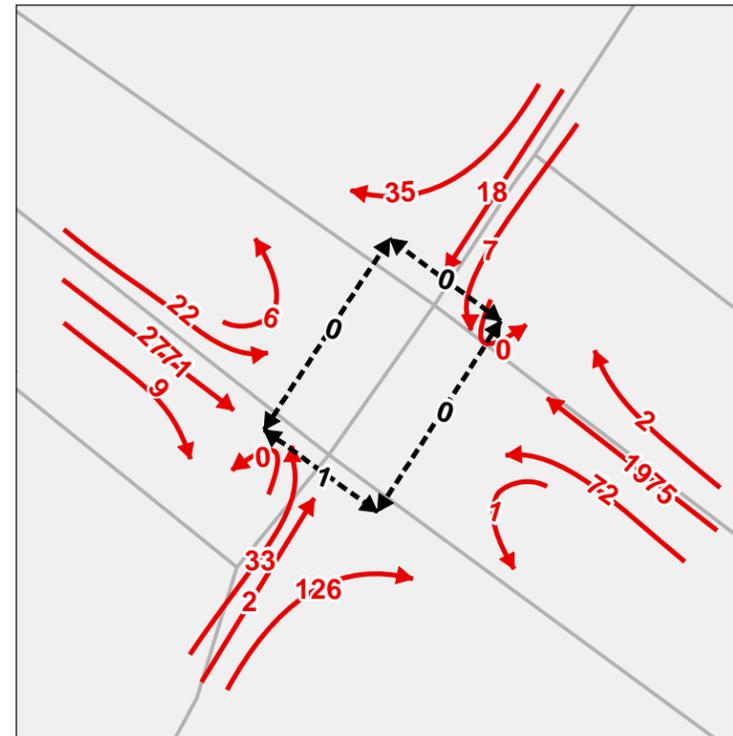
**COUNCIL ACTION REQUESTED:**

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.

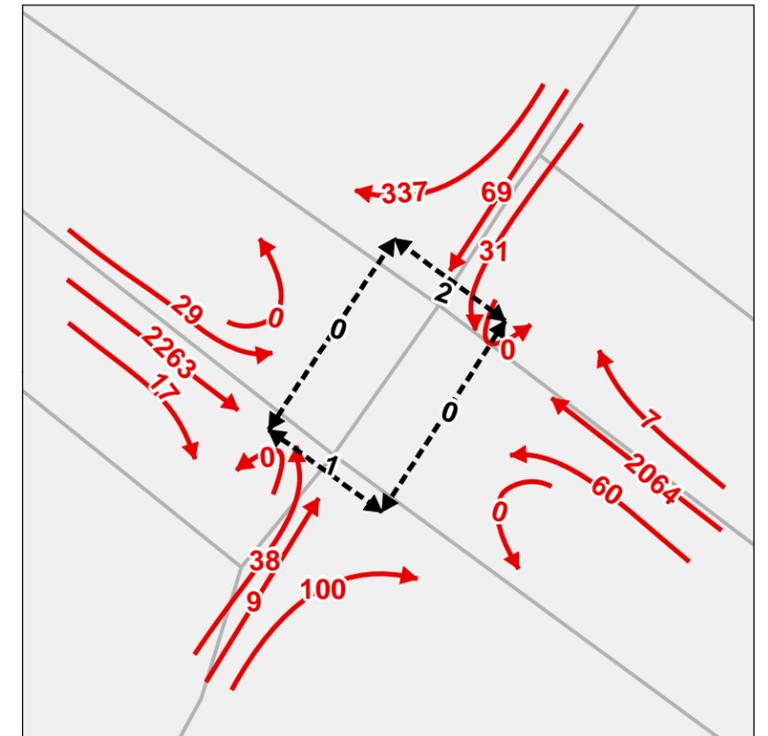
**TH 10 Corridor Location Map**



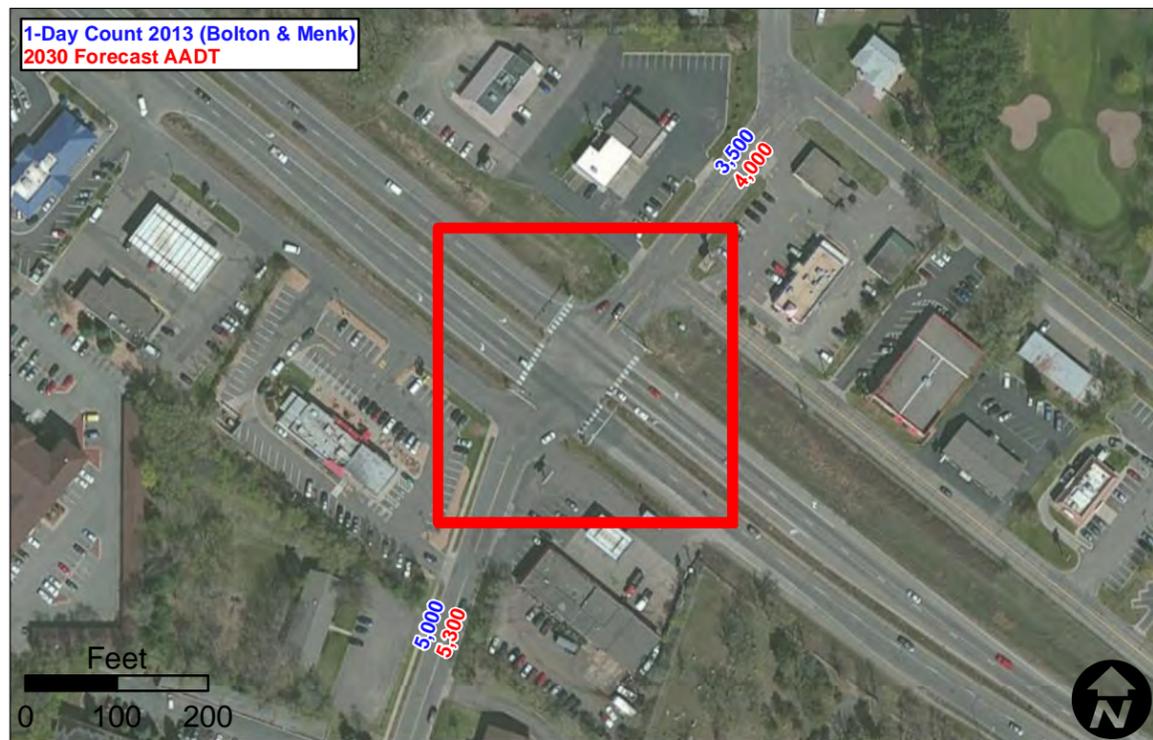
**Traffic Movements & Pedestrians - AM**



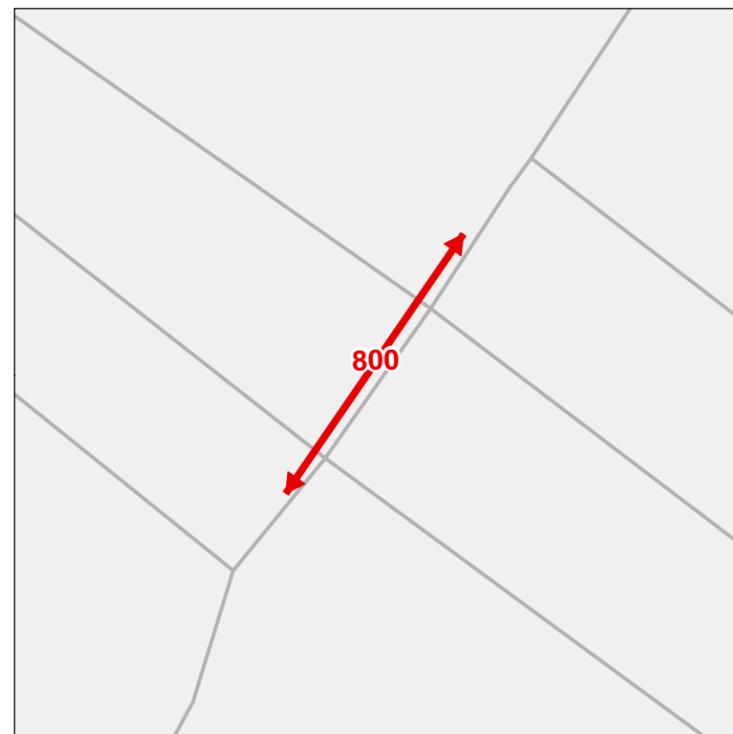
**Traffic Movements & Pedestrians - PM**



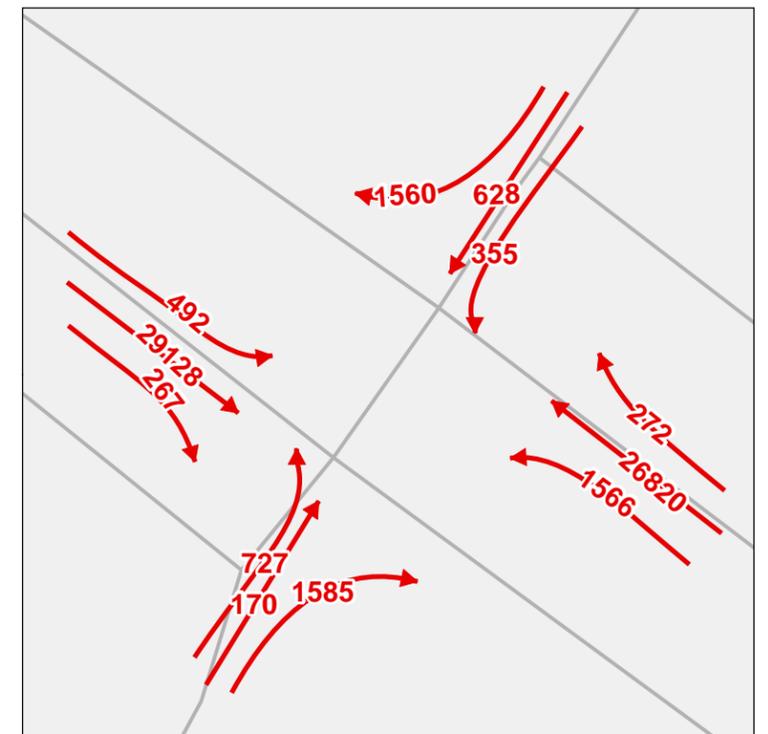
**Fairoak Intersection Map**



**Existing Daily Through Traffic**



**Existing Daily Traffic Movements**



- Municipal Boundary
- Railroad / Northstar Commuter Rail
- Vehicle Movement
- Pedestrian Movement

Source: ESRI Imagery, MnDOT, MnDNR, Metropolitan Council

**FAIROAK AVENUE GRADE SEPARATION**  
 City of Anoka, Minnesota | February 2015  
 Fairoak Intersection



# 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	<b>NA</b>	<b>+7</b>	<b>+15</b>	<b>+22</b>	<b>0</b>									
Fairoak Change in Elevation	<b>NA</b>	<b>-15</b>	<b>-7</b>	<b>0</b>	<b>+22</b>									
Retaining Walls	<b>NA</b>	-	-	---	-	---	-	-	---	-	---	-	---	---
Pedestrian Accommodations	---	+	+++	+++	+	+	+	-	---	---	+	+	+	+
Minimize Sharp Curves (Horz. & Vert.)	<b>NA</b>	+	+++	+++	+	-	-	-	-	---	---	-	+	---
Route Connectivity	+	+	+++	+++	+	-	-	-	---	---	-	+	+	---

## Impacts

Full Property Acquisitions	<b>0</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>11</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>6</b>	<b>7</b>	<b>7</b>	<b>8</b>	<b>6</b>	<b>7</b>
Full Commercial Acquisitions	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>2</b>
Limits Neighborhood Disruption	<b>NA</b>	+	+	+++	-	---	---	-	-	---	---	---	-	---
Impacts Golf Course	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	---	---	-	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
Noise Impacts / Walls?	<b>NA</b>	-	-	---	-	-	-	-	-	-	-	-	-	-
Contaminated Property	<b>NA</b>	---	---	---	---	---	---	---	---	---	+	-	+	---
Achieves Green Haven Parkway Vision	<b>+++</b>	<b>+++</b>	<b>+++</b>	<b>+++</b>	<b>+++</b>	+	+	+	<b>+++</b>	<b>+++</b>	+	---	+	---
TH 10 Construction Staging Impacts	<b>NA</b>	---	---	---	<b>+++</b>									

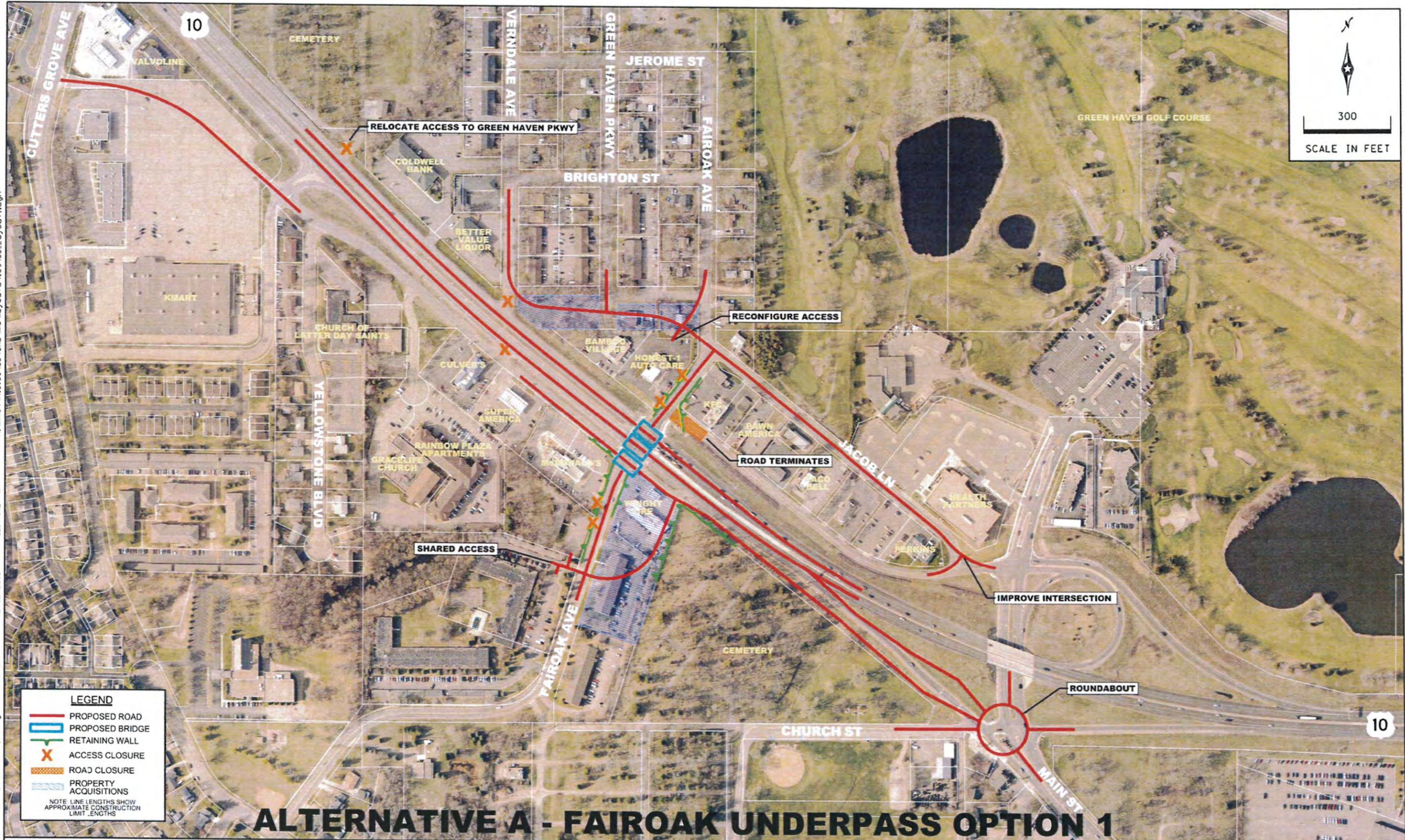
## Number of Access Points (between Thurston and Main)

Public	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
Private	<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>
Interim RI/RO	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>No</b>	<b>Yes</b>							

## Cost

Roadway Construction														
Bridge Construction														
ROW Cost														

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# ALTERNATIVE A - FAIROAK UNDERPASS OPTION 1

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

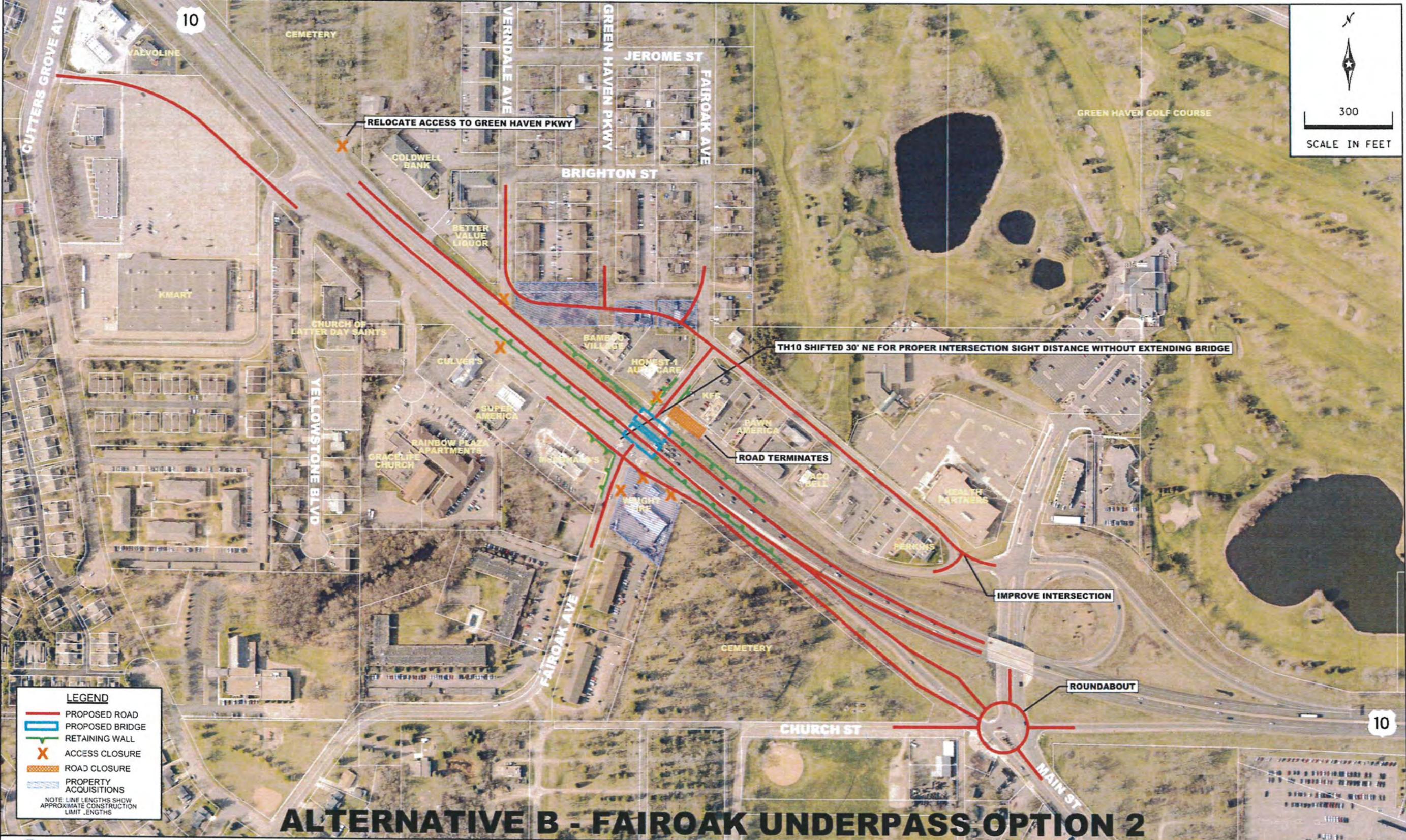
**DESCRIPTION:**  
 FAIROAK AVE UNDERPASS  
 (RAISE TH10 APPROX. 7'  
 LOWER FAIROAK APPROX. 15')

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE A**

**FEBRUARY 2015  
 CITY OF ANOKA**

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# ALTERNATIVE B - FAIROAK UNDERPASS OPTION 2

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

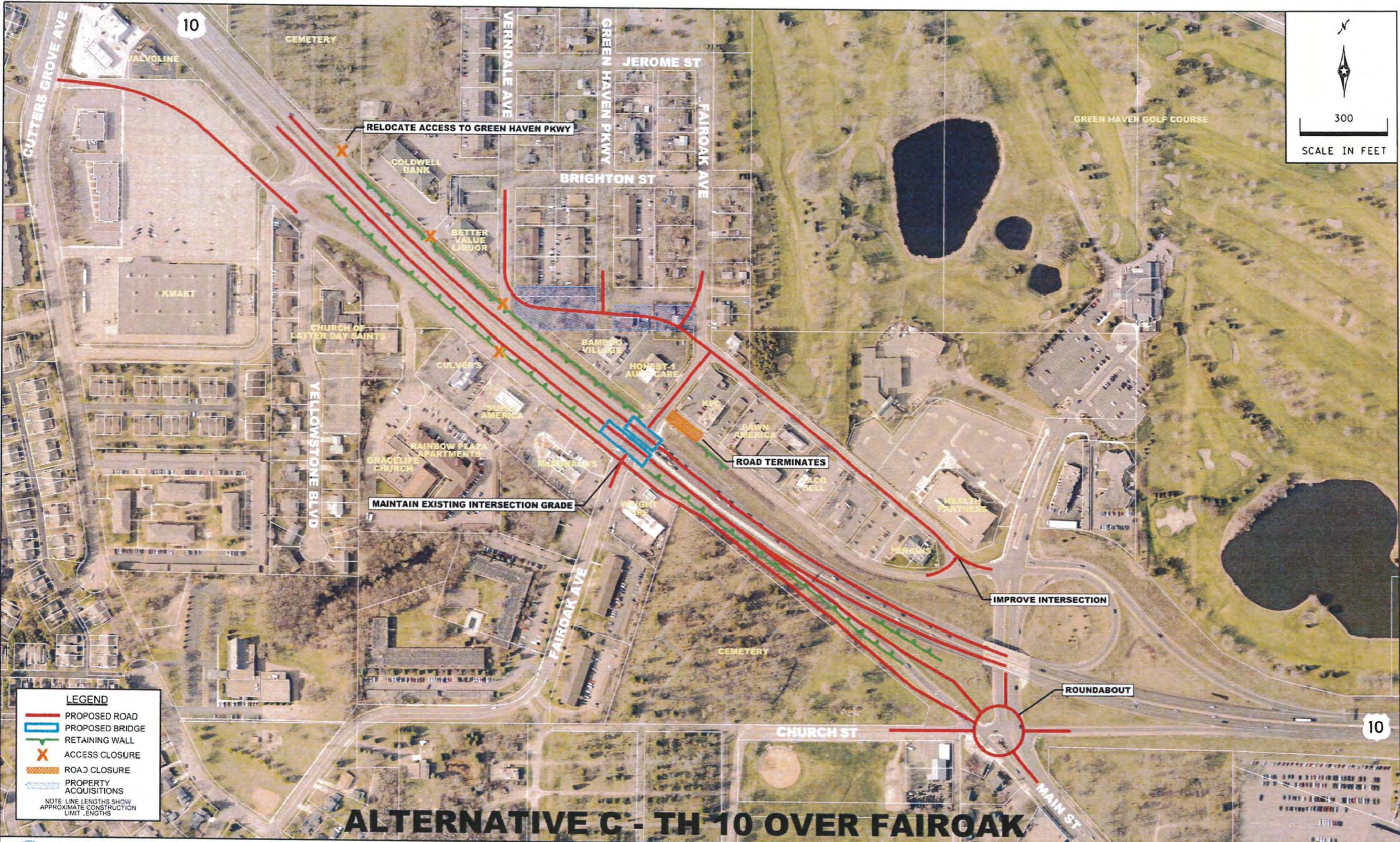
**DESCRIPTION:**  
 FAIROAK AVE UNDERPASS  
 (RAISE TH10 APPROX. 15'  
 LOWER FAIROAK APPROX. 7',  
 REALIGN TH10 30' NE)

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE B**

**FEBRUARY 2015  
 CITY OF ANOKA**

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# ALTERNATIVE C - TH 10 OVER FAIROAK

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS



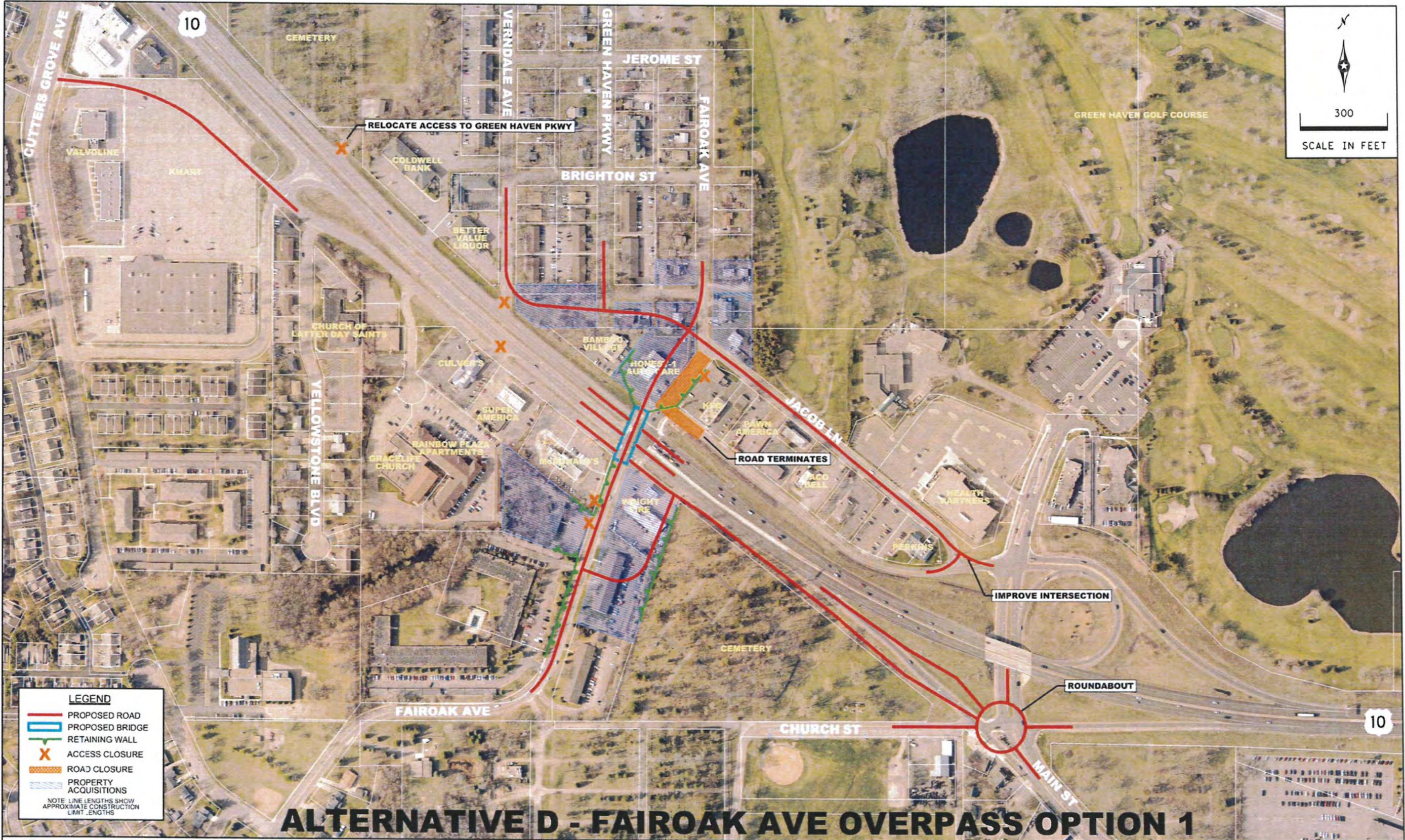
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**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE C**

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 CITY OF ANOKA**

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# ALTERNATIVE D - FAIROAK AVE OVERPASS OPTION 1

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS



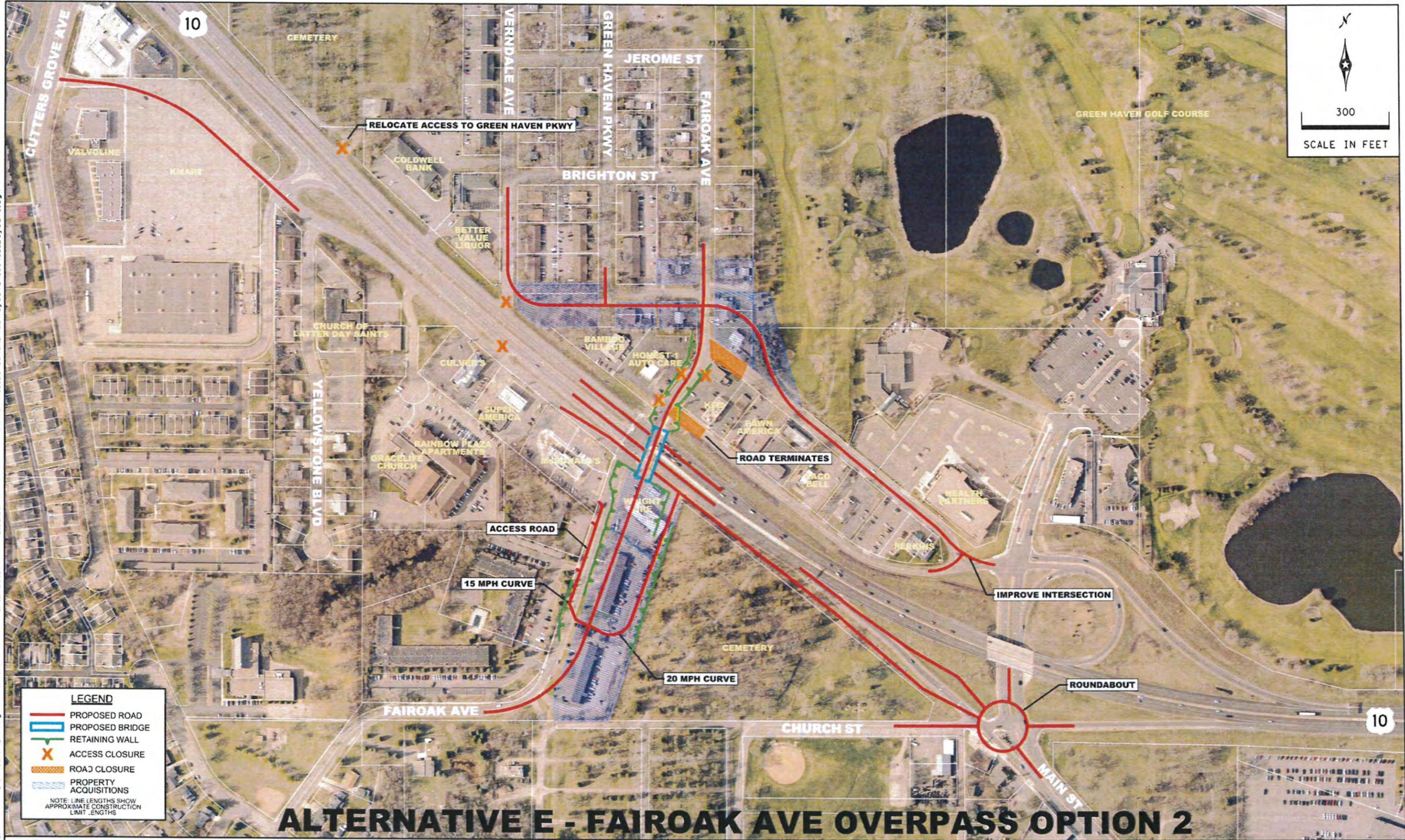
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(RAISE FAIROAK AVE APPROX. 22')

FAIROAK GRADE SEPARATION STUDY  
ALTERNATIVE D

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CITY OF ANOKA

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# ALTERNATIVE E - FAIROAK AVE OVERPASS OPTION 2

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

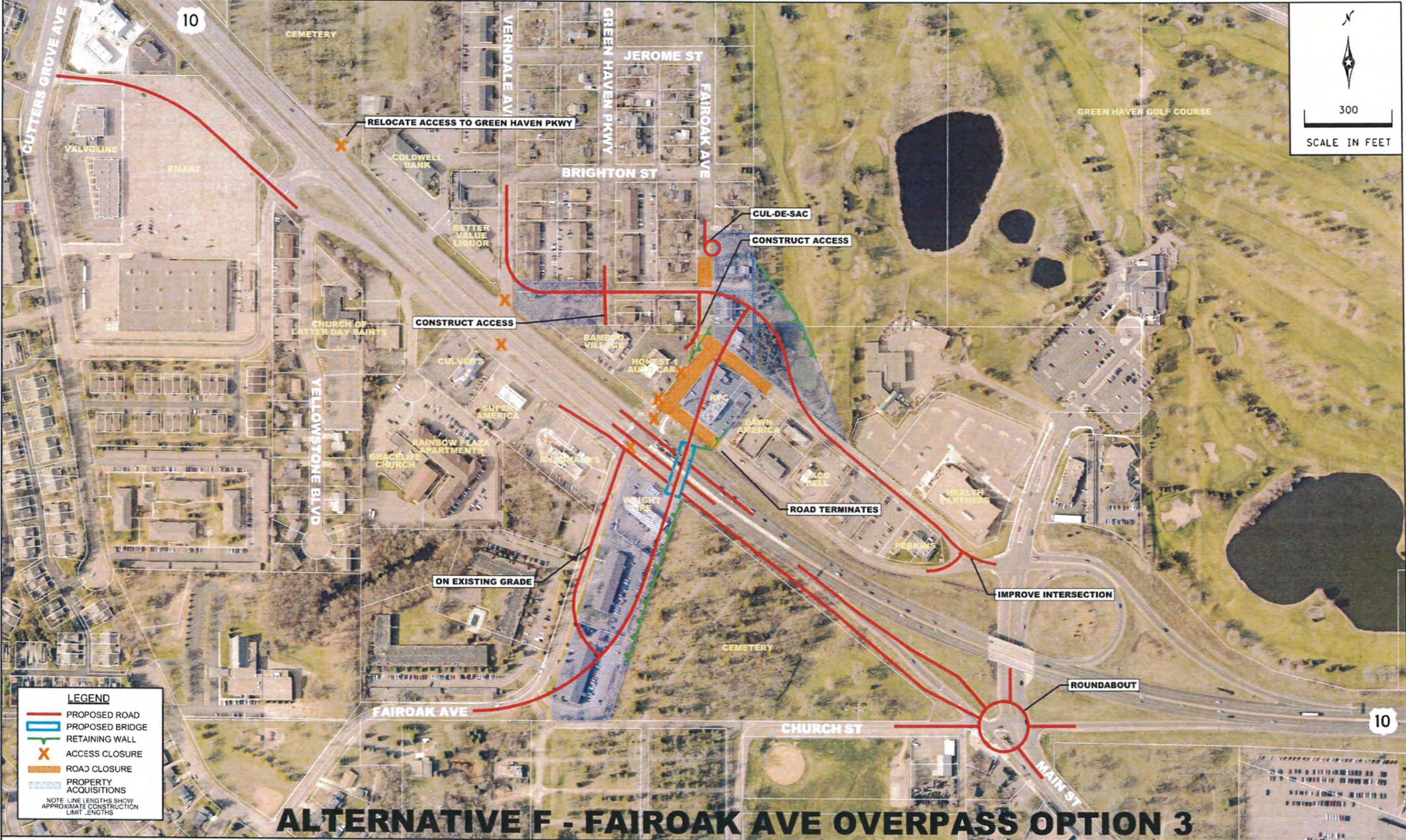
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 (RAISE FAIROAK AVE APPROX. 22')  
 \* REFERENCE ALTERNATIVE D PROFILES

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE E**

**FEBRUARY 2015  
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# ALTERNATIVE F - FAIROAK AVE OVERPASS OPTION 3

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS



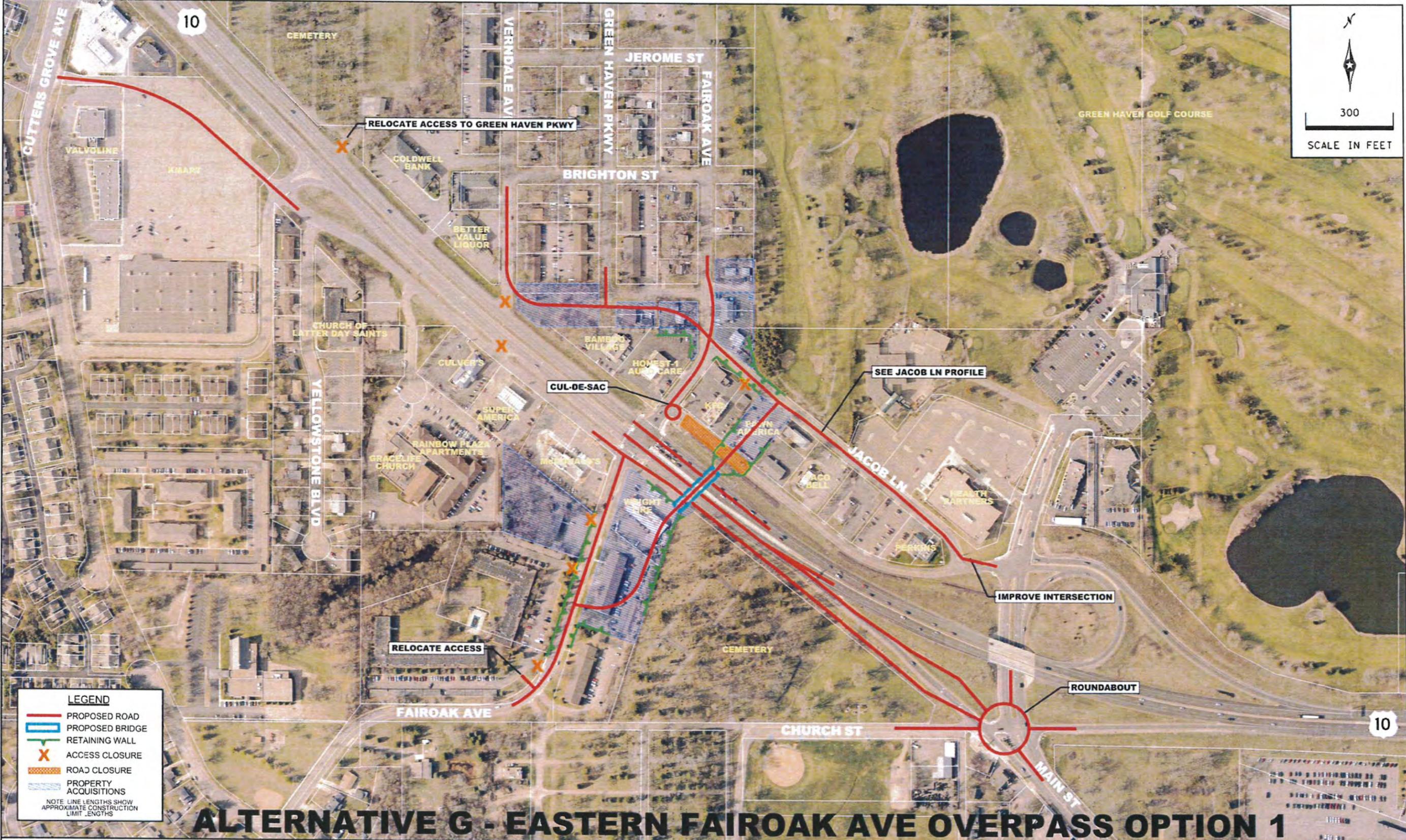
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 (RAISE FAIROAK AVE APPROX. 22')  
 \* REFERENCE ALTERNATIVE D PROFILES

**FAIROAK GRADE SEPERATION STUDY  
 ALTERNATIVE F**

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 CITY OF ANOKA**

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**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

# ALTERNATIVE G - EASTERN FAIROAK AVE OVERPASS OPTION 1



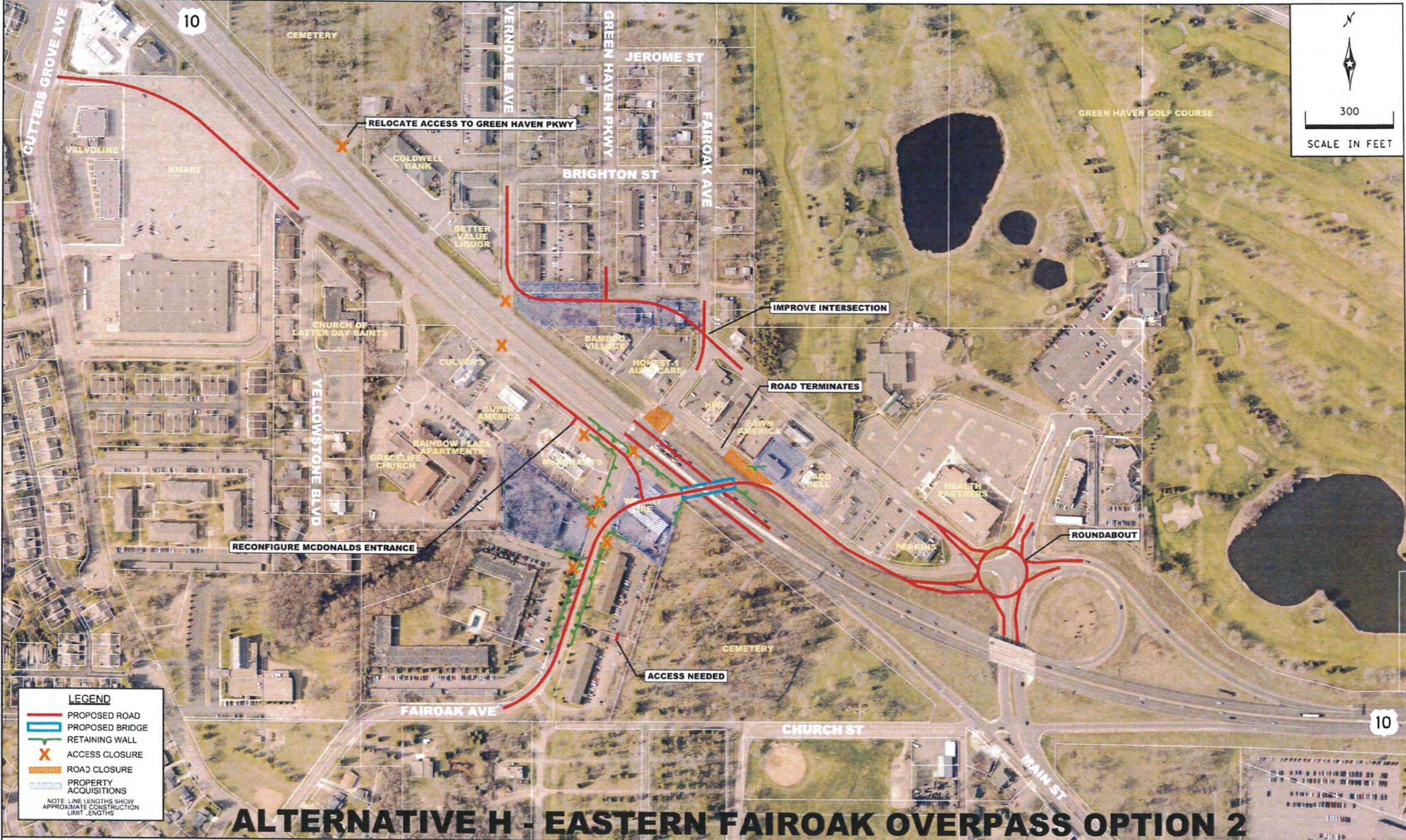
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(RAISE FAIROAK AVE APPROX. 22')

**FAIROAK GRADE SEPARATION STUDY  
ALTERNATIVE G**

**FEBRUARY 2015  
CITY OF ANOKA**

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**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

# ALTERNATIVE H - EASTERN FAIROAK OVERPASS OPTION 2



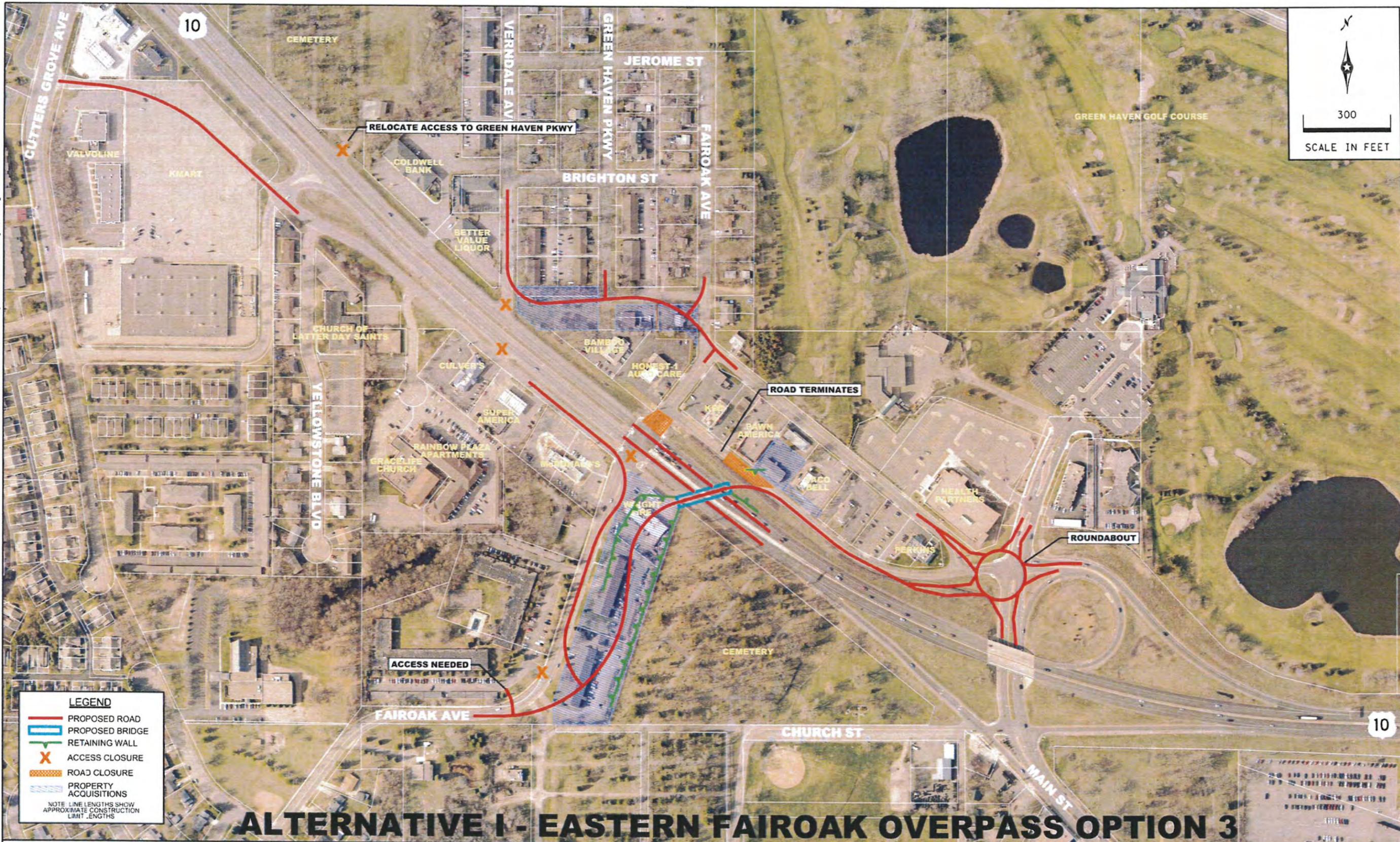
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 (RAISE FAIROAK AVE APPROX. 22')

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE H**

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 CITY OF ANOKA**

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# ALTERNATIVE I - EASTERN FAIROAK OVERPASS OPTION 3



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

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE I**

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# ALTERNATIVE J - WESTERN OVERPASS OPTION 1

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

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

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE J**

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**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

## ALTERNATIVE K - WESTERN OVERPASS OPTION 2

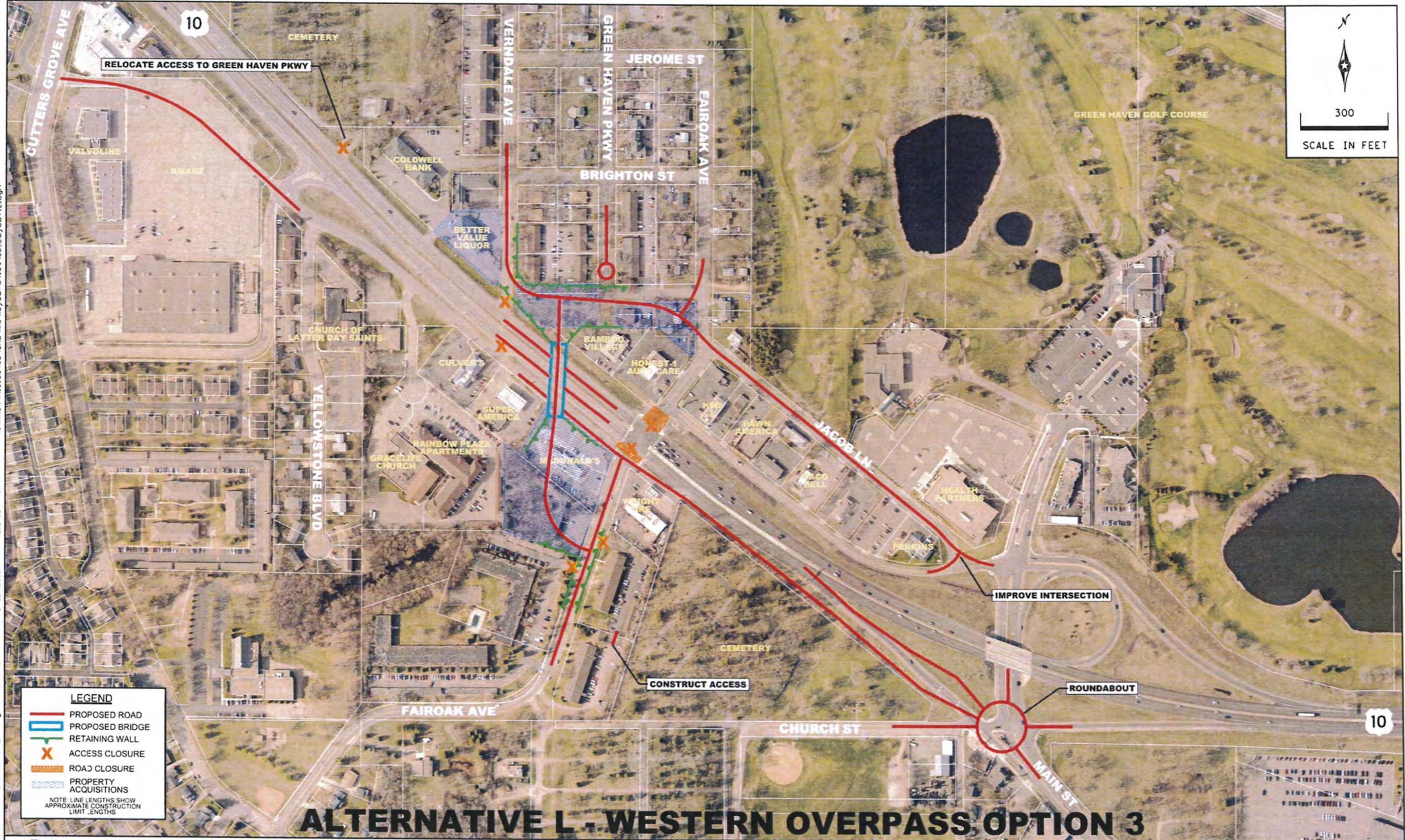
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 (RAISE VERNDALE AVE APPROX. 22')

**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE K**

**FEBRUARY 2015  
 CITY OF ANOKA**

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# ALTERNATIVE L - WESTERN OVERPASS OPTION 3

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS



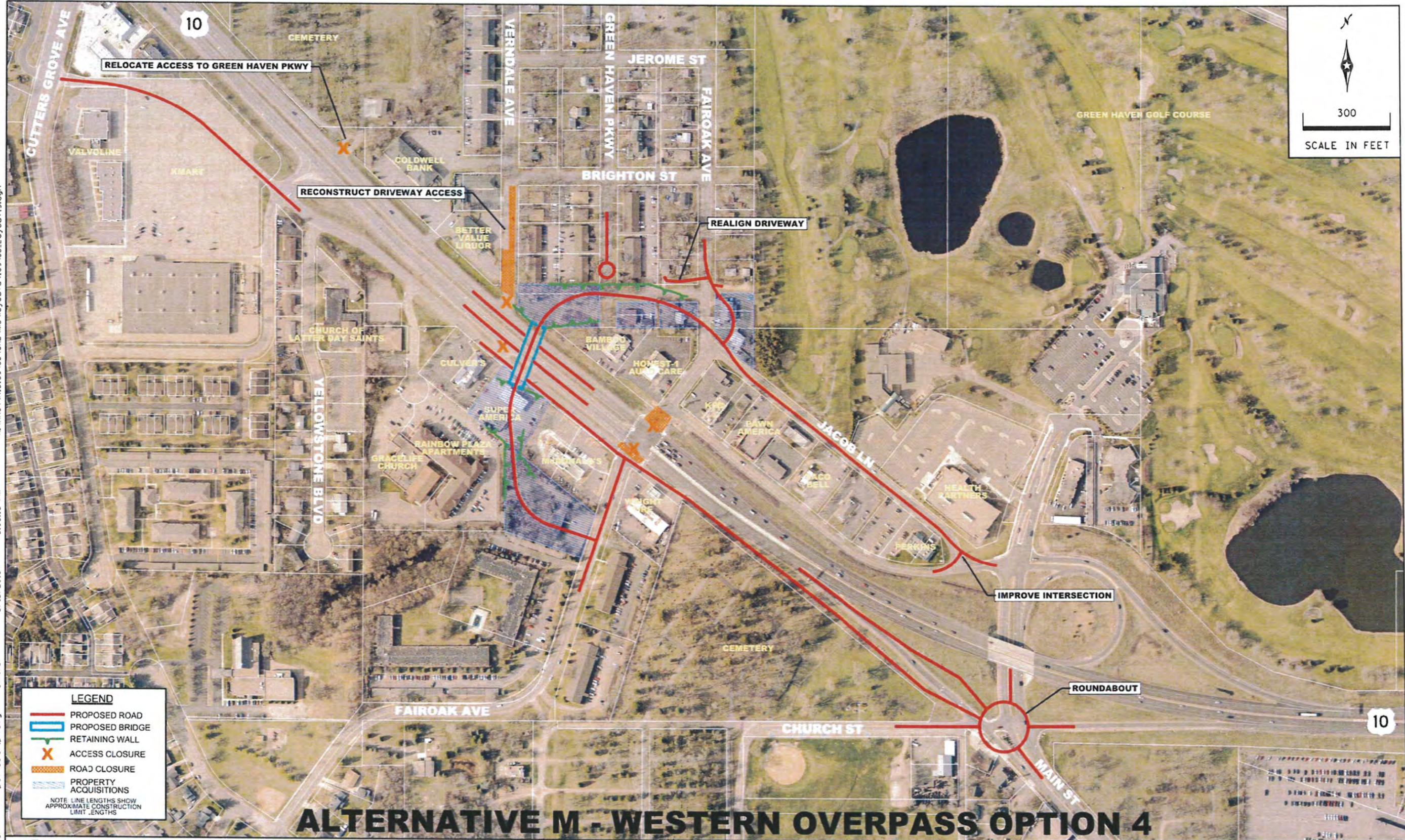
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**FAIROAK GRADE SEPARATION STUDY  
 ALTERNATIVE L**

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# ALTERNATIVE M - WESTERN OVERPASS OPTION 4

**LEGEND**

- PROPOSED ROAD
- PROPOSED BRIDGE
- RETAINING WALL
- X ACCESS CLOSURE
- ROAD CLOSURE
- PROPERTY ACQUISITIONS

NOTE: LINE LENGTHS SHOW APPROXIMATE CONSTRUCTION LIMIT LENGTHS

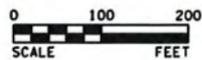
DESCRIPTION:  
FAIROAK AVE OVERPASS  
(RAISE JACOB LN APPROX. 22')

**FAIROAK GRADE SEPARATION STUDY  
ALTERNATIVE M**

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### RIVERDALE DRIVE EXTENSION

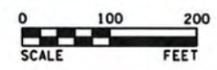
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LEGEND	
	PROPOSED ROAD
	PROPOSED CURB/ MEDIAN
	PROPOSED SHOULDER
	DRIVEWAY/SIDEWALK
	FUTURE ROADWAY CONNECTION
	FUTURE TRAIL
	CITY LIMIT



**RIVERDALE DRIVE EXTENSION**

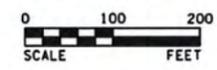
**FEBRUARY 2015  
CITY OF ANOKA**

**B**

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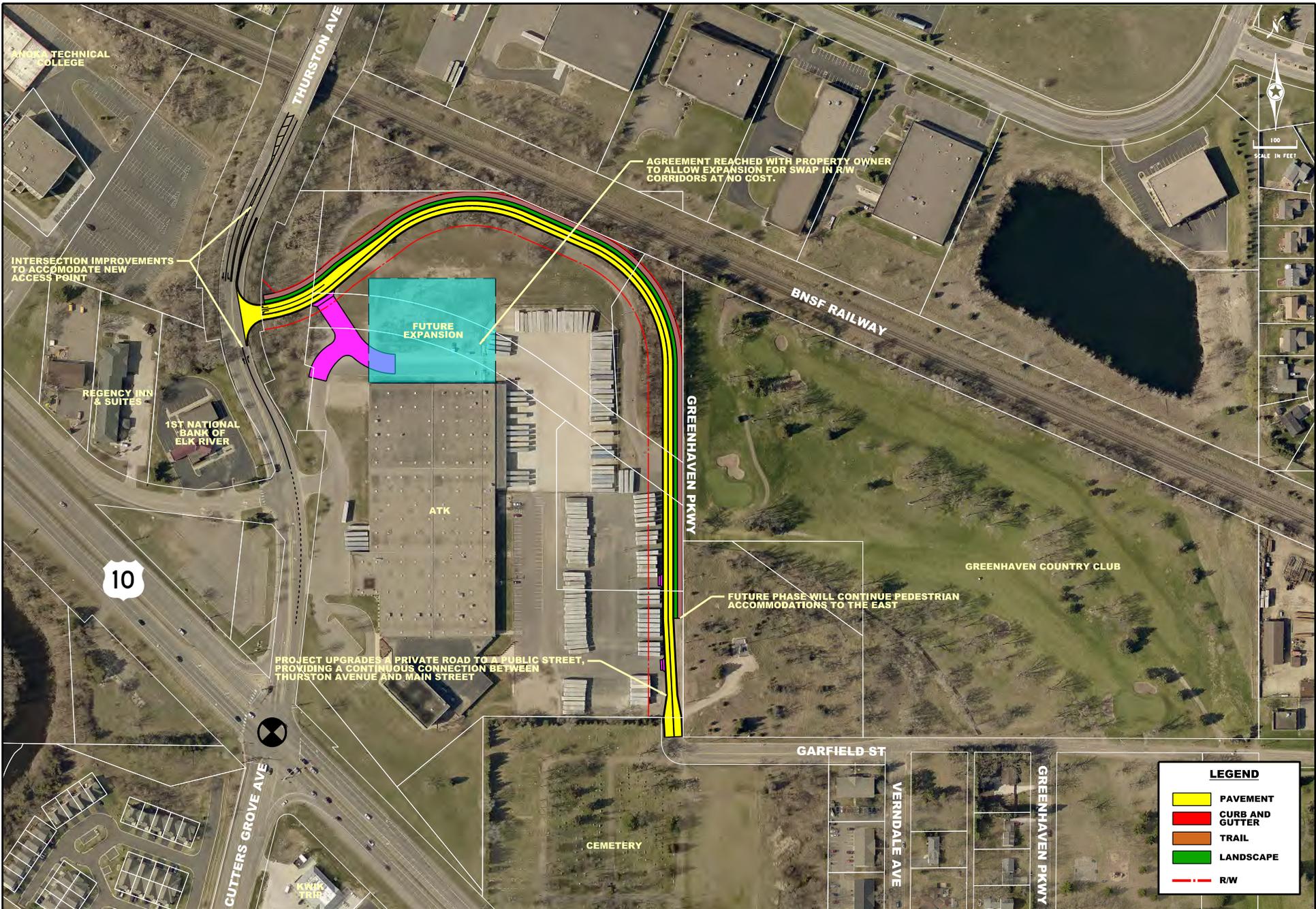
LEGEND	
	PROPOSED ROAD
	PROPOSED CURB/MEDIAN
	PROPOSED SHOULDER
	DRIVEWAY/SIDEWALK
	FUTURE ROADWAY CONNECTION
	FUTURE TRAIL
	CITY LIMIT



**RIVERDALE DRIVE EXTENSION**

**FEBRUARY 2015  
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**C**



**GREENHAVEN PARKWAY - PHASE 1 IMPROVEMENTS**

**JANUARY 2015**

**LRIP APPLICATION**

**CITY OF ANOKA**

# COUNCIL WORKSESSION MEMO FORM

3.2

Meeting Date	March 16, 2015
Agenda Section	Discussion Items
Item Description	Discussion: Entrance Monuments
Submitted By	Erik Thorvig, Economic Development Manager

## **BACKGROUND INFORMATION:**

In 2014 the Economic Development Commission reviewed entrance monument signs and created a long-term implantation plan for review by the City Council. The EDC has also identified following through on the plan as a goal in 2015. The following is a general plan for comment by the City Council.

### **Priority:**

#### High Quality Designed Signs

##### Highway 47 and Bunker Lk. Blvd.

- Southwest corner of the intersection.
- Red brick, wrought iron.
- With the 2016 intersection project.

##### E. Main Street near Federal and Pentair

- North side of Main Street.
- Unique design to incorporate industry at Federal and Pentair.
- Approach Federal and Pentair about funding.
- Can be done as part of the 2019 road project.

##### S. Ferry Street

- Replace existing sign in the same location.
- Move service organization signs somewhere downtown and be sensitive.
- Tie in a historic looking Halloween Capital of the Word sign?
- **FIRST PRIORITY!**
- Statement sign.

#### Smaller Signs

##### East River Road

- Located at the northeast corner of 9<sup>th</sup> Avenue and East River Road.
- Lower profile, lit, red brick.
- Timeline is not dependent.

##### Bunker Lake Blvd and 7<sup>th</sup> Avenue

- Located at NW corner of intersection on the commercial development site or next to Anoka Ice Arena.
- Incorporate design elements of the Rum River Shores project and Anoka County Library.
- Timing is dependent on commercial development at the corner.

### **Not a Priority**

North Street near Highway 10 and Carlson Toyota

**Wait for Development**

Highway 10 by ATC

- Vertical sign similar to Main Street bridge sign  
AEP at Thurston

**COUNCIL DIRECTION REQUESTED:**

Staff and the EDC would like direction on the plan. Most signs would have to be included in the Capital Improvement Program so priority and importance should be part of the discussion so these projects can be included in the CIP budget discuss this summer.



1503 E Main St  
Minneapolis, Minnesota  
Street View - Jul 2011



Google earth





Google earth





RIGHT  
TURN  
LANE

AARON

Wendy's  
AT&S  
EL AZTECA

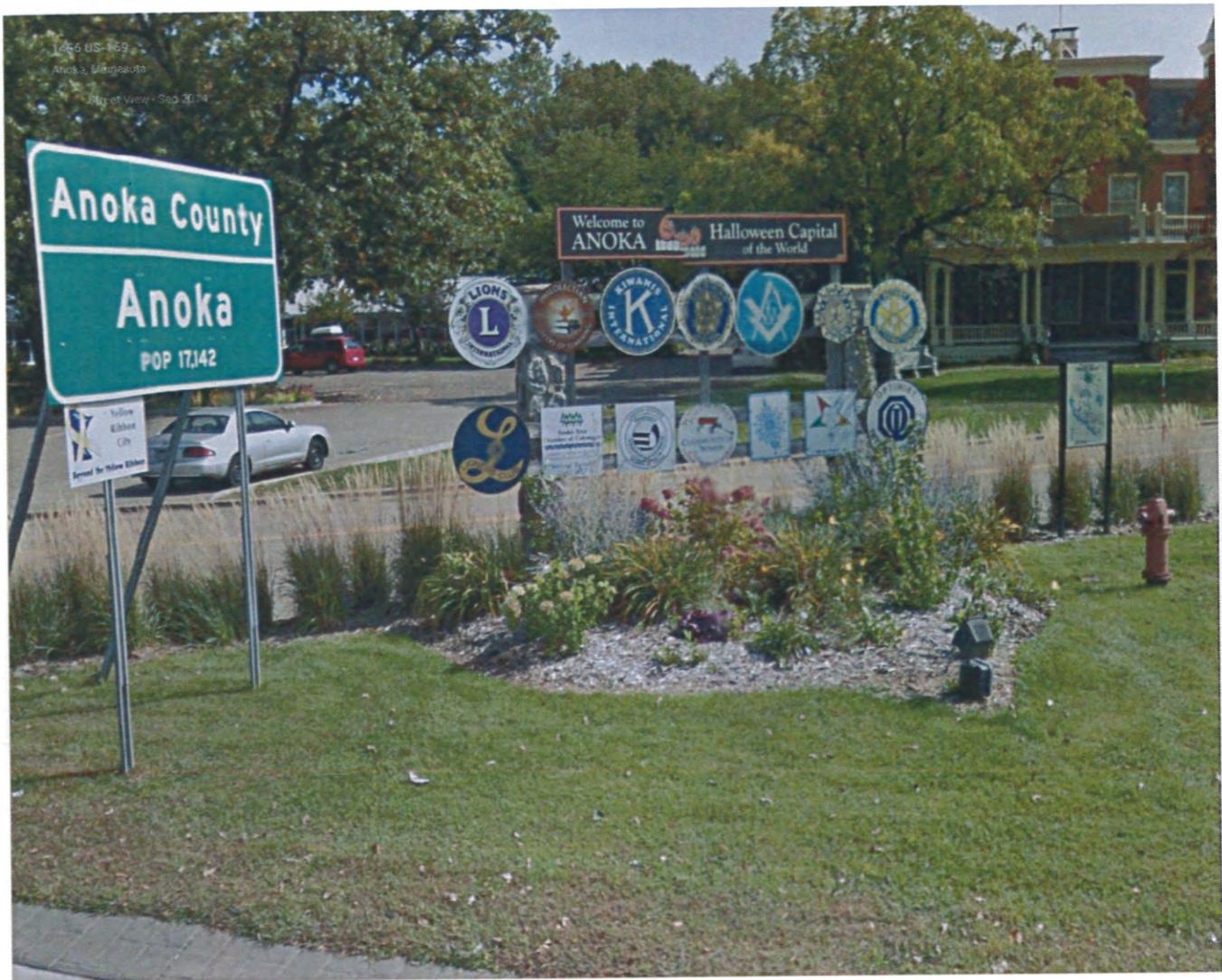


Image capture: Sep 2014 © 2015 Google





# COUNCIL WORKSESSION MEMO

3.3

Meeting Date	March 16, 2015
Agenda Section	Council Business/Discussion
Item Description	Traffic Sign Maintenance Policy
Submitted By	Public Services

## **BACKGROUND INFORMATION**

Staff is asking the City Council to adopt the attached City of Anoka Traffic Sign Maintenance Policy. This policy provides clear and definitive direction to staff regarding the proper maintenance of the city's street signs including, but not limited to, what information is to be gathered when inventorying street signs, how to identify excessive signing for removal, how to evaluate minimum retro-reflectivity levels, sign replacement prioritization, and general on-going maintenance strategies.

Retro-reflectivity generally describes the efficiency of a material to redirect light back to its source. Retro-reflective sign materials are engineered to redirect most of the light back toward the source, which gives signs and pavement markings a brighter appearance at night from the driver's perspective. Motorists therefore experience the benefits of retro-reflectivity when the light from their headlights shine on traffic signs and are redirected back towards the driver's eyes, making the legend on the sign easier to see.

The City of Anoka recognizes and follows the standards adopted in the Minnesota Manual on Uniform Traffic Control Devices (*MN MUTCD*) for guidance on the design, installation, and maintenance of our street signs. In January of 2008 the FHWA enacted new laws mandating specific changes to the *MN MUTCD* that were designed to improve the night-time visibility of traffic signs. This mandate required state and local agencies to meet the following requirements by the compliance dates noted below:

- **January 2012:** Agencies must implement and continued use of a sign assessment or management method that is designed to maintain traffic sign retro-reflectivity at or above the established minimum levels.
- **January 2015:** Agencies must replace regulatory, warning, and ground-mounted guide signs (except street name) that are identified as failing to meet the established minimum levels of sign retro-reflectivity.
- **January 2018:** Agencies must replace street name signs and overhead guide signs that are identified as failing to meet the established minimum levels of sign retro-reflectivity.

In May of 2012, the FHWA announced a proposal eliminating many of the burdensome regulations related to street signs. This proposal included extending the January 2012 compliance date related to establishing and implementing a sign management method to maintain minimum levels of sign retro-reflectivity by two years, as well as eliminating the January 2015 and 2018 compliance dates noted above. The final ruling of these regulations was published in the Federal Register (see attached publication) and the effective date was June 13, 2012. This update now required state and local agencies to meet the following requirement by the updated compliance date noted below:

- **June 2014:** Agencies must implement and continued use of a sign assessment or management method that is designed to maintain regulatory and warning sign retro-reflectivity at or above the established minimum levels.

It should be noted that in regards to the compliancy date of June 2014, this does not mean that all our street signs must meet the minimum level of retro-reflectivity at this time. Rather, it simply means the city must establish the assessment or management method to be used in managing our signs.

The FHWA has identified six (6) acceptable sign assessment or management methods for maintaining minimum levels of sign retro-reflectivity. These include:

1. **Visual Nighttime Inspection** – The retro-reflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retro-reflectivity below the minimum levels should be replaced.

2. **Measured Sign Retro-reflectivity** – Retro-reflectivity is measured using a retro-reflectometer. Signs with retro-reflectivity below the minimum levels should be replaced.
3. **Expected Sign Life** – When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retro-reflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.
4. **Blanket Replacement** – All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retro-reflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.
5. **Control Signs** – Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retro-reflective life for the associated signs. All field signs represented by the control sample should be replaced before the retro-reflectivity levels of the control sample reach the minimum levels.
6. **Other Methods** – Other methods developed based on engineering studies can be used.

Of these six acceptable methods, staff feels a combination of methods #3 & #4 will be the most reasonable and cost-effective for the city to implement and maintain, and is therefore recommending the use of this method.

An estimated 4,000 street signs are installed throughout the city. The following is a summary of the field inventory from 2009:

**Regulatory Signs** – Total 867 Signs (Compliance by 2015) including:

(510) Stop Signs	(123) All Way Plaques
(45) Speed Limit Signs	(31) One Way Signs
(21) Do Not Enter Signs	(15) Ped Signal Signs
(12) Yield Signs	(110) other signs

Estimated Cost = 867 signs times \$250 per sign = \$216,700

**Warning Signs** – Total 397 Signs (Compliance by 2015) including:

(100) Delineators	(51) School Signs
(49) Dead End	(40) Stop Ahead
(34) Chevrons	(32) RT/LT Curve/Turn
(24) Pedestrian	(23) Arrows
(6) Speed Advisory Plaques	(6) Double arrows
(32) other signs	

Estimated Cost = 397 signs times \$250 per sign = \$99,250

**Guide Signs (Green & White)** – Total 32 Signs (Compliance by 2015)

Estimated Cost = 32 signs times \$300 per sign = \$9,600

**Street Name Signs** – Total 1,860 Signs (Compliance by 2018)

Estimated Cost = 1,860 signs times \$200 per sign = \$372,000

**Other Signs** – Total 935 Signs (Retro-reflective not required) including:

(696) No Parking Signs	(83) Miscellaneous Signs
(46) Crime Signs	(55) MTC Bus Signs
(25) Slow Children Signs	(7) Private Drive
(7) No Cruising	(6) No Loud Music
(5) Slow Sign	(3) Deaf Child Signs
(2) Play Ground	

Estimated Cost = 935 signs times \$250 per sign = \$233,750

The cost to replace all city street signs is estimated to be about \$931,300. In order to minimize costs, staff is

recommending that the city employ method #3 and # 4 using in-house staff over a four year period. As part of the sign replacement, staff will follow the sign policy for consistency in sign removals within the city. After the four (4) year period the city will replacing each signs once every eleven (11) years. This is based on the use of 3M Diamond Grade 3 (DG<sup>3</sup>) reflective sheeting, which has the highest visibility rating of all retro-reflective sheeting types and has a minimum life expectancy of 10-12 years.

### **FINANCIAL IMPACT**

When City staff first became aware of the FHWA's retro-reflectivity mandate, staff began replacing street signs on all subsequent street reconstruction projects. As such, all existing regulatory and warning signs have been replaced with new signs on all the projects giving us a jump start on what will likely be a very costly process, assuming of course that the compliance dates listed above are not eliminated, and that the city will be required to replace many of our signs within the next four years.

Adopting this policy will affect future budgets. In 2014, the budget for street sign maintenance was approximately \$15,000 for normal sign maintenance. When preparing the future budget, a sign maintenance budget should be created for 2016 - 2020 to allow staff to replace signs as needed to comply with the FHWA mandates. To provide public safety, staff also recommends replacing the guide and street name signs during the first four (4) years. It is common practice that street name signs are replaced during the winter based on the available street budget allowance. Staff estimates we will need to replace at least 50% of our regulatory and warning signs to comply with the FHWA's minimum retro-reflectivity requirements. As such our sign maintenance budgets for 2016 to 2020 could approach \$117,000 for each year.

Only a minimal amount of time was spent writing the attached Traffic Sign Maintenance Policy, but a large amount of staff time will be required to inventory, evaluate, order and replace signs in the field as necessary.

### **COUNCIL DIRECTION REQUESTED**

City staff is looking for direction from the City Council on this Traffic Sign Maintenance Policy.

**DEPARTMENT OF TRANSPORTATION**

**Federal Highway Administration**

**23 CFR Part 655**

[FHWA Docket No. FHWA–2010–0159]

RIN 2125–AF43

**National Standards for Traffic Control Devices; the Manual on Uniform Traffic Control Devices for Streets and Highways; Revision**

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Final rule.

**SUMMARY:** The MUTCD is incorporated in regulations, approved by the FHWA, and recognized as the national standard for traffic control devices used on all streets, highways, bikeways, and private roads open to public travel. The purpose of this final rule is to revise certain information relating to target compliance dates for traffic control devices. This final rule revises Table I–2 of the MUTCD by eliminating the compliance dates for 46 items (8 that had already expired and 38 that had future compliance dates) and extends and/or revises the dates for 4 items. The target compliance dates for 8 items that are deemed to be of critical safety importance will remain in effect. In addition, this final rule adds a new Option statement exempting existing historic street name signs within a locally identified historic district from the Standards and Guidance of Section 2D.43 regarding street sign color, letter size, and other design features, including retroreflectivity.

Consistent with Executive Order 13563, and in particular its emphasis on burden-reduction and on retrospective analysis of existing rules, the changes adopted are intended to reduce the costs and impacts of compliance dates on State and local highway agencies and to

streamline and simplify the information. The MUTCD, with these changes incorporated, is being designated as Revision 2 of the 2009 edition of the MUTCD.

**DATES:** *Effective Date:* This final rule is effective June 13, 2012. The incorporation by reference of the publication listed in this regulation is approved by the Director of the Office of the Federal Register as of June 13, 2012.

**FOR FURTHER INFORMATION CONTACT:** Mr. Chung Eng, Office of Transportation Operations, (202) 366–8043; or Mr. William Winne, Office of the Chief Counsel, (202) 366–1397, Federal Highway Administration, 1200 New Jersey Ave. SE., Washington, DC 20590. Office hours are from 8 a.m. to 4:30 p.m., E.T., Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION:**

**Electronic Access and Filing**

This document, the notice of proposed amendment (NPA), and all comments received may be viewed online through the Federal eRulemaking portal at: <http://www.regulations.gov>. Electronic submission and retrieval help and guidelines are available on the Web site. It is available 24 hours each day, 366 days this year. Please follow the instructions. An electronic copy of this document may also be downloaded from the Office of the Federal Register’s home page at: <http://archives.gov/federal-register> and the Government Printing Office’s Web page at: <http://www.gpo.gov/fdsys>.

**Executive Summary**

*I. Purpose of the Regulatory Action*

The purpose of this final rule is to revise certain information relating to target compliance dates for traffic control devices. The changes adopted are intended to reduce the impacts of compliance dates on State and local

highway agencies and streamline and simplify information contained in the MUTCD without reducing safety. The FHWA has the authority to prescribe standards for traffic control devices on all roads open to public travel pursuant to 23 U.S.C. 109(d), 114(a), 217, 315, and 402(a).

*II. Summary of the Major Provisions of the Regulatory Action in Question*

This final rule revises Table I–2 of the MUTCD by eliminating the compliance dates for 46 items (8 that had already expired and 38 that had future compliance dates) and extends and/or revises the dates for 4 items. The target compliance dates for 8 items that are deemed to be of critical safety importance will remain in effect. In addition, this final rule adds a new Option statement exempting existing historic street name signs within a locally identified historic district from the Standards and Guidance of Section 2D.43 regarding street sign color, letter size, and other design features, including retroreflectivity.

*III. Costs and Benefits*

The changes in this rulemaking will not require the expenditure of additional funds, but rather will provide State and local governments with the flexibility to allocate scarce financial resources based on local conditions and the useful service life of its traffic control devices. Since this rulemaking will benefit State and local governments by providing additional clarification, guidance and flexibility, it is anticipated that the economic impacts will be minimal and that costs and burdens will be reduced. Thus, a full regulatory evaluation was not conducted.

**Revised Table I–2**

This final rule amends Table I–2 of the 2009 MUTCD to read as follows:

2009 MUTCD Section No.(s)	2009 MUTCD Section title	Specific provision	Compliance date
2A.08 .....	Maintaining Minimum Retroreflectivity.	Implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels (see Paragraph 2).	2 years from the effective date of this revision of the 2009 MUTCD*.
2A.19 .....	Lateral Offset .....	Crashworthiness of sign supports on roads with posted speed limit of 50 mph or higher (see Paragraph 2).	January 17, 2013 (date established in the 2000 MUTCD).
2B.40 .....	ONE WAY Signs (R6–1, R6–2).	New requirements in the 2009 MUTCD for the number and locations of ONE WAY signs (see Paragraphs 4, 9, and 10).	December 31, 2019.
2C.06 through 2C.14.	Horizontal Alignment Warning Signs.	Revised requirements in the 2009 MUTCD regarding the use of various horizontal alignment signs (see Table 2C–5).	December 31, 2019.

2009 MUTCD Section No.(s)	2009 MUTCD Section title	Specific provision	Compliance date
2E.31, 2E.33, and 2E.36.	Plaques for Left-Hand Exits.	New requirement in the 2009 MUTCD to use E1–5aP and E1–5bP plaques for left-hand exits.	December 31, 2014.
4D.26 .....	Yellow Change and Red Clearance Intervals.	New requirement in the 2009 MUTCD that durations of yellow change and red clearance intervals shall be determined using engineering practices (see Paragraphs 3 and 6).	5 years from the effective date of this revision of the 2009 MUTCD, or when timing adjustments are made to the individual intersection and/or corridor, whichever occurs first.
4E.06 .....	Pedestrian Intervals and Signal Phases.	New requirement in the 2009 MUTCD that the pedestrian change interval shall not extend into the red clearance interval and shall be followed by a buffer interval of at least 3 seconds (see Paragraph 4).	5 years from the effective date of this revision of the 2009 MUTCD, or when timing adjustments are made to the individual intersection and/or corridor, whichever occurs first.
6D.03 ** .....	Worker Safety Considerations.	New requirement in the 2009 MUTCD that all workers within the right-of-way shall wear high-visibility apparel (see Paragraphs 4, 6, and 7).	December 31, 2011.
6E.02 ** .....	High-Visibility Safety Apparel.	New requirement in the 2009 MUTCD that all flaggers within the right-of-way shall wear high-visibility apparel.	December 31, 2011.
7D.04 ** .....	Uniform of Adult Crossing Guards.	New requirement in the 2009 MUTCD for high-visibility apparel for adult crossing guards.	December 31, 2011.
8B.03, 8B.04 .....	Grade Crossing (Crossbuck) Signs and Supports.	Retroreflective strip on Crossbuck sign and support (see Paragraph 7 in Section 8B.03 and Paragraphs 15 and 18 in Section 8B.04).	December 31, 2019.
8B.04 .....	Crossbuck Assemblies with YIELD or STOP Signs at Passive Grade Crossings.	New requirement in the 2009 MUTCD for the use of STOP or YIELD signs with Crossbuck signs at passive grade crossings.	December 31, 2019.

\* Types of signs other than regulatory or warning are to be added to an agency's management or assessment method as resources allow.

\*\* MUTCD requirement is a result of a legislative mandate.

**Note:** All compliance dates that were previously published in Table I–2 of the 2009 MUTCD and that do not appear in this revised table have been eliminated.

## Background

One of the purposes of the MUTCD is to provide for the consistent and uniform application of traffic control devices on streets and highways open to public travel. These traffic control devices are designed to promote highway safety and efficiency. As technology evolves and surroundings change, new provisions for traffic control devices and their application may be proposed. When new provisions are adopted in a new edition or revision of the MUTCD, any new or reconstructed traffic control devices installed after adoption are required to be in compliance with the new provisions. Existing devices already in use that do not comply with the new MUTCD provisions are expected to be upgraded by highway agencies over time to meet the new provisions, unless the FHWA establishes a target compliance date for upgrading such devices. If such a target date has been established by the FHWA through the Federal rulemaking process, agencies are to upgrade existing noncompliant devices on or before the target compliance date. Due to the current economic climate, State and local agencies have expressed concern about the potential costs associated with replacing noncompliant traffic control

devices within the target compliance dates previously adopted in the MUTCD. In response to those concerns, the FHWA issued a Request for Comments in the **Federal Register**<sup>1</sup> seeking public input on traffic control device compliance dates.

After reviewing and considering the nearly 600 letters submitted by State and local government highway agencies, national associations, traffic industry representatives, traffic engineering consultants, and private citizens, on August 31, 2011, the FHWA published a Notice of Proposed Amendments (NPA), proposing revisions to the MUTCD at 76 FR 54156. The NPA proposed to revise Table I–2 of the 2009 edition of the MUTCD to eliminate the compliance dates for 46 items (8 that have already expired and 38 that have future compliance dates) and to extend and/or revise the dates for 4 items. In addition, the NPA proposed to retain the target compliance dates for eight items that were deemed to be of critical safety importance. Interested persons were invited to submit comments to FHWA Docket No. FHWA–2010–0159. Based on the comments received and its own experience, the FHWA is issuing this final rule and is designating the MUTCD, with these changes

<sup>1</sup> 75 FR 74128, November 30, 2010.

incorporated, as Revision 2 of the 2009 edition of the MUTCD.

The text of Revision 2 of the 2009 edition of the MUTCD, with these final rule changes incorporated, is available for inspection and copying, as prescribed in 49 CFR part 7, at the FHWA Office of Transportation Operations (HOTO–1), 1200 New Jersey Avenue SE., Washington, DC 20590. Furthermore, the text of the 2009 edition of the MUTCD, with these final rule changes and the changes of Revision 1 also incorporated, is available on the FHWA's MUTCD Web site at: <http://mutcd.fhwa.dot.gov>. The 2009 edition with Revisions 1 and 2 incorporated supersedes all previous editions and revisions of the MUTCD.

## Summary of Comments

The FHWA received, reviewed, and analyzed 158 letters submitted to the docket, which contain nearly 240 different comments on the proposed changes. The American Association of State Highway and Transportation Officials (AASHTO), the National Committee on Uniform Traffic Control Devices (NCUTCD), the American Public Works Association (APWA), the National Association of County Engineers (NACE), the American Traffic Safety Services Association (ATSSA), American Road and Transportation

Builders Association (ARTBA), State departments of transportation (DOTs), city and county government agencies, other associations, transportation consultants, and individual private citizens submitted comments. The majority of the comments were fully or partially supportive of the NPA proposal, agreeing with the general intent. The AASHTO agreed with the NPA, except for two specific compliance dates that were retained in the NPA (see below for additional details). In addition to commenting on the compliance date proposal, several local jurisdictions and individuals submitted comments regarding existing provisions in Section 2D.43 of the MUTCD that affect "historic" street name signs in their communities. A summary of the comments received and the changes in the MUTCD adopted in this final rule are included in the following section.

#### Discussion of Comments on Table I-2 and Adopted Revisions

As noted above, most the comments were fully or partially supportive of the NPA proposal, and agreed with the general intent of the NPA. Many commenters had previously taken the opportunity to comment on the November 30, 2010, request for comments on traffic control compliance dates published at 75 FR 74128. As a result, the proposals in the NPA reflected many of the commenters' concerns and opinions. The following discussion addresses the significant issues raised by comments in opposition to elements of the NPA published on August 31, 2011 at 76 FR 54156.

1. In the NPA, the FHWA proposed to eliminate 46 of the existing compliance dates (not including the two associated with sign retroreflectivity). Six citizens and one association of local governments in Minnesota opposed these 46 eliminations, on the basis of reduced uniformity and safety of traffic control devices. The Maryland State Highway Administration noted that the NPA preamble stated that FHWA proposed to "eliminate" the dates that have already expired for eight items in Table I-2, but the note at the bottom of the table stated that these dates were "deleted" from the table. The eight specific compliance dates that have expired were intended to be legally eliminated (rather than just removed from the table). To clarify this issue, the FHWA revises the note at the bottom of the table in the final rule to read, "All compliance dates that were originally published in Table I-2 of the 2009 MUTCD that do not appear in this revised table have been eliminated."

The FHWA adopts the elimination of the compliance dates in Table I-2, as proposed in the NPA, for Sections 2B.03, 2B.09, 2B.10, 2B.11, 2B.13, 2B.26, 2B.55, 2C.04, 2C.13, 2C.20, 2C.30, 2C.38, 2C.40, 2C.41, 2C.42, 2C.46, 2C.49, 2C.50, 2C.61, 2C.63, 2D.43 (two provisions), 2D.44, 2D.45, 2G.01 through 2G.07, 2G.11 through 2G.15, 2H.05 and 2H.06, 2I.09, 2I.10, 2J.05, 2N.03, 3B.04 and 3B.05, 3B.18, 4D.01, 4D.31, 4E.07, 5C.05, 7B.11, 7B.12, 7B.16, 8B.19 and 8C.02 through 8C.05, 8C.09, 8C.12, and 9B.18.

The elimination of a compliance date for a given Standard contained in the MUTCD does not eliminate the regulatory requirement to comply with that Standard. The Standard itself remains in the MUTCD and applies to any new installations, but the compliance date for replacing noncompliant devices that exist in the field is eliminated. To further clarify, any new installation of an existing noncompliant device (such as moving a noncompliant device to another location) would also have to comply with the Standard upon installation.

2. The FHWA proposed to extend the compliance date by approximately 2 years for the provision in Section 2A.08 that requires agencies to implement an assessment or management method designed to maintain sign retroreflectivity at or above the established minimum levels. As part of this proposal, the FHWA proposed to limit this particular compliance date to apply only to regulatory and warning signs. This compliance date does not require replacement of any signs by a particular date. Rather, it requires highway agencies to implement an assessment or management method for maintaining sign retroreflectivity, in accordance with section 406 of the Department of Transportation and Related Agencies Appropriations Act, 1993 (Pub. L. 102-388; October 6, 1992), by the compliance date. Safety advocacy organizations, the ARTBA, one State DOT, and some industry representatives generally disagreed with the proposal. The ATSSA and some State DOTs agreed with the extension for implementing an assessment/management method, but requested that guide signs not be excluded. However, many agencies stated that including guide signs in the assessment method would limit funds that could be used for other projects. The FHWA disagrees with including guide signs at this time because regulatory and warning signs constitute the highest priority for assessing retroreflectivity of existing signs. The FHWA, therefore, adopts the revisions as proposed in the final rule.

The additional cost of including guide signs would increase the economic burden on agencies, whose funds are limited due to the current economic climate. The revisions to the compliance date and its applicability will provide relief and enable agencies to determine when their resources will allow them to add signs, other than regulatory and warning signs, to their assessment or management method. Several commenters noted the confusion and potential for misinterpretation introduced by limiting the compliance date to regulatory and warning signs. The FHWA reiterates that the language in Section 2A.08 still requires agencies to establish a method for all types of signs, but understands that limiting the compliance date to regulatory and warning signs could lead some agencies to mistakenly think that guide signs would never be required to be included in an agency's method. In addition, because the MUTCD requirement is for a method rather than a device, it is unclear how agencies would interpret the application of "systematic upgrading" (applicable to MUTCD requirements that have no specific compliance date) in the case of adding guide signs to the agency's management or assessment method. The FHWA adds a footnote to Table I-2 to clarify that other types of signs are to be added to an agency's management or assessment method as resources allow. The FHWA believes that adding this footnote in the final rule, rather than being silent on the issue, will provide clarity. The FHWA adopts the extension of the compliance date from January 22, 2012, to 2 years after this final rule and adds a footnote as discussed above.

In addition, the FHWA proposed in the NPA to eliminate the compliance dates for replacement of signs found not to meet the minimum retroreflectivity standards. The ATSSA, the ARTBA, other safety advocates, industry representatives, some States and cities, and several citizens disagreed with eliminating the January 22, 2015, and January 22, 2018, compliance dates and suggested that the dates instead be extended to 2018 and 2021, respectively. Even without a specific date, agencies will still need to replace any sign they identify as not meeting the established minimum retroreflectivity levels. Their schedules replacing the signs, however, would be based on resources and relative priorities, rather than specific compliance dates. As a result, the FHWA eliminates these compliance dates in the final rule.

3. The FHWA proposed to extend the compliance dates for signal timing adjustments associated with vehicular

yellow and red clearance intervals in Section 4D.26 and pedestrian clearance intervals in Section 4E.06 from December 31, 2014, to 5 years after this final rule. The National Association of City Transportation Officials requested a further extension to 10 years after the final rule and Pennsylvania DOT suggested eliminating this date instead of extending it. The FHWA disagrees with extending the compliance date even further into the future or eliminating it, as the extension that was proposed in the NPA achieves a reasonable balance between the need for these critical safety retiming efforts and resource constraints. As mentioned in the NPA, the original compliance date of December 31, 2014 published for the 2009 edition of the MUTCD was based on what FHWA believed to be the typical signal retiming frequency of about 5 years. This new proposed compliance date provides agencies with more than 2 additional years to implement the new requirements of Sections 4D.26 and 4E.06 at any locations that have not already been made compliant under a previous intersection or corridor retiming. Thus, the FHWA believes that it is reasonable for agencies to retime those signals by 2017 that have not already been made compliant under a previous intersection or corridor retiming. The FHWA adopts the extension of the compliance dates for Sections 4D.26 and 4E.06 to 5 years after this final rule, or when timing adjustments are made to the individual intersections and/or corridor, whichever occurs first, as proposed in the NPA.

4. In the NPA, the FHWA proposed to revise and extend the compliance dates in Sections 8B.03 and 8B.04 related to requiring retroreflective strips on the back of Crossbuck signs and on the front and back of supports for Crossbuck signs at passive railroad grade crossings (those crossings that do not have gates and/or flashing lights activated upon approach of a train). As discussed in the NPA, the FHWA proposed to extend this compliance date to December 31,

2019, which would coincide with the date for adding YIELD or STOP signs with Crossbuck signs at passive grade crossings so that railroad companies and highway agencies can avoid unnecessary expense and achieve greater economies of sending sign crews to crossings only once rather than twice. The FHWA also proposed to extend the compliance date to clarify that the requirements for retroreflective strips are in Section 8B.04 as well as Section 8B.03 and to clarify that the compliance date was also intended to apply to the retroreflective strip on the backs of the Crossbuck signs. Two State DOTs and one consultant opposed this extension, suggesting instead that the dates be eliminated. Two commenters questioned the effectiveness of the devices but did not provide supporting evidence. As a result, the FHWA could not evaluate the commenters' effectiveness concerns. As to the suggestion of eliminating the compliance date entirely, the FHWA disagrees with those commenters because the extension proposed in the NPA provides an additional 9 years beyond the original 10-year compliance period established for this requirement in the 2000 edition of the MUTCD, while achieving the practical benefit of allowing agencies and companies to apply the retroreflective strips at the same time that they add YIELD or STOP signs at those same crossings. The FHWA adopts the revision and extension of this compliance date to December 31, 2019, as proposed in the NPA.

5. The FHWA proposed in the NPA to retain the existing target compliance dates for eight items that it deemed to be of critical safety importance, based on existing evidence, FHWA's subject matter expertise, and FHWA's experience in traffic control device matters. As stated in the NPA, final rules establishing compliance dates for each of the eight items clearly identified the safety justification for the compliance dates established. As a

general comment, the NCUTCD, the NACE, three State DOTs, two cities, and two State associations of engineers requested that all retained compliance dates be justified by a benefit/cost analysis in accordance with Executive Order 13563. The FHWA disagrees that such an analysis is necessary because the compliance dates are already in the MUTCD and were put in place prior to the issuance of the Executive Order. This rulemaking is not establishing new, more burdensome dates for these items and is actually relieving burdens associated with many existing compliance dates. The following paragraphs describe the concerns that commenters expressed specifically related to the target compliance dates retained by the FHWA.

The FHWA proposed to retain the January 17, 2013, target compliance date for provisions in Section 2A.19 requiring crashworthiness of existing sign supports on roads with posted speed limits of 50 miles per hour (mph) or higher. This compliance date was established in the 2003 edition of the MUTCD. The AASHTO, the NCUTCD, the NACE, four State DOTs, a city, and a state association of engineers requested extension of the January 17, 2013, compliance date to 2019, or the end of the useful life of the sign supports (with no specific compliance date), rather than retaining the existing compliance date. The commenters did not provide supporting evidence for their position. The FHWA disagrees with eliminating or extending the compliance date because eliminating fixed-object hazards on high-speed roads remains a critical safety need due to the potential for death or severe injury that can result from high-speed, run-off-the-road crashes when non-crashworthy sign supports are struck. The following data on fatal crashes on roads with speed limits of 50 mph or higher, where a sign support was the "most harmful event," was obtained from the Fatality Analysis Reporting System (FARS).<sup>2</sup>

Most harmful event	Year				
	2005	2006	2007	2008	2009
Highway Sign Post .....	47	56	54	71	53
Overhead Sign Support .....	9	9	12	17	12
Total Fatalities .....	56	65	66	88	65

During the 5-year period from 2005 to 2009, on average each year, 68 fatalities occurred that can be attributed to

collisions with sign supports. The most recent year where full data is available is 2009. The data does not differentiate

between crashworthy and non-crashworthy supports. However, based on this data, if the compliance date was

<sup>2</sup> <http://www.nhtsa.gov/FARS>.

extended by 6 years, about 400 potential fatalities might occur during that time. Collisions with sign supports are the cause of about 15 percent of the total fatalities involving poles of any sort. Nevertheless, they represent a significant problem on high-speed roads. To address this problem, in late 2000, the MUTCD addressed this issue by adding a requirement for a 10-year compliance date (2013), which was formally adopted in 2003. By 2013, agencies will have had 12 years to comply. The FHWA adopts the retention of the existing January 17, 2013, compliance date for this item, as proposed in the NPA.

For provisions in Section 2B.40 that require agencies to install additional ONE WAY signs at certain types of intersections, the FHWA proposed retaining the target compliance date of December 31, 2019, as established in the 2009 edition of the MUTCD. Two State DOTs and a county disagreed with retaining the existing compliance date and asked that the date be eliminated instead. The FHWA adopts the retention of the existing compliance date for this item, as proposed in the NPA, because of the safety issues associated with wrong-way travel on divided highways (the subject of a current National Transportation Safety Board (NTSB) investigation), research on the needs of older drivers, and the significant safety benefits to road users that the addition of such signs may provide.<sup>3</sup>

The FHWA proposed in the NPA to retain the December 31, 2019, target compliance date for the provisions in Sections 2C.06 through 2C.14 that require the use of various horizontal alignment warning signs and determinations of advisory speed values, adopted in the 2009 edition of the MUTCD. The AASHTO, the NCUTCD, the NACE, eight State DOTs, one city, a State association of engineers, and a consultant requested postponing the existing compliance date until National Cooperative Highway Research Program (NCHRP) Project 03-106 ("Traffic Control Device Guidelines for Curves") confirms or disproves the costs and benefits of these warning signs, rather than retaining the date. The FHWA disagrees with extending the date because the NCHRP research is due to be completed by the end of 2015, which is 4 years before the compliance date. Four years allows sufficient time for revision of the 2019 date, if

necessary. As stated in the NPA, the FHWA established the 10-year compliance date due to the safety issues associated with run-off-the-road crashes at horizontal curves and the disproportionate number of fatalities at horizontal curves on the Nation's highways. The FHWA adopts the retention of the existing compliance date for this item, as proposed in the NPA.

One State DOT disagreed with the FHWA's proposal in the NPA to retain the December 31, 2014, compliance date associated with requiring the use of LEFT EXIT plaques on guide signs for left exits established in Sections 2E.31, 2E.33, and 2E.36 of the 2009 edition of the MUTCD. The State DOT suggested eliminating, rather than retaining, the compliance date. The FHWA disagrees, because the 5-year target compliance date was established to address a recommendation of the NTSB arising from a significant safety concern with left-hand exits. The NTSB made a specific recommendation that the implementation of the LEFT plaque at left-hand exits be accelerated with a 5-year compliance date due to the fact that left-hand exits, though relatively rare, continue to violate driver expectancy at freeway and expressway locations. The lack of clear notice of a left-hand exit was cited as a contributing factor in a 2007 fatal crash of a motorcoach that inadvertently departed the freeway lanes at a left-hand exit. The FHWA adopts the retention of the December 31, 2014, compliance date in the final rule. As stated in the NPA, the installation of these plaques generally does not require replacement of the existing sign or sign support and this change affects relatively few existing locations throughout the country.

As proposed in the NPA, the FHWA adopts the retention of the existing December 31, 2011, target compliance date associated with the requirements in Sections 6D.03, 6E.02, and 7D.04 that all workers, including flaggers and school crossing guards must wear high-visibility apparel within the right-of-way of all highways, not just Federal-aid highways. Although a consultant suggested that the compliance date for high-visibility apparel should be eliminated because the compliance date will have expired by the time the final rule becomes effective, the FHWA retains the existing compliance date. Due to safety concerns and minimal costs, the FHWA does not believe agencies that have not yet complied should be relieved from compliance at the earliest possible time.

Finally, as proposed in the NPA, the FHWA adopts the retention of the

existing December 31, 2019, target compliance date for the provisions in Section 8B.04 that require the use of either a YIELD or STOP sign with the Crossbuck sign at all passive grade crossings. Two State DOTs and a consultant disagreed with retaining the existing compliance date, suggesting that the date be eliminated. One of these commenters stated that this signing was only minimally effective and that compliance by the existing date was too costly but did not provide any evidence for either of these statements. The FHWA disagrees, because the 10-year compliance period provides adequate time to install these signs and because research has found the signs are needed to improve grade crossing safety.<sup>4</sup>

#### Discussion of Comments on Section 2D.43 and Adopted Revisions

Comments on the provisions of Section 2D.43 regarding Street Name signs were submitted to the docket by officials and citizens of the Township of Lower Merion, Pennsylvania, the Town of Brookline, Massachusetts, citizens of Saugerties and Forest Hills, New York, and the organization Historic New England. The comments stated that the communities have "historic" Street Name signs that do not meet the Standards and Guidance of Section 2D.43 regarding color, letter size, and other design features, including retroreflectivity. These communities asked for an exemption from the MUTCD so that they can retain their historic Street Name signs without fear of noncompliance with the MUTCD. These docket comments are similar to other concerns raised previously to the FHWA by two other communities (Fox Point, Wisconsin, and Waverly, Pennsylvania). The FHWA understands the desire of some communities to retain truly historic Street Name signs that are a key component of maintaining the historic character and environment of a particular district.

The FHWA agrees to provide flexibility for communities with historic Street Name signs that do not meet the provisions of the MUTCD, where the community deems the historic Street Name signs to meet the need for effective navigational information to road users. However, the FHWA believes that such flexibility is appropriate only in specific circumstances and lower risk situations. The Code of Federal Regulations, in 36 CFR part 60, governs the listing on the

<sup>3</sup> "Guidelines and Recommendations to Accommodate Older Drivers and Pedestrians," FHWA Report No. FHWA-RD-01-051, May 2001, can be viewed at the following Internet Web site: <http://www.tfhrc.gov/humanfac/01105/cover.htm>. Recommendations 1E(4), 1K(2), and 1K(3).

<sup>4</sup> See NCHRP Report 470: Traffic-Control Devices for Passive Railroad-Highway Grade Crossings, available at [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_470-a.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_470-a.pdf).

National Register of Historic Places (NRHP) of historic districts and structures such as Street Name signs. Specifically, 36 CFR 60.4 provides criteria for evaluating a district to be identified as a historic district and for evaluating a system of structures, such as Street Name signs, to be identified as historic structures.

Therefore, the FHWA adds a new OPTION paragraph at the end of Section 2D.43 stating, "On lower speed roadways, historic street name signs within locally identified historic districts that are consistent with the criteria contained in 36 CFR 60.4 for such structures and districts may be used without complying with the provisions of Paragraphs 3, 4, 6, 9, 12 through 14, and 18 through 20 of this section."

The FHWA believes that the vast majority of what is expected to be a fairly small number of historic Street Name signs meeting the criteria will be on local roads with speed limits of 25 mph or less. If a community decides to use the new OPTION to retain existing historic Street Name signs within a historic district, the FHWA believes it is important for the community to ensure that the historic Street Name signs provide at least some degree of utility as navigational devices for road users. External illumination of the Street Name signs should be considered for this purpose. It is also important to note that the OPTION applies only to historic Street Name signs in historic districts meeting the eligibility criteria of 36 CFR 60.4 and does not apply to other types of traffic signs or devices, nor to locations outside of historic districts.

#### Rulemaking Analyses and Notices

*Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures*

The FHWA has determined that this action constitutes a significant regulatory action within the meaning of Executive Order 12866 and within the meaning of DOT regulatory policies and procedures due to the significant public interest in issues surrounding the MUTCD. This action complies with Executive Orders 12866 and 13563 to improve regulation. In particular, this action is consistent with, and can be seen as directly responsive to, the requirements of Executive Order 13563, and in particular its requirement for retrospective analysis of existing rules (section 6), with an emphasis on streamlining its regulations. This approach is also consistent with

Presidential Memorandum, Administrative Flexibility, which calls for reducing burdens and promoting flexibility for State and local governments.

The changes in the MUTCD will reduce burdens on State and local government in the application of traffic control devices. They will provide additional clarification, guidance, and flexibility to such governments. The uniform application of traffic control devices will greatly improve roadway safety and traffic operations efficiency. The standards, guidance, options, and support are also used to create uniformity and to enhance safety and mobility. The changes in this rulemaking will not require the expenditure of additional funds, but rather will provide State and local governments with the flexibility to allocate scarce financial resources based on local conditions and the useful service life of its traffic control devices. It is anticipated that the economic impact of this rulemaking will be minimal and indeed costs and burdens will be reduced, not increased; therefore, a full regulatory evaluation is not required.

As noted, this action streamlines existing significant regulation to reduce burden and promote the flexibilities of State and local governments under Executive Order 13563. In response to concerns about the potential impact of previously adopted MUTCD compliance dates on State and local governments in the current economic climate, the FHWA published a Request for Comments on traffic control device compliance dates. The FHWA asked for responses to a series of seven questions about compliance dates, their benefits and potential economic impacts, especially economic hardships to State and local governments that might result from specific target compliance dates for upgrading certain non-compliant existing devices. The responses received from that notice were considered in the development of this final rule. The FHWA anticipates that this rulemaking will reduce the impacts of compliance dates on State and local highway agencies and will streamline and simplify information contained in the MUTCD without reducing safety. The FHWA has retained compliance dates where it is of critical safety importance.

#### Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96-354, 5 U.S.C. 601-612), the FHWA has evaluated the effects these changes on small entities. I certify that this action will not have a significant economic impact on a

substantial number of small entities because this rule will reduce burdens and provide clarification and additional flexibility, and will not require an expenditure of funds.

#### Executive Order 13132 (Federalism)

This action has been analyzed in accordance with the principles and criteria contained in Executive Order 13132 dated August 4, 1999. This action will increase flexibility for State and local governments. The FHWA has determined that this action would not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this rulemaking will not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions. The MUTCD is incorporated by reference in 23 CFR part 655, subpart F. These proposed amendments are in keeping with the Secretary of Transportation's authority under 23 U.S.C. 109(d), 315, and 402(a) to promulgate uniform guidelines to promote the safe and efficient use of the highway. The overriding safety benefits of the uniformity prescribed by the MUTCD are shared by all of the State and local governments. In general, this rule will increase flexibility for States and local governments. To the extent that these amendments override any existing State requirements regarding traffic control devices, they do so in the interest of national uniformity.

#### Unfunded Mandates Reform Act of 1995

This rule will not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, 109 Stat. 48, March 22, 1995). On the contrary, the rule provides additional guidance, flexibility, and clarification and would not require an expenditure of funds. This action will not result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$140.8 million or more in any 1 year (2 U.S.C. 1532).

#### Executive Order 13175 (Tribal Consultation)

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that it will not have substantial direct effects on one or more Indian tribes, will not impose substantial direct compliance costs on Indian tribal governments, and will not preempt tribal law. Therefore, a tribal summary impact statement is not required.

*Executive Order 13211 (Energy Effects)*

The FHWA has analyzed this final rule under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has determined that this is not a significant energy action under that order because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects under Executive Order 13211 is not required.

*Executive Order 12372 (Intergovernmental Review)*

Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction. The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program.

*Paperwork Reduction Act*

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, *et seq.*), Federal agencies must obtain approval from the Office of Management and Budget for each collection of information they conduct, sponsor, or require through regulations. The FHWA has determined that this action does not contain a collection of information requirement for the purposes of the PRA.

*Executive Order 12988 (Civil Justice Reform)*

This action meets applicable standards in Sections 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, to eliminate ambiguity, and to reduce burden.

*Executive Order 13045 (Protection of Children)*

The FHWA has analyzed this action under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. This is not an economically significant action and does not concern an environmental risk to health or safety that might disproportionately affect children.

*Executive Order 12630 (Taking of Private Property)*

This action would not affect a taking of private property or otherwise have taking implications under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights.

*National Environmental Policy Act*

The agency has analyzed this action for the purpose of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*) and has determined that it will not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

*Regulation Identification Number*

A regulation identification number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross reference this action with the Unified Agenda.

**List of Subjects in 23 CFR Part 655**

Design standards, Grant programs—Transportation, Highways and roads, Incorporation by reference, Signs, Traffic regulations.

Issued on: May 9, 2012.

**Victor M. Mendez,**  
*Administrator.*

In consideration of the foregoing, the FHWA is amending title 23, Code of Federal Regulations, part 655, subpart F as follows:

**PART 655—TRAFFIC OPERATIONS**

- 1. The authority citation for part 655 continues to read as follows:

**Authority:** 23 U.S.C. 101(a), 104, 109(d), 114(a), 217, 315 and 402(a); 23 CFR 1.32; and 49 CFR 1.48(b).

**Subpart F—[Amended]**

- 2. Revise § 655.601 to read as follows:

**§ 655.601 Purpose.**

To prescribe the policies and procedures of the Federal Highway

Administration (FHWA) to obtain basic uniformity of traffic control devices on all streets and highways in accordance with the following references that are approved by the FHWA for application on Federal-aid projects:

(a) MUTCD.

(b) AASHTO Guide to Metric Conversion.

(c) AASHTO Traffic Engineering Metric Conversion Factors.

(d) The standards required in this section are incorporated by reference into this section in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the FHWA must publish notice of change in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Transportation Operations, 1200 New Jersey Avenue SE., Washington, DC 20590, (202) 366-8043 and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA call (202) 741-6030, or go to <http://www.archives.gov/federal-register/cfr/index.html>.

(1) AASHTO, American Association of State Highway and Transportation Officials, Suite 249, 444 North Capitol Street NW., Washington, DC 20001

(i) AASHTO Guide to Metric Conversion, 1993;

(ii) AASHTO, Traffic Engineering Metric Conversion Factors, 1993—Addendum to the Guide to Metric Conversion, October 1993.

(2) FHWA, Federal Highway Administration, 1200 New Jersey Avenue SE., Washington, DC 20590, telephone (202) 366-1993, also available at <http://mutcd.fhwa.dot.gov>.

(i) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), 2009 Edition, including Revisions No. 1 and No. 2, FHWA, dated May 2012.

(ii) [Reserved]

[FR Doc. 2012-11710 Filed 5-10-12; 4:15 pm]

**BILLING CODE 4910-22-P**



# Traffic Sign Maintenance Policy



## **Purpose and Goal**

The purpose of this policy is to establish uniformity and consistency in the application, installation, and maintenance of traffic signs on city right-of-way.

This policy recognizes that the Minnesota Manual on Uniform Traffic Control Devices (*MN MUTCD*) as the standard for all traffic control devices on all public roads in Minnesota, and, therefore, all traffic control devices on the City of Anoka's roadway system must conform to its standards and specifications as identified in Minnesota Statute Chapter 169.

This policy officially recognizes the rule in the *MN MUTCD* that establishes minimum retro-reflectivity levels for traffic signs and describes how the City of Anoka will achieve compliance.

The goal of this policy is to improve public safety on the City's streets and roads and prioritize the City's limited resources for maintenance and to replace signs. It is in the interest of the City of Anoka and the public to prevent the excessive use of traffic signs on the city roadway system. A conservative use of traffic signs reduces maintenance costs and improves the effectiveness of the remaining signs. Limiting the excessive use of traffic signs achieves the following:

- Fulfills demonstrated needs
- Improves public safety
- Champions a command of attention
- Reduces clutter that impedes the conveyance of a clear and simple meaning
- Fosters respect by road users, and reduces conflicts that may restrict time for a proper response that cumulatively improves traffic safety for all users

## **Introduction**

There are five different types of roadway signs, they include:

- Regulatory Signs (510 stop signs)
- Warning Signs
- Guide Signs
- Special Purpose or Miscellaneous Signs
- Construction Signs

There are approximately 4,000 permanent signs in the City of Anoka.

## **Policy**

All traffic signs on the City of Anoka's roadway system must conform to the *MN MUTCD*. Traffic signs not explicitly required to be installed by the *MN MUTCD* should not be installed on the City of Anoka's roadway system unless otherwise specified in this policy or authorized by the City Council.

## **Policy Criteria**

### **Installation of Signs:**

The City of Anoka will complete a sign inventory of all signs on the roadway system within the right-of-way. Based on the inventory and level of funding available for sign maintenance, the City of Anoka will determine the amount of inventory that can be supported by the current funding structure.

The City of Anoka will maintain the determined amount of traffic signs to ensure safe and efficient operations. Based on the inventory and policy considerations, signs that are not consistent with policy, and signs that are not required or are determined by an engineering study to be unnecessary, may be removed. The following best practices will be implemented to assist in determining the need for all traffic signs:

- Signs that will be required to be installed are listed below. For low volume roads (less than 400 ADT), only the warning signs (minimum maintenance & railroad advance warning) listed below are required:

Regulatory	 	<ul style="list-style-type: none"> <li>■ Speed Limits <u>IE</u> a speed zone (other than a statutory limit) has been established.</li> <li>■ ONE-WAY &amp; DO NOT ENTER where applicable.</li> <li>■ The ALL-WAY STOP plaque at All-Way Stops.</li> <li>■ Prohibition signs where applicable</li> </ul>
Warning	 	<ul style="list-style-type: none"> <li>■ Rail Road Advance Warning and No Train Horn (if quiet zone established)</li> <li>■ Clearance <u>IE</u> clearance is less than 14'-6" (12" above the statutory minimum clearance height)</li> <li>■ Advance Traffic Control <u>IE</u> there is limited sight distance.</li> <li>■ Minimum Maintenance</li> </ul>
Guide	  	<ul style="list-style-type: none"> <li>■ Route Numbers on ALL numbered highways</li> <li>■ Junction Assembly</li> <li>■ Advance Route Turn Assembly</li> </ul>

- No warning (curve, pedestrian crossing, deer signs) or regulatory (speed limit, stop) signs on roads classified as local or residential unless specified in this policy or one of the following items is present:
  - Unusual or unique condition exists in the area
  - Indication of potential hazard
  - School campus
- Stop signs will automatically be installed on the less important road with a main road under the following conditions:
  - Total intersection traffic volumes are greater than 800 vehicles per day
  - Intersect with a state or federal highway
  - Intersect with a county or state aid road
  - Unsignalized intersection in a signalized area
  - Rail road crossing that are not equipped with an active traffic control system
- NO stops signs installed on low volume intersection (fewer than 800 vehicles per day) unless a minimum of two of the following items are met:
  - There is sight obstruction in the clear view triangle
  - Average speed at the 85<sup>th</sup> percentile is more than five (5) miles per hour over the speed limit
  - Five (5) or more crashes that involve the failure to yield right-of-way within a 3-year period or three (3) or more such crashes within a 2-year period.
  - Authorized by Public Services Director/City Engineer, Chief of Police or City Council
- Signs that require engineering judgment will undergo an engineering study, the results of which will be on file documenting reason for installation.
- Speed Limit signs will be installed at the entrance of the road and beyond major intersections when the

speed zone is different than the statutory limit on local or residential road.

- No Parking signs will be installed at the entrance of the road and then spaced at a reasonable distance when there is parking restrictions on the local or residential road.
- No Outlet signs will be installed at the entrance of the road only when the end of the road is not visible from the intersection on local or residential road.
- No Passing Zone signs shall be installed at all locations the roads are striped as *no passing* on a local or residential road.
- Application of curve warning signs will be consistent with *MN MUTCD* requirements along roadways with ADT volumes greater than 1,000 vehicles per day with the following general guidelines for ADT volumes less than 1,000 vehicles per day:

<i>Radius</i>	<i>Horizontal Curve Signing</i>
Greater than 350 feet	No Sign
150 to 350 feet	Combination Curve Warning with Advisory Speed Sign
Less than 150 feet	Combination Curve Warning with Advisory Speed Sign + Chevrons (40 foot spacing)

- The installation of signs at roundabouts must be authorized by the City Engineer or City Council.
- Traffic signs will not be used as a reactive response to traffic crashes.
- Traffic signs will not be installed for traffic calming purposes.
- The application of warning signs will be based on system considerations; locations with similar characteristics will be proactively signed.
- When street name signs and stop signs are in the same quadrant (south-east), the signs will be combined onto one (1) post.

**Removal of Signs:**

This policy is to consider removal of signs which are not required to comply with an applicable federal or state regulation or statute and which have been determined to be unnecessary for safety purposes.

Studies have found that various non-standard signs (e.g. Children at Play) are ineffective. Unauthorized or non-standard signs, defined as any sign not included in the *MN MUTCD*, will not be installed or reinstalled within the city, and may be removed at any time.

Extraordinary maintenance, such as a high amount of vandalism or theft may result in the removal of a sign.

**Maintenance Method**

**Sign Inventory:**

The City of Anoka did a general inspection of all the street signs in 2009 and has updated this computerized inventory in 2011. The City of Anoka will update this inventory by dividing the city into four quadrants. Sign maintenance personal will collect the installation date of the signs and then replace all signs outside of the expected sign life within the quadrant. Once the four quadrants are completed, the City of Anoka will continue to use the expected sign life for the retro-reflectivity requirements. The city expects to complete the sign inventory by 2020.

**Responsibility:**

Anoka will maintain all signs and street identification signs with in the city, with the following exceptions:

- Signs on approaches to county highways originally installed by Anoka County.
- Stop signs at Minnesota Department of Transportation (MnDOT) controlled intersections and highway ramps with state/county highways.

- Specific signs installed by others.
- Signs along highways, within the right-of-way, unless specific agreement with MnDOT or Anoka County stipulates the city for the maintenance.
- Signs on approaches to city roads installed by private business and/or property owners.

### **Retro-reflectivity Evaluation:**

This section applies to all regulatory, warning, and guide signs as set forth in the *MN MUTCD*.

Pursuant to Section 2A.08 of the *MN MUTCD*, the city excludes the following signs from the retroreflectivity maintenance guidelines:

- Parking, Stand, and Stopping signs (R7 & R8 series),
- Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
- Acknowledgement signs, including Memorial signs,
- All signs with blue or brown backgrounds, and
- Bikeway signs that are intended for exclusive use by bicyclists or pedestrians.

Substantial conformance with the *MN MUTCD* retro-reflectivity requirements (see Appendix A) will be achieved using a combination of management methods using the expected sign life and blanket replacement method. Conformance does not require or guarantee that every individual sign in the City of Anoka will meet or exceed the minimum retro-reflectivity levels at every point in time.

The City of Anoka adopts eleven (11) years for the life of signs by using 3M Diamond Grade 3 (DG<sup>3</sup>) reflective sheeting material (see appendix B). Applicable sign life may be revisited to determine appropriate length based on the latest research and sign materials. Signs may be replaced prior to the expiration date due to damage, vandalism, stolen, knock downs, missing or other necessary reasons.

### **Sign Replacement:**

After the initial completion of replacing the signs, removal of unnecessary signs, and proper retro-reflectivity evaluation, the City of Anoka shall for the purpose of complying with the requirements of the *MN MUTCD*, maintain minimum retro-reflectivity standards as budgetary factors allow by replacing signs as they reach the end of the latter of their (a) expected life for the sheeting material used on the sign or (b) expected life as determined by an engineering study.

As each new sign is installed, the mounting should be checked for deterioration. Bent or excessively rusted posts should be replaced. All posts will comply with the *Manual for Assessing Safety Hardware* (AASHTO) for crashworthiness on roadways with speeds greater than 45 miles per hour. The sign location and mounting height will be standardized and be installed according to *MN MUTCD* Sign Location and Mounting tables (see Appendix C).

For signs not recommended for installation by the Public Services or Chief of Police but approved by the City Council, the requesting party shall be responsible for cost and sign maintenance.

### **Public Concerns:**

When sign repair is needed, the city's goal is to respond after receiving notice of the repair with the following priorities:

- Stop sign: As soon as practical, no later than one (1) business day, a temporary story sign will be placed if required.
- Other regulatory signs: No later than three (3) business days.
- Warning signs: Within one (1) scheduled workday.
- Informational/guidance signs: As soon as scheduling/delivery permits.

Sign maintenance staff is not directly on-call after normal working hours. After-hours phone numbers for maintenance managers are available to the dispatchers so staff can be contacted in case of an emergency.

When the visibility of a sign is found to be impaired by other signs, trees, shrubs, etc. so that the effectiveness of the sign is significantly reduced, the City of Anoka will take action to bring the sign back to a functional level as soon as scheduling permits.

**Modification and Deviation from Policy:**

The city reserves the right to modify this Traffic Sign Maintenance Policy at any time if deemed to be in the best interests of the city based on safety, social, political, and economic considerations.

The Public Services Director/City Engineer, or his/her designee, may authorize a deviation from the implementation of this policy in regard to a particular sign when deemed to be in the best interests of the city based on safety, social, political and economic considerations. Such deviation shall be documented including the reason for the deviation and other information supporting the deviation.

Adopted by the City Council of the City of Anoka on this \_\_\_\_ day of \_\_\_\_\_, 2015.

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Mayor

DRAFT

# APPENDIX A

DRAFT



# Maintaining Traffic Sign Retroreflectivity

*\*updated in 2013 to reflect current MUTCD compliance dates*

FHWA-SA-07-020 (Revised 2013)

This document is referenced in **Section 2A.08** of the *Manual on Uniform Traffic Control Devices (MUTCD)*. Please be sure to review the methods discussed on pages two and three, along with the related procedures that make each method reliable and meaningful in its use to maintain signs above the minimum retroreflectivity levels. A full report on these methods can be found at [www.fhwa.dot.gov/retro](http://www.fhwa.dot.gov/retro).

## SCHEDULE

### Method:

Agencies have until **June 14, 2014** to implement and continue to use an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the minimum levels in Table 2A-3 of the 2009 MUTCD.

Although guide signs are included in the minimum retroreflectivity levels table, there is not a specified compliance date for guide signs (including street name signs) to be addressed by an agency's method. Guide signs are to be added to an agency's management or assessment method as resources allow.

### Sign Replacement:

Agencies need to replace any sign they identify as not meeting the established minimum retroreflectivity levels. Agencies' schedules for replacing signs are based on resources and relative priorities rather than specific compliance dates.

Traffic signs provide important information to road users. To be effective, traffic sign visibility must be maintained during daytime and nighttime conditions. In addition to Section 2A.08, the MUTCD addresses sign visibility in several other places, including Sections 1A.03, 1A.04, 1A.05, 2A.06, 2A.07, and 2A.22. These sections address factors such as uniformity, design, placement, operation, and maintenance.

The Standard in Section 2A.08 requires agencies to use a maintenance method that is designed to maintain traffic signs at or above minimum levels of retroreflectivity in Table 2A-3. Including Table 2A-3 in the MUTCD does not imply that an agency must measure the retroreflectivity of every sign. Rather, the MUTCD summarizes five methods that agencies can use to maintain traffic sign retroreflectivity at or above the minimum levels. These methods are listed in Section 2A.08 and are discussed on pages two and three of this document. The Standard promotes safety while providing sufficient flexibility for agencies to choose one or more maintenance methods that best match their specific conditions.

This Standard does NOT imply all signs need to be replaced. The intent is to identify and replace signs that no longer meet the needs of nighttime drivers.

The MUTCD language recognizes that there may be some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time. Reasons for this include vandalism, weather, or damage due to a crash. As long as the agency is using one of the methods (with appropriate procedures) to maintain their signs, they are considered to be in compliance with this Standard.

The methods recommended in the MUTCD are broken into two categories: management methods and assessment methods. Assessment methods involve sending personnel out to examine and assess the retroreflective performance of signs. Some agencies may find this approach to be more labor intensive and turn to management methods as an alternative. Management methods may require less field work (or none at all in some cases) but may also result in replacing some signs that still have useful life left in terms of retroreflectivity. These recommended methods are discussed on pages two and three of this document and are described in detail in a full report entitled "Methods for Maintaining Traffic Sign Retroreflectivity," available at [www.fhwa.dot.gov/retro](http://www.fhwa.dot.gov/retro).

## ASSESSMENT METHODS

**Assessment methods** involve evaluating individual signs within an agency's jurisdiction. There are two basic assessment methods identified in the 2009 MUTCD: visual nighttime inspection and measured sign retroreflectivity.

### 1. VISUAL NIGHTTIME INSPECTION METHOD

In the visual nighttime inspection method, on-the-fly assessments of retroreflectivity are made by an inspector during nighttime conditions. The following are keys to successfully implementing the visual nighttime inspection method:

- A. Develop guidelines and procedures for inspectors to use in conducting the nighttime inspections and train inspectors in the use of these procedures.
- B. Conduct inspections at normal speed from the travel lane(s).
- C. Conduct inspections using low-beam headlights while minimizing interior vehicle lighting.
- D. Evaluate signs at typical viewing distances so that adequate time is available for an appropriate driving response.

One or more of the following procedures should be used to properly implement this method:

#### **Calibration Signs Procedure (for Visual Nighttime Inspection Method)**

Calibration signs have known retroreflectivity levels at or above minimum levels. These calibration signs are set up so the inspector views the calibration signs in a manner similar to nighttime field inspections. A trained inspector views calibration signs prior to conducting the nighttime inspection described in 1 A-D above. The inspector uses the visual appearance of the calibration signs to establish the evaluation threshold for that night's inspection.

During the nighttime drive-through inspection of in-service signs, if the inspector believes a sign appears to be less bright than the calibration signs viewed earlier, the in-service sign should be replaced. The following factors provide additional information on the use of this procedure:

- Calibration signs are needed for each color of sign in Table 2A-3 of the 2009 MUTCD.
- Calibration signs are viewed at typical viewing distances using the inspection vehicle.
- Calibration signs need to be properly stored between inspections so that their retroreflectivity does not deteriorate over time.

#### **Comparison Panels Procedure (for Visual Nighttime Inspection Method)**

Comparison panels are fabricated with retroreflectivity levels at or above the minimum levels. The trained inspector makes an initial nighttime visual inspection described in 1 A-D above to identify signs that are obviously above or below the minimum retroreflectivity values as well as those the inspector considers to be marginal.

Those signs designated as obviously below the minimum retroreflectivity values are scheduled for replacement. For signs considered marginal, a supplementary nighttime inspection is conducted by attaching a comparison panel to the in-service sign. With a flashlight, the inspector views the in-service sign along with the comparison panel to determine whether the in-service sign appears brighter or less bright than the comparison panel. If the in-service sign appears less bright than the comparison panel, the in-service sign should be replaced.

#### **Consistent Parameters Procedure (for Visual Nighttime Inspection Method)**

For this procedure, nighttime inspections described in 1 A-D above are conducted by a trained inspector under similar factors that were used in the research to develop the minimum retroreflectivity levels. These traits include:

- Using an inspector who is at least 60 years old.
- Using a sport utility vehicle or pick-up truck from which to make the observations.
- Using a model year 2000 or newer vehicle.

The trained inspector makes a judgment call as to whether an in-service sign meets their nighttime driving needs. Those signs judged not to meet the visual driving needs should be replaced. Note, the three factors listed here are specific to this procedure and are not required for visual nighttime inspections using the calibration signs procedure or the comparison panels procedure.

### 2. MEASURED SIGN RETROREFLECTIVITY METHOD

In this method the retroreflectivity of a sign is measured with a handheld or mobile retroreflectometer and directly compared to the minimum level appropriate for that sign. ASTM E1709, Standard Test Method for Measurement of Retroreflective Signs Using a Portable Retroreflectometer, provides the standard method for measuring sign retroreflectivity with handheld instruments. If the measured sign retroreflectivity value is less than the appropriate level in Table 2A-3, the sign should be replaced.

## MANAGEMENT METHODS

**Management methods** provide an agency with the ability to maintain sign retroreflectivity without having to physically inspect each individual sign. While it is not required by the MUTCD, some agencies have chosen to determine the sheeting type and age or retroreflectivity levels of existing signs before using a management method. This is done by those agencies to prevent signs currently near or below minimum levels from being left in place several additional years. The 2009 MUTCD identifies three management methods:

### 1. EXPECTED SIGN LIFE METHOD

In this method, the agency monitors the age of individual signs and replaces them before they are expected to degrade below the minimum levels in Table 2A-3 of the 2009 MUTCD. The retroreflectivity life of a sign may vary by such factors as type of sheeting, geographic location, color, and direction the sign faces. This method depends on knowing the age and type of sheeting used for the signs. Agencies may choose to consider weathering deck results, measurements of field signs, sign sheeting warranties, or other criteria as the basis for the expected sign life. A common approach for identifying the age of individual signs uses a label on the sign to mark the year of fabrication or installation. Agencies can also use sign management systems to track the age of individual signs.

### 2. BLANKET REPLACEMENT METHOD

In this method, an agency manages signs in groups rather than as individual signs. An agency may choose to group signs by geographic area, roadway corridor, type of sheeting, or sign category (e.g., warning signs). The sign replacement interval is based on the expected sign life for the sign sheeting in the group with the shortest expected life. This method typically obligates an agency to replace all of the designated signs within a group, even if a sign was recently replaced due to issues such as vandalism or damage.

### 3. CONTROL SIGNS METHOD

In this method, agencies monitor the performance of a control sample of signs that represent a larger group of signs. Agencies track the retroreflectivity of the control signs to determine when replacement of the larger group is necessary based on the performance of the control signs.

- Agencies should develop a sampling plan to determine the appropriate number and type of control signs needed to represent the larger group of signs. Samples should represent the entire group, including such factors as sign sheeting type and color.
- Control signs may be actual signs in the field or signs in a maintenance yard (for convenience).
- Agencies should monitor the retroreflectivity of the control signs using an assessment method.

## OTHER METHODS

**Other assessment or management methods** that are developed based on engineering studies can be used as long as they are designed to maintain minimum levels in Table 2A-3 of the 2009 MUTCD, as stated in the MUTCD Standard statement in Section 2A.08.

# Excerpt from Part 2 of the 2009 MUTCD

## Section 2A.08 Maintaining Minimum Retroreflectivity

Support:

01 Retroreflectivity is one of several factors associated with maintaining nighttime sign visibility (see Section 2A.22).

**Standard:**

02 **Public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3.**

Support:

03 Compliance with the Standard in Paragraph 2 is achieved by having a method in place and using the method to maintain the minimum levels established in Table 2A-3. Provided that an assessment or management method is being used, an agency or official having jurisdiction would be in compliance with the Standard in Paragraph 2 even if there are some individual signs that do not meet the minimum retroreflectivity levels at a particular point in time.

**Guidance:**

04 *Except for those signs specifically identified in Paragraph 6, one or more of the following assessment or management methods should be used to maintain sign retroreflectivity:*

- A. *Visual Nighttime Inspection*—The retroreflectivity of an existing sign is assessed by a trained sign inspector conducting a visual inspection from a moving vehicle during nighttime conditions. Signs that are visually identified by the inspector to have retroreflectivity below the minimum levels should be replaced.
- B. *Measured Sign Retroreflectivity*—Sign retroreflectivity is measured using a retroreflectometer. Signs with retroreflectivity below the minimum levels should be replaced.
- C. *Expected Sign Life*—When signs are installed, the installation date is labeled or recorded so that the age of a sign is known. The age of the sign is compared to the expected sign life. The expected sign life is based on the experience of sign retroreflectivity degradation in a geographic area compared to the minimum levels. Signs older than the expected life should be replaced.

D. *Blanket Replacement*—All signs in an area/corridor, or of a given type, should be replaced at specified intervals. This eliminates the need to assess retroreflectivity or track the life of individual signs. The replacement interval is based on the expected sign life, compared to the minimum levels, for the shortest-life material used on the affected signs.

E. *Control Signs*—Replacement of signs in the field is based on the performance of a sample of control signs. The control signs might be a small sample located in a maintenance yard or a sample of signs in the field. The control signs are monitored to determine the end of retroreflective life for the associated signs. All field signs represented by the control sample should be replaced before the retroreflectivity levels of the control sample reach the minimum levels.

F. *Other Methods*—Other methods developed based on engineering studies can be used.

Support:

05 Additional information about these methods is contained in the 2007 Edition of FHWA's "Maintaining Traffic Sign Retroreflectivity" (see Section 1A.11).

Option:

06 Highway agencies may exclude the following signs from the retroreflectivity maintenance guidelines described in this Section:

- A. Parking, Standing, and Stopping signs (R7 and R8 series)
- B. Walking/Hitchhiking/Crossing signs (R9 series, R10-1 through R10-4b)
- C. Acknowledgment signs
- D. All signs with blue or brown backgrounds
- E. Bikeway signs that are intended for exclusive use by bicyclists or pedestrians

**Note:** The referenced document is actually this four-page brochure you are reading.

**Table 2A-3.  
Minimum Maintained  
Retroreflectivity  
Levels<sup>1</sup>**

Sign Color	Sheeting Type (ASTM D4956-04)				Additional Criteria
	Beaded Sheeting			Prismatic Sheeting	
	I	II	III	III, IV, VI, VII, VIII, IX, X	
White on Green	W*; G ≥ 7	W*; G ≥ 15	W*; G ≥ 25	W ≥ 250; G ≥ 25	Overhead
	W*; G ≥ 7	W ≥ 120; G ≥ 15			Post-mounted
Black on Yellow or Black on Orange	Y*; O*	Y ≥ 50; O ≥ 50			2
	Y*; O*	Y ≥ 75; O ≥ 75			3
White on Red	W ≥ 35; R ≥ 7				4
Black on White	W ≥ 50				—

<sup>1</sup> The minimum maintained retroreflectivity levels shown in this table are in units of cd/lx/m<sup>2</sup> measured at an observation angle of 0.2° and an entrance angle of -4.0°.  
<sup>2</sup> For text and fine symbol signs measuring at least 48 inches and for all sizes of bold symbol signs  
<sup>3</sup> For text and fine symbol signs measuring less than 48 inches  
<sup>4</sup> Minimum sign contrast ratio ≥ 3:1 (white retroreflectivity ÷ red retroreflectivity)  
 \* This sheeting type shall not be used for this color for this application.

2009 MUTCD Section Number(s)	2009 MUTCD Section Title	Specific Provision	Compliance Date
2A.08	Maintaining Minimum Retroreflectivity	Implementation and continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels (see Paragraph 2)	<b>June 14, 2014</b> (date established in Revision 2 to 2009 MUTCD)*

\* Types of signs other than regulatory or warning are to be added to an agency's management or assessment method as they become available.

# APPENDIX B

DRAFT



# Diamond Grade™

# DG<sup>3</sup> Reflective Sheeting Series 4000

Product Bulletin 4000

January 2012

## Description

3M™ Diamond Grade™ DG<sup>3</sup> Reflective Sheeting Series 4000 is a super-high efficiency, full cube retroreflective sheeting designed for the production of traffic control signs and delineators that are exposed vertically in service. DG<sup>3</sup> sheeting is designed to have the highest retroreflective characteristics at medium and short road distances as determined by the R<sub>A</sub> values at 0.5° and 1.0° observation angles in Table B. Performance at these observation angles represents the most common nighttime viewing geometries encountered by the driving public. During the daytime, Diamond Grade DG<sup>3</sup> fluorescent reflective sheeting provides higher visibility than ordinary (non-fluorescent) colored sheetings.

Applied to properly prepared sign substrates Diamond Grade DG<sup>3</sup> reflective sheeting provides long-term retroreflectivity and durability. Series 4000 sheeting is available in the following colors.

Color	Product Code
White	4090
Yellow	4091
Red	4092
Blue	4095
Green	4097
Brown	4099
Fluorescent Yellow - FY	4081
Fluorescent Yellow Green- FYG	4083
Fluorescent Orange - FO	4084

## Color

## Product Code

White - thermal transfer printable	4090TT
Yellow - thermal transfer printable	4091TT
Fluorescent Yellow - TT printable	4081TT
Fluorescent Yellow - Green - TT printable	4083TT

## Photometrics

### Daytime Color (x, y, Y)

The chromaticity coordinates and total luminance factor of the retroreflective sheeting conform to Table A.

### Color Test – Fluorescent Sheetings

Conformance to standard chromaticity (x, y) and luminance factor (Y %) requirements shall be determined by instrumental method in accordance with ASTM E 991 on sheeting applied to smooth aluminum test panels cut from Alloy 6061-T6 or 5052-H38. The values shall be determined on a HunterLab ColorFlex 45/0 spectrophotometer. Computations shall be done for CIE Illuminant D65 and the 2° standard observer.<sup>2</sup>

### Color Test – Ordinary Colored Sheeting

Conformance to standard chromaticity (x, y) and luminance factor (Y %) requirements shall be determined by instrumental method in accordance with ASTM E 1164 on sheeting applied to smooth aluminum test panels cut from Alloy 6061-T6 or 5052-H38. The values shall be determined on a HunterLab ColorFlex 45/0 spectrophotometer. Computations shall be done for CIE Illuminant D65 and the 2° standard observer.<sup>2</sup>

Table A - Daytime Color Specification Limits<sup>1</sup>

Color	x		y		x		y		Daytime Luminance Limit (Y%)	
	x	y	x	y	x	y	x	y	Min.	Max.
White	0.303	0.300	0.368	0.366	0.340	0.393	0.274	0.329	27	
Yellow	0.498	0.412	0.557	0.442	0.479	0.520	0.438	0.472	15	45
Red	0.648	0.351	0.735	0.265	0.629	0.281	0.565	0.346	2.5	15
Blue	0.140	0.035	0.244	0.210	0.190	0.255	0.065	0.216	1	10
Green	0.026	0.399	0.166	0.364	0.286	0.446	0.207	0.771	3	12
Brown	0.430	0.340	0.610	0.390	0.550	0.450	0.430	0.390	1	9
FY	0.479	0.520	0.446	0.483	0.512	0.421	0.557	0.442	40	
FYG	0.387	0.610	0.369	0.546	0.428	0.496	0.460	0.540	60	
FO	0.583	0.416	0.535	0.400	0.595	0.351	0.645	0.355	20	

<sup>1</sup>The four pairs of chromaticity coordinates determine the acceptable color in terms of the CIE 1931 Colorimetric System. 53 of 64

<sup>2</sup>The instrumentally determined color values of retroreflective sheeting can vary significantly depending on the make and model of colorimetric spectrophotometer as well as the color and retroreflective optics of the sheeting (David M. Burns and Timothy J. Donahue, Measurement Issues in the Color Specification of Fluorescent Retroreflective Materials for High Visibility Traffic Signing and Personal Safety Applications, Proceedings of SPIE: Fourth Oxford Conference on Spectroscopy, 4826, pp. 39-49, 2003). For the purposes of this document, the HunterLab ColorFlex 45/0 spectrophotometer shall be the referee instrument.

### Coefficients of Retroreflection (R<sub>A</sub>)

The values in Table B are minimum coefficients of retroreflection expressed in candelas per lux per square meter (cd/lux/m<sup>2</sup>).

### Test for Coefficients of Retroreflection

Conformance to coefficient of retroreflection requirements shall be determined by instrumental method in accordance with ASTM E-810 “Test Method for Coefficient of Retroreflection of Retroreflective Sheeting”, and per E-810 the values of 0° and 90° rotation are averaged to determine the R<sub>A</sub> in Table B.

**Table B - Minimum Coefficient of Retroreflection R<sub>A</sub> for new sheeting (cd/lux/m<sup>2</sup>)**

	Observation Angle <sup>4</sup>		
	0.2°	0.5°	1.0°
<b>-4° Entrance Angle<sup>3</sup></b>			
White	580	420	120
Yellow	435	315	90
Red	87	63	18
Green	58	42	12
Blue	26	19	5
Brown	17	13	4
Fluorescent Yellow	350	250	72
Fluorescent Yellow Green	460	340	96
Fluorescent Orange	175	125	36
<b>30° Entrance Angle<sup>3</sup></b>			
	0.2°	0.5°	1.0°
White	220	150	45
Yellow	165	110	34
Red	33	23	7
Green	22	15	5
Blue	10	7	2
Brown	7	5	1
Fluorescent Yellow	130	90	27
Fluorescent Yellow Green	180	120	36
Fluorescent Orange	66	45	14

<sup>3</sup>Entrance Angle – The angle from the illumination axis to the retroreflector axis. The retroreflector axis is an axis perpendicular to the retroreflective surface.

<sup>4</sup> Observation Angle – The angle between the illumination axis and the observation axis.

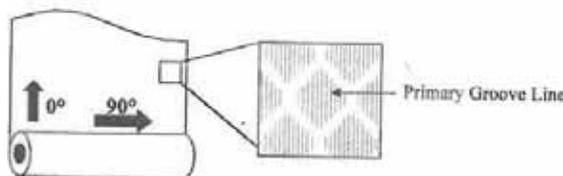
## Printed Colors and Overlay Films

For screenprinted or thermally transfer printed transparent color areas on white sheeting when processed according to 3M recommendations, the coefficients of retroreflection shall not be less than 70% of the value for the corresponding color in Table B. For white sheeting covered with 3M™ ElectroCut™ Film Series 1170 when processed according to 3M recommendations, the coefficients of retroreflection shall not be less than 100% of the value for the corresponding color in Table B. The color chromaticity and luminance shall conform to Table A on page 1.

## Entrance Angularity Performance in Regard to Orientation

Diamond Grade DG<sup>3</sup> Reflective Sheeting is designed to be an effective wide angle reflective sheeting regardless of its orientation on the substrate or ultimate orientation of the sign after installation. However, because the efficiency of light return from cube corner reflectors is not equal at all application orientations, especially with increasing entrance angles, it is possible to get the widest entrance angle light return when the sheeting is oriented in a particular manner. When high entrance angle (>50°) performance is required for given signs (e.g. Keep Right Symbols), it can be obtained easily by specifying the application orientation of the completed signs. In these situations the completed sign should have the sheeting positioned at the 0° orientation (downweb direction perpendicular to the road).

When the “primary groove line” (or, flat side of the diamond shape) is vertical in the completed sign, sheeting is said to be at a 0° orientation. When the “primary groove line” (or, flat side of the diamond shape) is horizontal in the completed sign, the sheeting is said to be at a 90° orientation. (Figure 1)



**Figure 1**

Unless the sign location and/or position calls for extra-wide entrance angularity performance, signs and applied copy (letters, arrows, borders and shields) can be fabricated and installed using the application orientation that most efficiently utilizes the reflective sheeting.

Note: For multi-panel signs it is recommended that all background panels be sheeted such that the sheeting direction is the same for all panels.

## Fabrication Lines

The manufacture of prismatic sheeting results in lines being present in the product. In Diamond Grade DG<sup>3</sup> sheeting these lines are slightly thicker than the seal pattern legs. Fabrication lines are noticeable in shop light but are not observable on the road either in daylight or at night under typical use conditions (Figure 2).

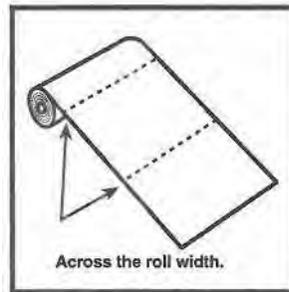


Figure 2 - Fabrication Lines

## Adhesive

Diamond Grade DG<sup>3</sup> sheeting has a pressure-sensitive adhesive that is recommended for application at temperatures of 65°F (18°C) or higher.

## Adhesive and Film Properties

### Standard Test Panels

Unless otherwise specified herein, sheeting shall be applied to test panels and conditioned in accordance with ASTM D4956 and test methods and conditions shall conform to ASTM D4956.

### Properties

The following properties shall conform to the requirements in ASTM D4956.

1. Adhesion
2. Outdoor weathering
  - retained coefficient of retroreflection
  - colorfastness
3. Shrinkage
4. Flexibility
5. Liner removal
6. Impact resistance
7. Night time color

In addition, DG<sup>3</sup> sheeting will conform to the following properties.

### 1. Gloss

Test Method – Test in accordance with ASTM D523 using a 60° glossmeter.

Requirement – Rating not less than 50.

### 2. Optical Stability

Test Method – Apply a 3-inch x 6-inch sample to a test panel. Measure  $R_A$  then place it in an oven at 71° C ± 3° C (160°F ± 5°F) for 24 hours followed by conditioning at standard conditions for two hours.

Remeasure  $R_A$ .

Requirement – The sheeting shall retain a minimum of 85% and a maximum of 115% of the original coefficient of retroreflection.

## Sign Fabrication Methods

### Application

Diamond Grade DG<sup>3</sup> sheeting incorporates a pressure sensitive adhesive and should be applied to the sign substrate at temperature of 65°F/18°C or higher by any of the following methods:

Mechanical squeeze roll applicator – refer to 3M Information Folder (IF) 1.4. Application to extrusions that are edge wrapped requires sufficient softening of the sheeting. This can be accomplished by directing additional heat to the “next to last” edge roller. This practice will increase productivity and minimize cracking.

Hand squeeze roll applicator – refer to 3M IF 1.6.

Application of Diamond Grade DG<sup>3</sup> sheeting for complete signs or backgrounds must be done with a roll laminator, either mechanical or hand driven.

### Hand Application

Hand application is recommended for legend and copy only. Refer to 3M Information Folder 1.5 for more details.

Hand applications will show some visual irregularities, which are objectionable to aesthetically critical customers. These are more noticeable on darker colors. To obtain a close-up uniform appearance, a roll laminator must be used.

All direct applied copy and border MUST be cut at all metal joints and squeegeed at the joints.

### Splices

Series 4000 sheeting must be butt spliced when more than one piece of sheeting is used on one piece of substrate. The sheeting pieces should not touch each other. This is to prevent buckling as the sheeting expands in extreme temperature and humidity exposure.

### Double Faced Signs

The sheeting on the bottom side of a double faced sign can be damaged if rolled through a squeeze roll applicator with an unprotected steel bottom roller. The use of a semi-soft flat sheet between the steel roller and the applied sign face will provide protection from damage. A material such as a rubber mat, tag board or cardboard is recommended.

## Substrates

For traffic sign use, substrates found to be most reliable and durable are properly prepared aluminum sheets and extrusions. **Users are urged to carefully evaluate all other substrates for adhesion and sign durability.** Other substrates that may be satisfactory for proper application of sheeting will have the following characteristics:

- Clean
- Smooth
- Flat
- Rigid
- Dimensionally stable
- Weather resistant
- Non-porous
- High surface energy (passes water break test)

Refer to Information Folder 1.7 for surface preparation recommendations. Substrates with low surface energy may require additional preparation such as flame treatment, mechanical abrasion or use of adhesion promoters prior to sheeting application. Guide sign extrusions may be edge wrapped. Flat panels or unwrapped extrusions are to be carefully trimmed so that sheeting from adjacent panels does not touch on assembled signs.

Diamond Grade DG<sup>3</sup> sheeting is designed primarily for applications to flat substrates. Any use that requires a radius of curvature of less than five inches should also be supported by rivets or bolts. Plastic substrates are not recommended where cold shock performance is required. **Sign failures caused by the substrate or improper surface preparation are not the responsibility of 3M.**

## Imaging

Diamond Grade DG<sup>3</sup> sheeting may be processed into traffic signs by any of the imaging methods described below. 3M assumes no responsibility for failure of sign face legends or backgrounds that have been processed with non-3M process colors or matched component imaging materials other than those listed below.

### Screen Processing

Diamond Grade DG<sup>3</sup> sheeting may be screen processed into traffic signs before or after mounting on a sign substrate, using 3M Process Colors Series 880I or Series 880N. Series 880I or 880N process colors can be screened at 60-100°F (16-38°C) at relative humidity of 20-50%. A PE 157 screen mesh with a fill pass is recommended. Refer to Information Folder 1.8 for details. No clear coating is required or recommended. Use of other process colors series is not recommended.

**Care should be taken to avoid flexing DG<sup>3</sup> sheeting before and especially after screening to eliminate the possibility of cracking from improper handling techniques.**

### Thermal Transfer Printing

Diamond Grade DG<sup>3</sup> TT sheeting may be imaged with 3M™ Thermal Transfer Ribbon Series TTR2300 in conjunction with the Matan SprinG3 or Matan Spot4 thermal transfer printers. For regulated traffic signs, Series TTR2300 Spot Traffic Colors are to be applied using these printers and must be covered with 3M™ ElectroCut™ Film 1170. Refer to Product Bulletin TTR2300 for more information.

### 3M™ ElectroCut™ Film

3M™ ElectroCut™ Film Series 1170 may be used to provide transparent colored background copy for traffic control signs on Diamond Grade DG<sup>3</sup> sheeting. Refer to Product Bulletin 1170 for fabrication procedures.

### Applied Cut-Out Copy

Diamond Grade DG<sup>3</sup> cut letters may be applied to a DG<sup>3</sup> sheeting background to create a sign legend. Such cut-out copy may be directly applied to the background sheeting, or may be applied in a demountable form. Direct applied copy must be cut at all panel seams and carefully trimmed back so that sheeting from adjacent panels does not touch on assembled signs. Refer to Information Folder 1.10 for more information.

Note: It is recommended to fabricate all but the largest signs using 1170 electronic cuttable overlay film instead of direct applied copy.

## Cutting

Diamond Grade DG<sup>3</sup> sheeting may be cut into letters and shapes of at least three inches in height and stroke widths of at least one half inch. Smaller sizes are not recommended. Sealing cut edges of DG<sup>3</sup> sheeting is not required.

### Plotter Cutting

Programmable knife cut (electronic cutting)

1. Flat bed plotters can either die cut or kiss cut and offer the most consistent and reliable performance.
2. Friction Fed plotter. Kiss cut only. Success has been achieved using plotters that have 600 grams of down force and a 60° cutting blade. Additional drive wheels may need to be added to improve tracking. An alternative procedure is to cut sheeting from the liner side. Blade force and knife depth must be set to score but not cut through the topfilm. Break apart individual copy or apply premask to retain spacing.

## Other Cutting Methods

Diamond Grade DG<sup>3</sup> sheeting may be hand cut or die cut one sheet at a time, and band sawed or guillotined in stacks. Cutting equipment such as guillotines and metal shears, which have pressure plates on the sheeting when cutting, may damage the optics. Padding the pressure plate and easing it down onto the sheets being cut will significantly reduce damage. Maximum stack height for cutting Series 4000 sheeting is 1½ inch or 50 sheets. Details on cutting can be found in Information Folder 1.10.

## Storage and Packaging

3M Diamond Grade DG<sup>3</sup> Sheeting should be stored in a cool, dry area, preferably at 65-75°F (18-24°C) and 30-50% relative humidity and should be applied within one year of purchase. Rolls should be stored horizontally in the shipping carton. Partially used rolls should be returned to the shipping carton or suspended horizontally from a rod or pipe through the core. Unprocessed sheets should be stored flat. Finished signs and applied blanks should be stored on edge.

Screen processed signs must be protected with SCW 568 slipsheet paper. Place the glossy side of the slipsheet against the sign face and pad the face with closed cell packaging foam. Double faced signs must have the glossy side of the slipsheet against each face of the sign.

Unmounted screened faces must be stored flat and interleaved with SCW 568 slipsheet, glossy side against the sign face.

Avoid banding, crating, or stacking signs. Package for shipment in accordance with commercially accepted standards to prevent movement and chafing. Store sign packages indoors on edges.

Panels or finished signs must remain dry during shipment and storage. If packaged signs become wet, unpack immediately and allow signs to dry. Refer to Information Folder 1.11 for instructions on packing for storage and shipment.

## Installation

Nylon washers are required when twist style fasteners are used to mount the sign.

## Cleaning

Signs that require cleaning should be flushed with water, then washed with a detergent solution and soft bristle brush or sponge. Avoid pressure that may damage the sign face. Flush with water following washing. Do not use solvents to clean signs. Refer to 3M Information Folder 1.10.

## Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheet and/or product label of any materials prior to handling or use.

## General Performance Considerations

The durability of Diamond Grade DG<sup>3</sup> sheeting and finished signs using 3M Matched Component materials will depend upon substrate selection and preparation, compliance with recommended application procedures, geographic area, exposure conditions, and maintenance. Maximum durability of Diamond Grade DG<sup>3</sup> sheeting can be expected in applications subject to vertical exposure on stationary objects when processed and applied to properly prepared aluminum according to 3M recommendations provided in Information Folder 1.7. The user must determine the suitability of any nonmetallic sign backing for its intended use. **Sign failures caused by the substrate or improper surface preparation are not the responsibility of 3M.** Applications to unprimed, excessively rough or non-weather resistant surfaces or exposure to severe or unusual conditions can shorten the performance of such applications. Signs in mountainous areas that are covered by snow for prolonged periods may also have reduced durability. 3M process colors and ElectroCut™ Film, when used according to 3M recommendations, are generally expected to provide performance comparable to colored reflective sheeting. Custom colors, certain lighter colors, heavily toned colors or blends containing yellow or gold may have reduced durability. Atmospheric conditions in certain geographic areas may result in reduced durability.

Periodic sign inspection and regular sign replacement are strongly recommended in order for sign owners to establish their own effective service life expectation, beyond the warranty period.

## 3M Basic Product Warranty and Limited Remedy

3M™ Diamond Grade™ DG<sup>3</sup> Reflective Sheeting Series 4000 (“Product”) is warranted to be free of defects in materials and manufacture at the time of shipment and to meet the specifications stated in this Product Bulletin. If DG<sup>3</sup> Sheeting is proven not to have met the Basic Warranty on its shipment date, then a buyer’s exclusive remedy, and 3M’s sole obligation, at 3M’s option, will be refund or replacement of the sheeting.

## General Warranty Terms:

1. 3M makes the Additional Warranty (as defined below) as to any traffic control and guidance sign in the United States and Canada (“Sign”) made with 3M™ Diamond Grade™ DG<sup>3</sup> Reflective Sheeting Series 4000 (“Product”) and the Matched Component materials listed in Table E. Any Additional Warranty is contingent on all components involved in that Additional Warranty being stored, applied, installed, and used only as 3M recommends in its Product Bulletins and Other Product Information.

2. The Basic Warranty and any applicable Additional Warranty are collectively referred to as the “3M Warranty.” EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, RIGHTS OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND THOSE ARISING FROM A COURSE OF DEALING, CUSTOM OR USAGE OF TRADE. A BUYER IS RESPONSIBLE FOR DETERMINING IF A PRODUCT IS SUITABLE FOR ITS PARTICULAR PURPOSE AND APPLICATION METHODS.

3. A Sign’s failure to meet the 3M Warranty must be solely the result of the Product or the matched component materials’ design or manufacturing defects. 3M has no obligation under the 3M Warranty if a sign failure is caused by:

improper fabrication, handling, maintenance or installation; non-vertical applications where the Sign face is more than +/- 10% from vertical; use of any material or product not made by 3M or not included in Table E; use of application equipment not recommended by 3M; failure of sign substrate; loss of adhesion due to incompatible or improperly prepared substrate; exposure to chemicals, abrasion and other mechanical damage; snow burial or any other sign burial; collisions, vandalism or malicious mischief.

4. 3M reserves the right to determine the method of replacement, and any replacement Product will have the remainder of the original Product’s unexpired 3M Warranty. Claims made under this warranty will be honored only if

–The Sign was dated upon completion of fabrication (“Fabrication Date”) using a permanent method (sticker, permanent marker or crayon, metal stamp, etc.)

–3M is notified of a 3M Warranty claim during any applicable Warranty Period and the owner or fabricator provides the information reasonably required by 3M to verify if a 3M Warranty is applicable.

## Additional Warranty & Limited Remedy for Ordinary colored Product

1. The Additional Warranty for a Sign made with ordinary colored Product is that the Sign will: (a) **remain effective for its intended use when viewed from a moving vehicle under normal day and night driving conditions by a driver with normal vision**, and (b) after cleaning, will meet the **minimum values for coefficient of retroreflection stated in Table C** for Table C’s applicable Warranty Period measured from the Sign’s Fabrication Date.

**Table C – Minimum Percent Retained of Table B Initial R<sub>A</sub> for applicable Warranty Period for Ordinary Colors (white, yellow, red, green, blue and brown)**

Warranty Period	Minimum Percentage R <sub>A</sub> Retained
1-7 Years	80%
8-12 Years	70%

2. If any Sign made with Ordinary Product is proven not to have met the Additional Warranty, then a buyer’s **exclusive remedy**, and 3M’s sole obligation, at 3M’s option:

(a) if this occurs within seven years after the Fabrication Date, then 3M will, at its expense, restore the Sign’s surface to its **original effectiveness**; or

(b) if this occurs during the remainder of the Additional Warranty Period, then 3M will furnish only the necessary 3M sheeting Product and matched component materials quantity to restore the Sign’s surface to its original effectiveness.

## Additional Warranty & Limited Remedy for Fluorescent Product

1. The Additional Warranty for a Sign made with Fluorescent Product is that the Sign will: (a) **remain effective for its intended use when viewed from a moving vehicle under normal day and night driving conditions by a driver with normal vision**; (b) after cleaning, will **retain 70% of the minimum values for coefficient of retroreflection stated in Table B** for the applicable Warranty Period stated in Table D, measured from Fabrication Date; and (c) after cleaning, the fluorescent Product will **maintain daytime luminance equal to or greater than the minimums specified in Table A**.

**Table D – Warranty Period for Fluorescent Colors.**

Color	Warranty Period
Fluorescent Yellow	10/7 Years <sup>5</sup>
Fluorescent Yellow Green	10/7 Years <sup>5</sup>
Fluorescent Orange	3 Years

<sup>5</sup> Due to climatic conditions, Signs in Alabama, Arizona, Florida, Georgia, Hawaii, Louisiana, Mississippi, New Mexico, South Carolina and Texas have the 7-year Additional Warranty Period.

2. If a Sign made with Fluorescent Product is proven not to have met the Additional Warranty, then a buyer’s exclusive remedy, and 3M’s sole obligation, at 3M’s option:

- (a) for those Fluorescent Products with a 10-year Additional Warranty Period, 3M will, at its expense: (a) restore the Sign’s surface to its **original effectiveness** if this occurs within seven years after the Fabrication Date; or (b) furnish only the necessary 3M Fluorescent Product and matched component materials quantity to restore the Sign’s surface to its original effectiveness if this occurs during the remainder of the Warranty Period.
- (b) for those Fluorescent Products with a 7-year Additional Warranty Period, 3M will, at its expense: (a) restore the Sign’s surface to its **original effectiveness** if this occurs within five years after the Fabrication Date; or (b) furnish only the necessary 3M Fluorescent Product and matched component materials quantity to restore the Sign’s surface to its original effectiveness if this occurs during the remainder of the Warranty Period.
- (c) for those Fluorescent Products with a 3-year Additional Warranty Period, 3M will furnish only the necessary Fluorescent Product and matched component materials quantity to restore the Sign’s surface to its original effectiveness.

**Table E. Matched Component Materials.**

Matched Components	
Process Colors	Series 880I
Process Colors	Series 880N
Thermal Transfer Ribbons – Spot Traffic Colors only*	Series TTR2300
ElectroCut™ Film	Series 1170
Premium Protective Overlay Film	Series 1160
Slipsheet	SCW 568
Prespacing Tape	SCPS-2
Premasking Tape	SCPM-3
Transfer Tape	TPM-5

\* Must be covered with 3M™ ElectroCut™ Film 1170

Refer to 3M Information Folders and Product Bulletins for detailed information about recommended application procedures and equipment.

**Other Product Information**

**Always confirm that you have the most current version of the applicable Product Bulletin, Information Folder or Other Product Information.**

- IF 1.4 Instructions for Interstate Squeeze Roll Applicator
- IF 1.5 Hand Application Instructions
- IF 1.6 Hand Squeeze Roll Applicator
- IF 1.7 Sign Base Surface Preparation
- IF 1.8 Process Color Application Instructions
- IF 1.10 Cutting, Premasking, and Prespacing
- IF 1.11 Sign Maintenance Management
- PB 880I Process Color 880I
- PB 880N Process Color 880N
- PB 1170 ElectroCut™ Film
- PB TTR2300 Thermal Transfer Ribbons Series TTR2300
- PB 1160 Protective Overlay Film 1160

## Limitation of Liability

3M WILL NOT UNDER ANY CIRCUMSTANCES BE LIABLE TO A BUYER FOR DIRECT (other than the applicable Limited Remedy stated above), SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, LOSS OF PROFITS) IN ANY WAY RELATED TO A PRODUCT OR THIS PRODUCT BULLETIN, REGARDLESS OF THE LEGAL OR EQUITABLE THEORY ON WHICH SUCH DAMAGES ARE SOUGHT.

ASTM Test Methods are available from ASTM International, West Conshohoken, PA.

3M assumes no responsibility for any injury, loss or damage arising out of the use of a product that is not of our manufacture. Where reference is made in literature to a commercially available product, made by another manufacturer, it shall be the user's responsibility to ascertain the precautionary measures for its use outlined by the manufacturer.

### Important Notice

All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, or conditions express or implied. Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct, special or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his/her intended use, and user assumes all risk and liability whatsoever in connection therewith. Statements or recommendations not contained herein shall have no force or effect unless in an agreement signed by officers of seller and manufacturer.

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#### Traffic Safety Systems Division

3M Center, Building 0235-03-A-09  
St. Paul, MN 55144-1000  
1-800-553-1380  
[www.3M.com/tss](http://www.3M.com/tss)

#### 3M Canada Company

P.O. Box 5757  
London, Ontario N6A 4T1  
1-800-3MHELPS

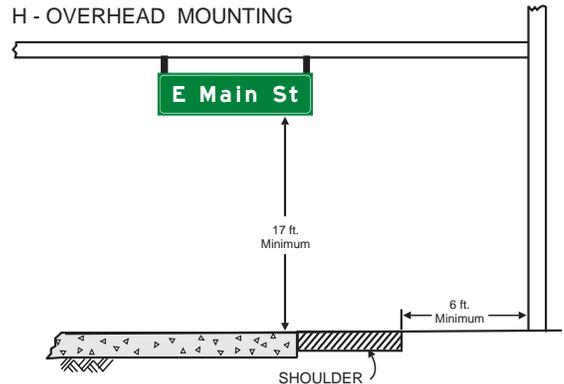
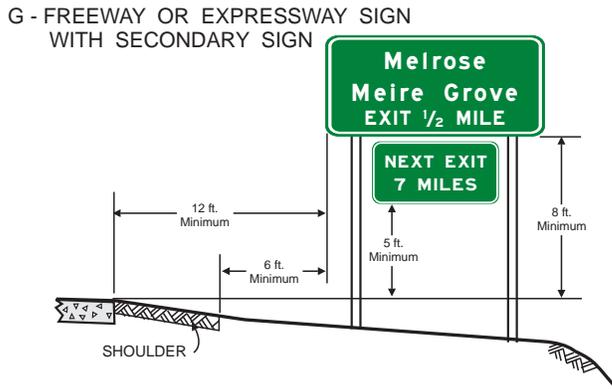
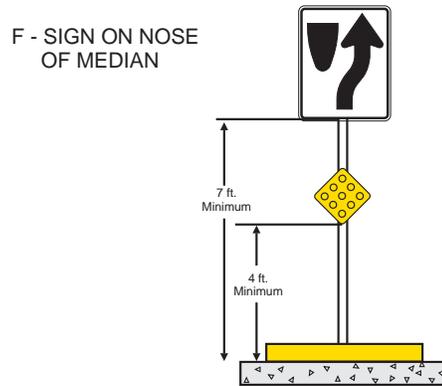
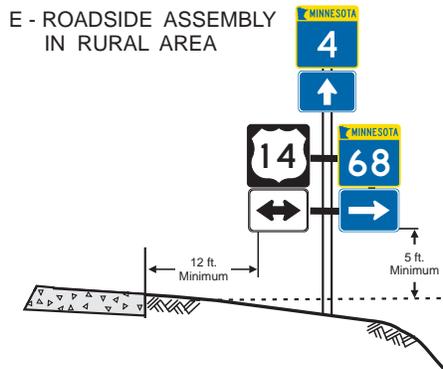
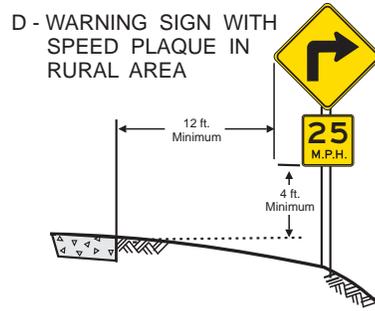
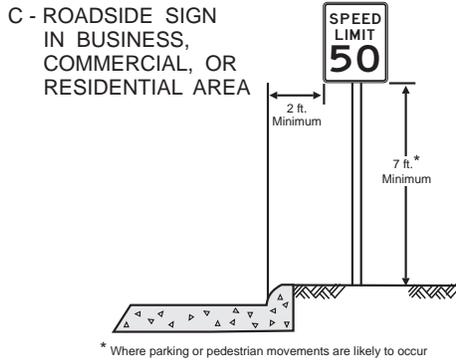
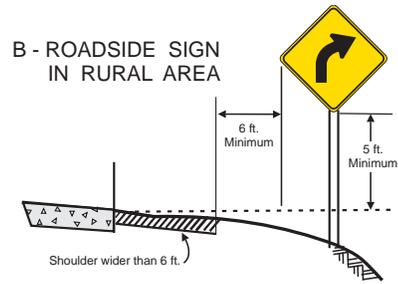
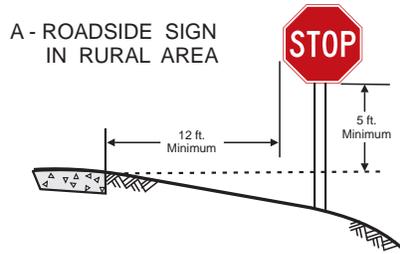
#### 3M México, S.A. de C.V.

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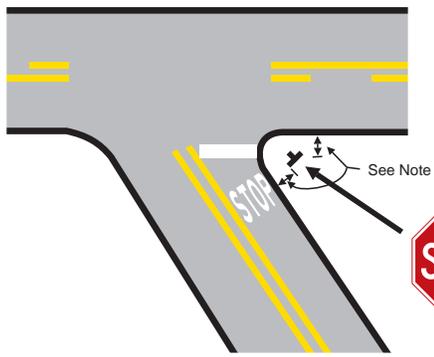
# APPENDIX C

DRAFT

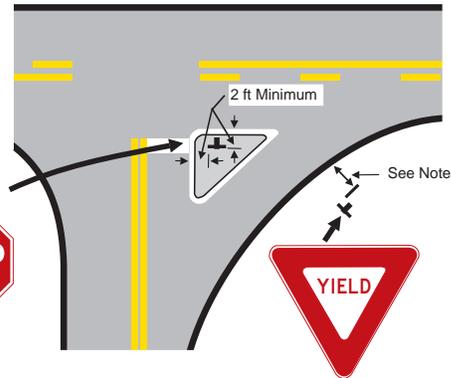


Note:  
See Section 2A.19 for reduced lateral offset distances that may be used in areas where lateral offsets are limited, and in business, commercial, or residential areas where sidewalk width is limited or where existing poles are close to the curb.

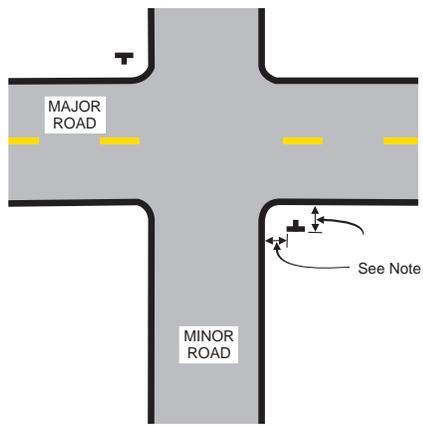
Figure 2A-2 Examples of Heights and Lateral Locations of Sign Installations



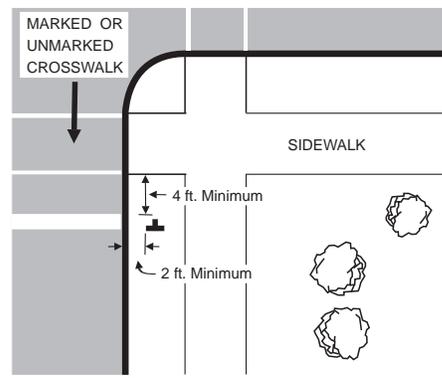
A - ACUTE ANGLE INTERSECTION



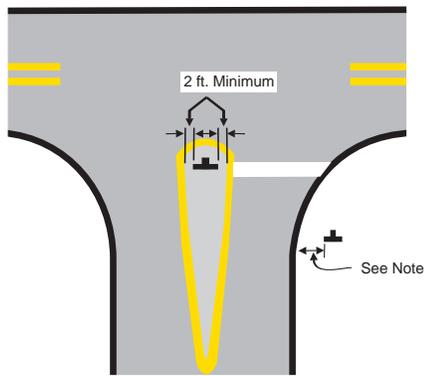
B - CHANNELIZED INTERSECTION



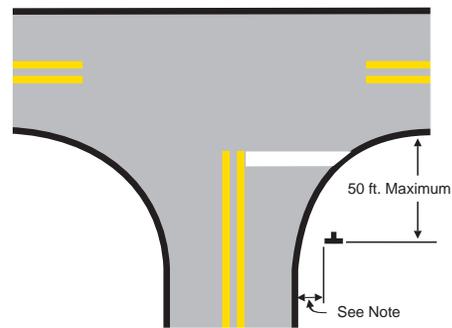
C - MINOR CROSSROAD



D - URBAN INTERSECTION



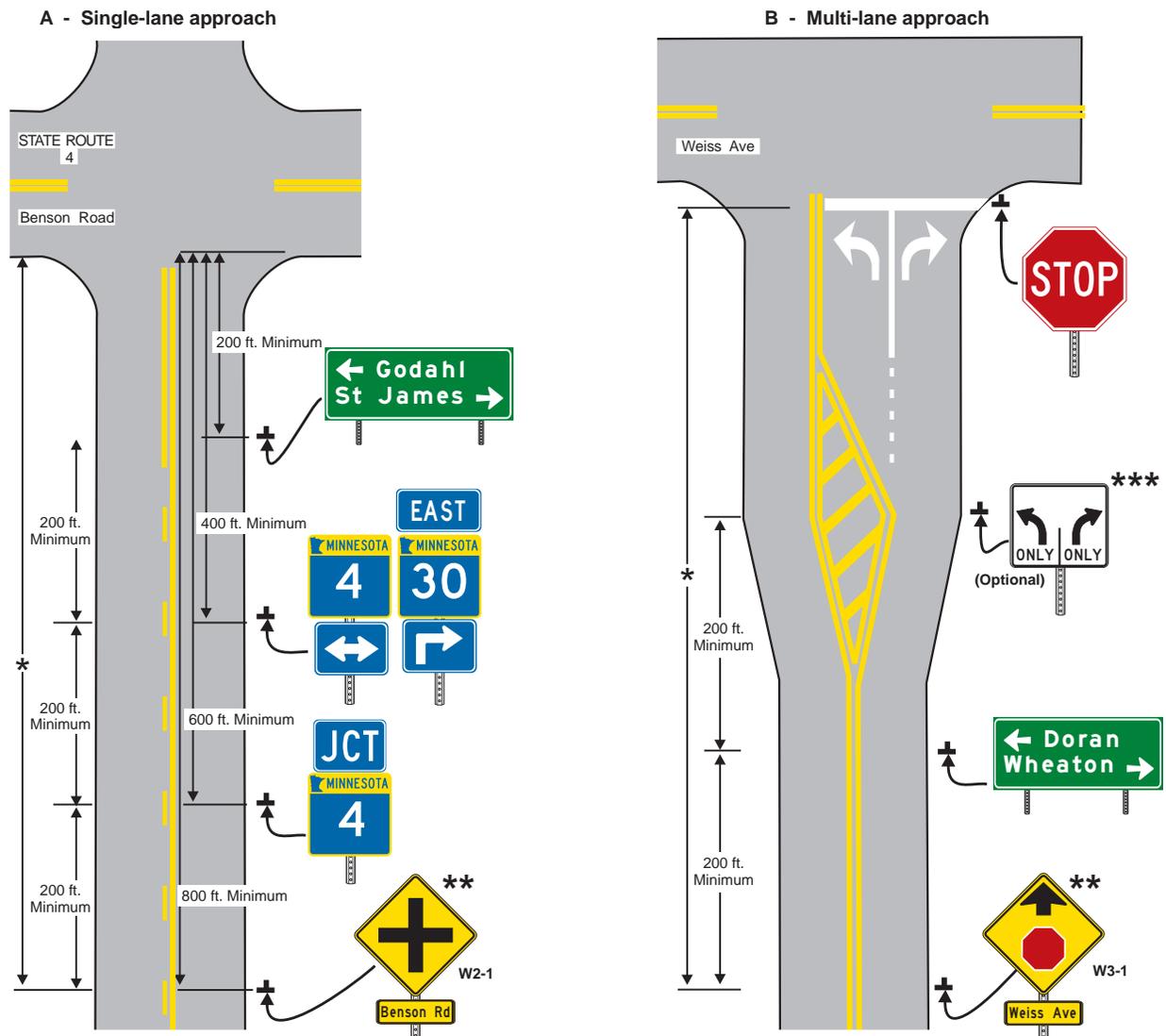
E - DIVISIONAL ISLAND



F - WIDE THROAT INTERSECTION

Note: Lateral offset is a minimum of 6 feet measured from the edge of the shoulder, or 12 feet measured from the edge of the traveled way. See Section 2A.19 for lower minimums that may be used in urban areas, or where lateral offset space is limited.

**Figure 2A-3 Examples of Locations for Some Typical Signs at Intersections**



Notes: See Chapter 2D for information on guide signs and Part 3 for information on pavement markings

- \* See Table 2C-4 for the recommended minimum distance
- \*\* See Section 2C.46 for the application of the W2-1 sign and Section 2C.36 for the application of the W3-1 signs
- \*\*\* See Section 2B.22 for the application of Intersection Lane Control signs

**Figure 2A-4 Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection Approach**

**SUPPORT:**

STOP signs are typically located within 6 to 12 feet of the edge of the traveled portion of intersecting roadways (see Figure 2A-2) in order to place vehicles stopped on the minor road in a location that optimizes sight lines to the major roadway. At wide throat intersections with large corner radii (over 40 feet), this optimum sign location would result in the STOP sign being placed in the paved part of the road. In

these cases, the 50 foot major road offset should be maintained because a larger offset would require drivers on the minor road to either stop twice or look for a longer gap. When corner radii exceeds 90 feet, it is not possible to comply with both the minor and major road offsets. Redesigning the intersection in order to provide a free right turn island would provide a protected location for the STOP sign consistent with the optimum major and minor road offsets.