

U.S. 42 TRAFFIC STUDY

**Prepared by the
Ohio-Kentucky-Indiana
Regional Council of Governments**

**For the
Kentucky Transportation Cabinet**

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Introduction and Study Purpose

This report documents the results of a traffic operations analysis conducted by the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) on the section of U.S. 42 from Industrial Road, just east of I-71/75 in Florence, Kentucky, to Farmview Drive, at the north corporate limits of Union, Kentucky. This study was conducted at the request of the Kentucky Transportation Cabinet.

The purpose of this review is to examine in general terms the physical and operational characteristics of this roadway corridor, including an overview of the roadway system (function, geometrics, volumes, crash history), as well as general land use and demographic characteristics of the corridor (recent growth trends, adjacent development). An attempt will be made to characterize and quantify the nature and magnitude of any problems identified, and to identify and propose any physical or operational roadway improvements which appear to warrant further consideration, by either the Kentucky Transportation Cabinet or the affected units of local government.

Among the information collected and analyzed for this study is the following:

- 1) Physical characteristics of the roadway;
- 2) Existing traffic controls;
- 3) Existing traffic volumes;
- 4) Crash experiences;
- 5) Adjacent land uses;
- 6) Travel time survey information;
- 7) Planned roadway improvements; and
- 8) Other potential roadway and traffic operations improvement opportunities, ranging from relatively inexpensive traffic control recommendations to major long-range roadway reconstruction and re-alignment options.

Corridor Overview

The U.S. 42 corridor which is the subject of this study extends about 2.54 miles from northeast to southwest in Boone County, between Industrial Road and Farmview Drive (See Figures 1-4 for aerial views of the corridor, and Figures 5-17 for diagrams of signalized intersection geometrics). It is a major arterial serving the southwest side of the City of Florence, and providing connections to rapidly growing suburbs further to the southwest. It is a major linkage to I-71/75, which leads directly into the center of the entire region.

Figure 1
Sycamore - Industrial

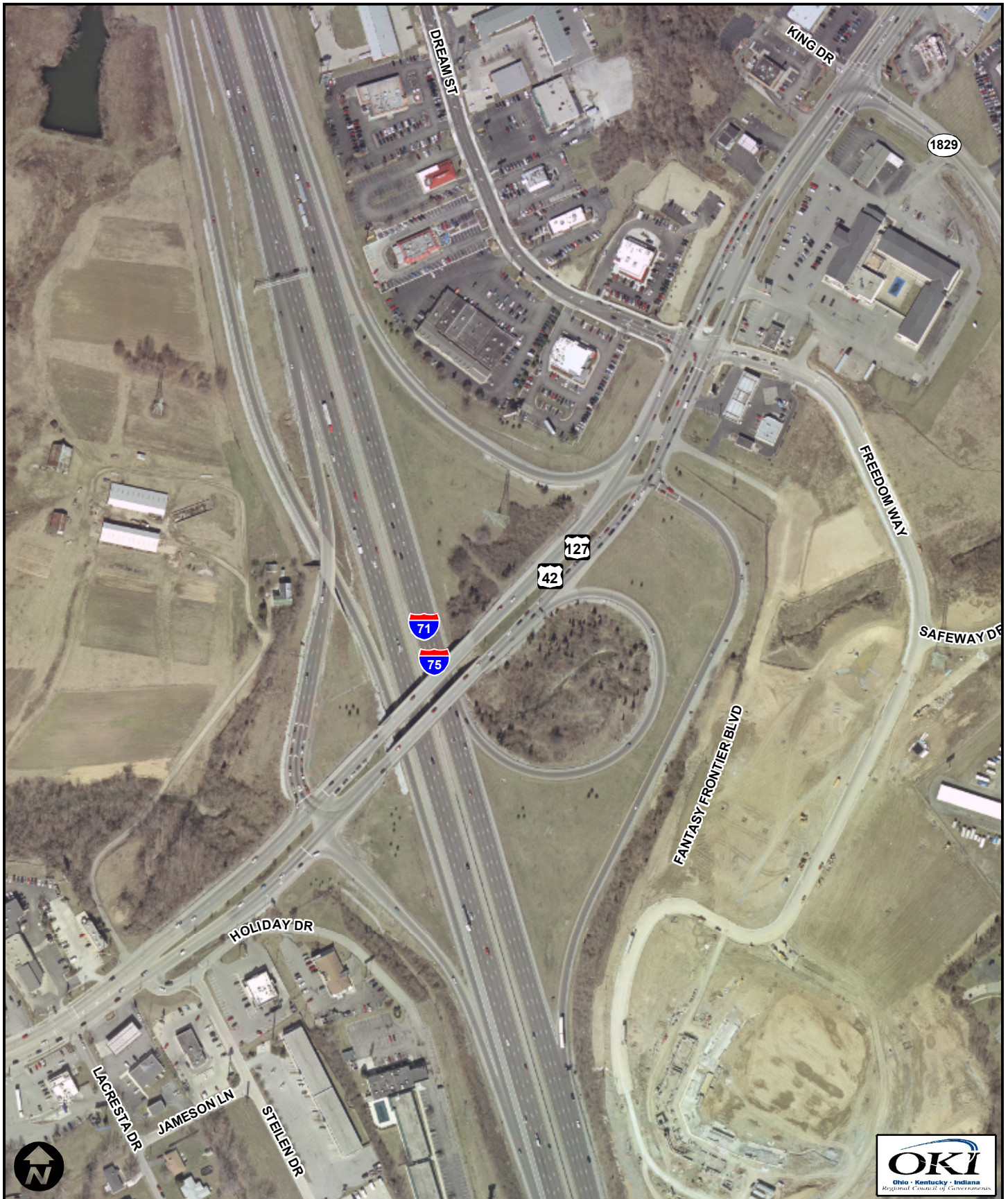


Figure 2

Ockerman - Dilcrest



Figure 3
Pleasant Valley - Weaver



Figure 4
Farmview - Wetherington



U.S. 42 & Industrial Road Intersection

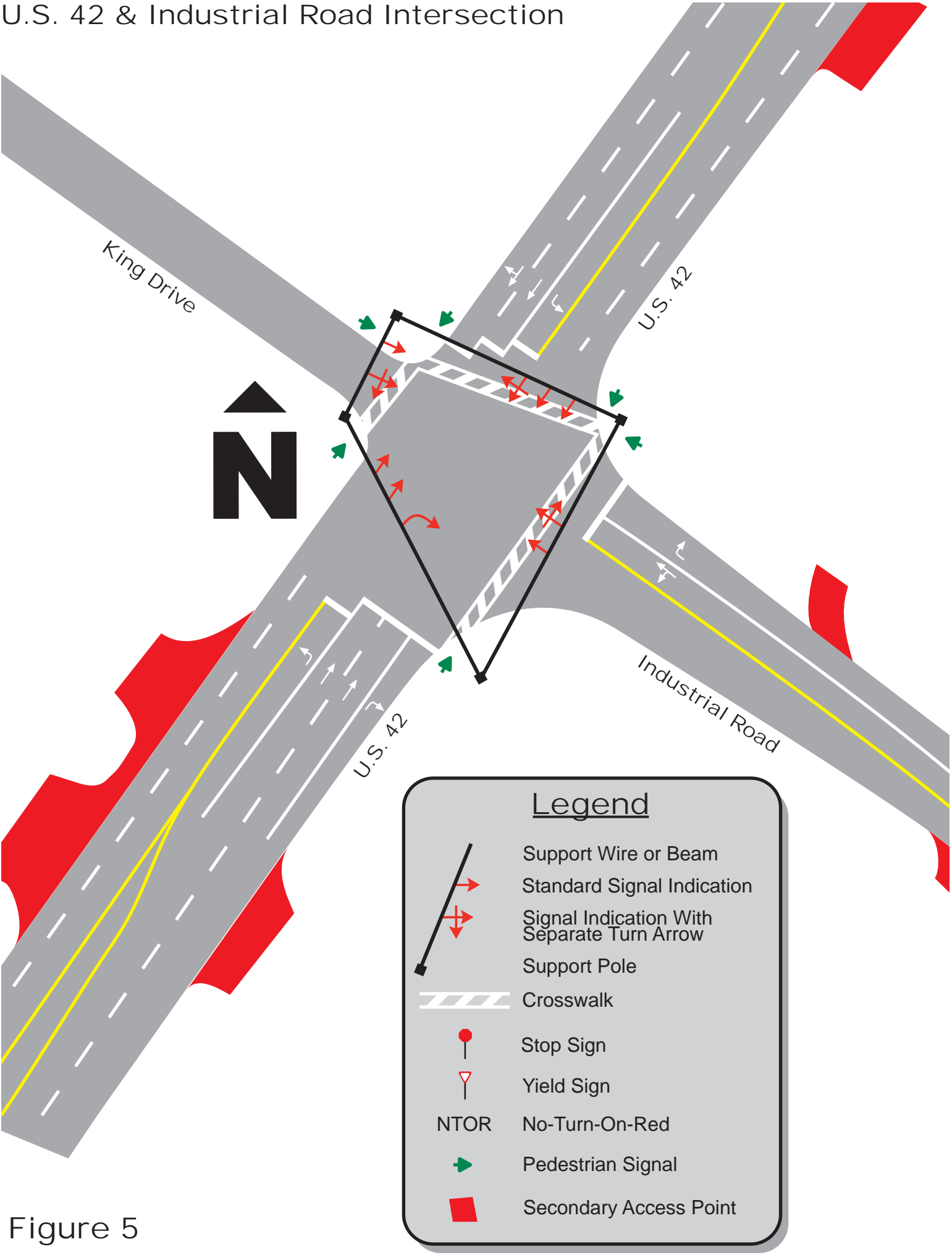


Figure 5

U.S. 42 & Dream Street / Freedom Way Intersection

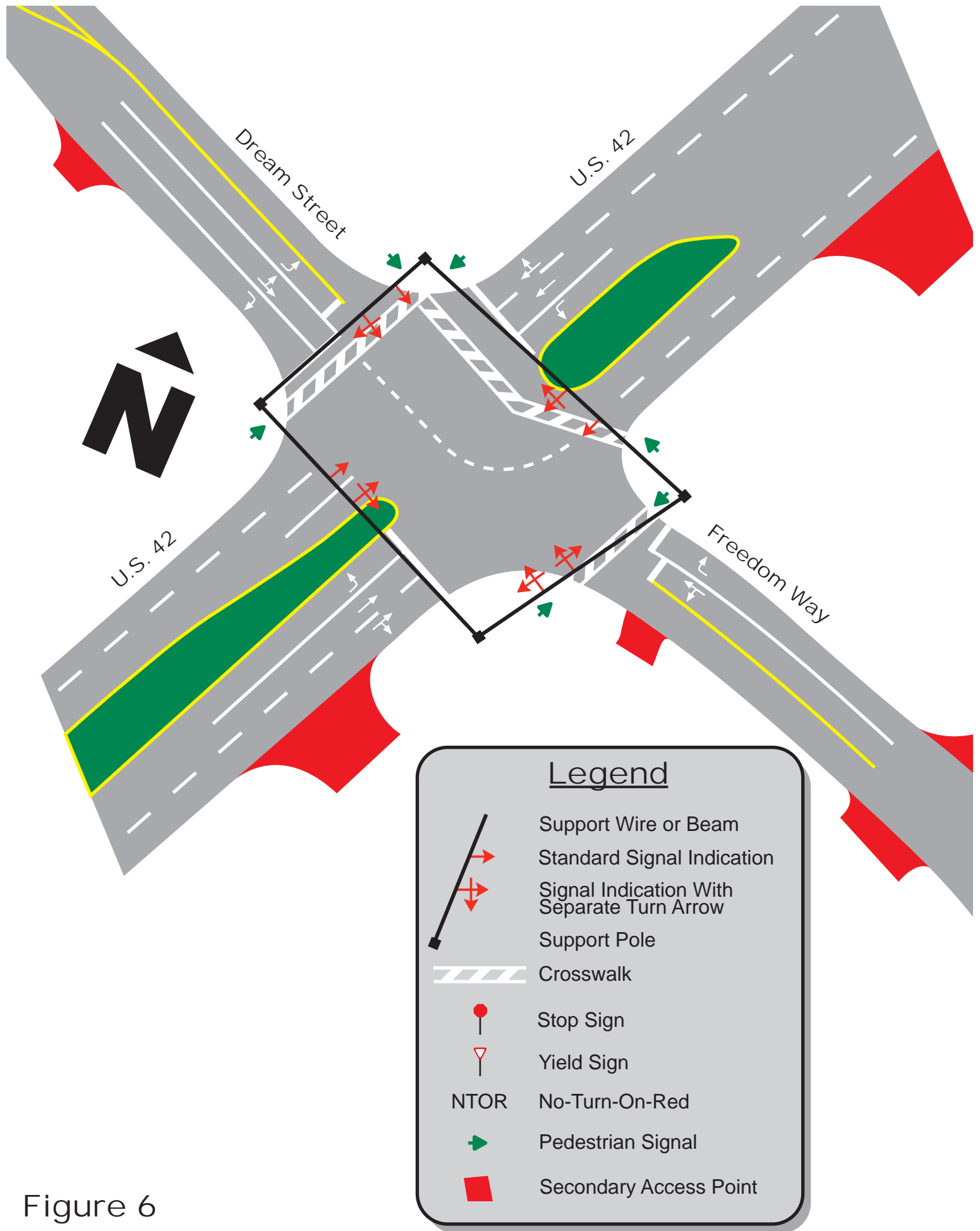


Figure 6

U.S. 42 & Northbound I-71/75 Interchange

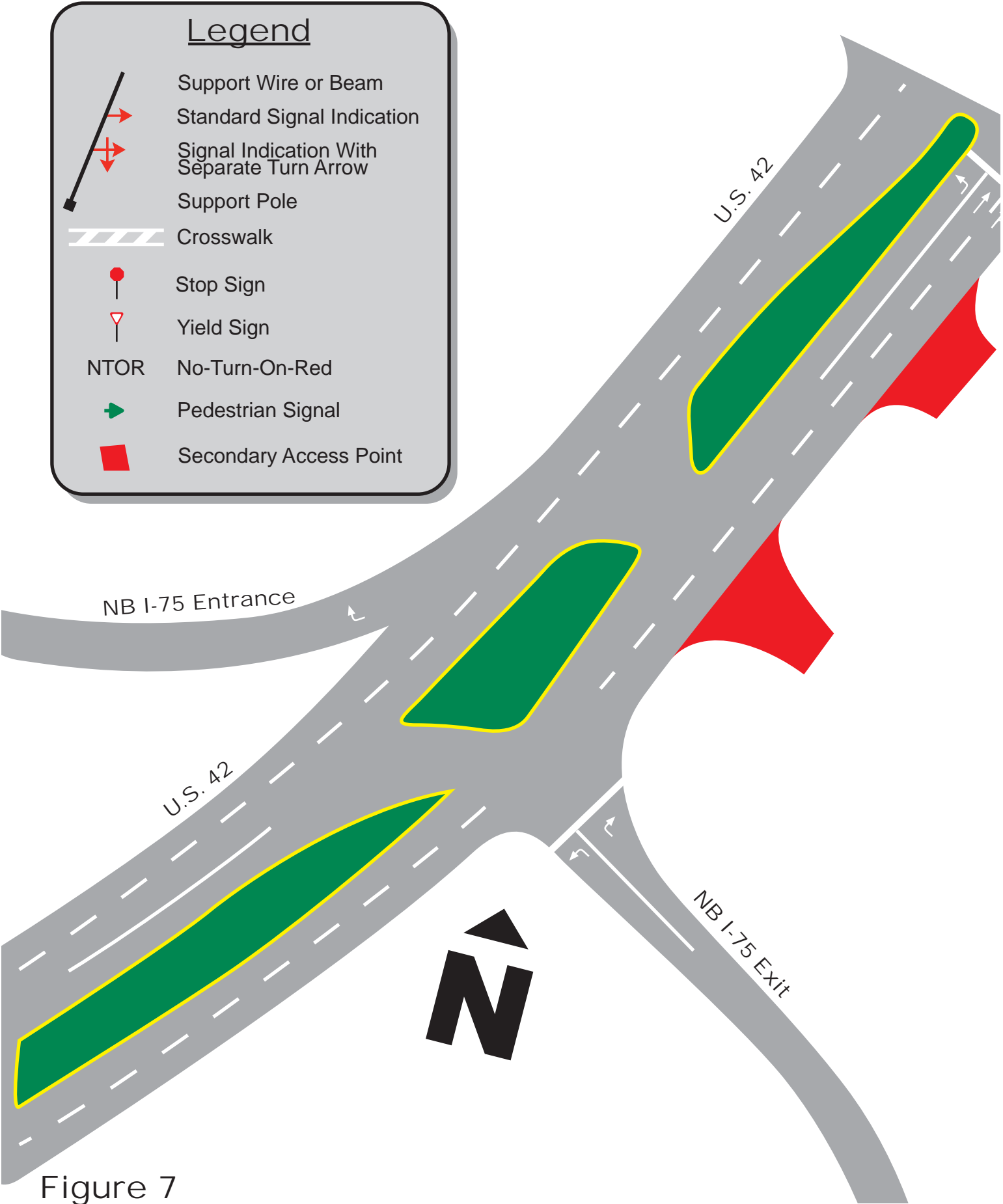


Figure 7

U.S. 42 & Southbound I-71/75 Interchange

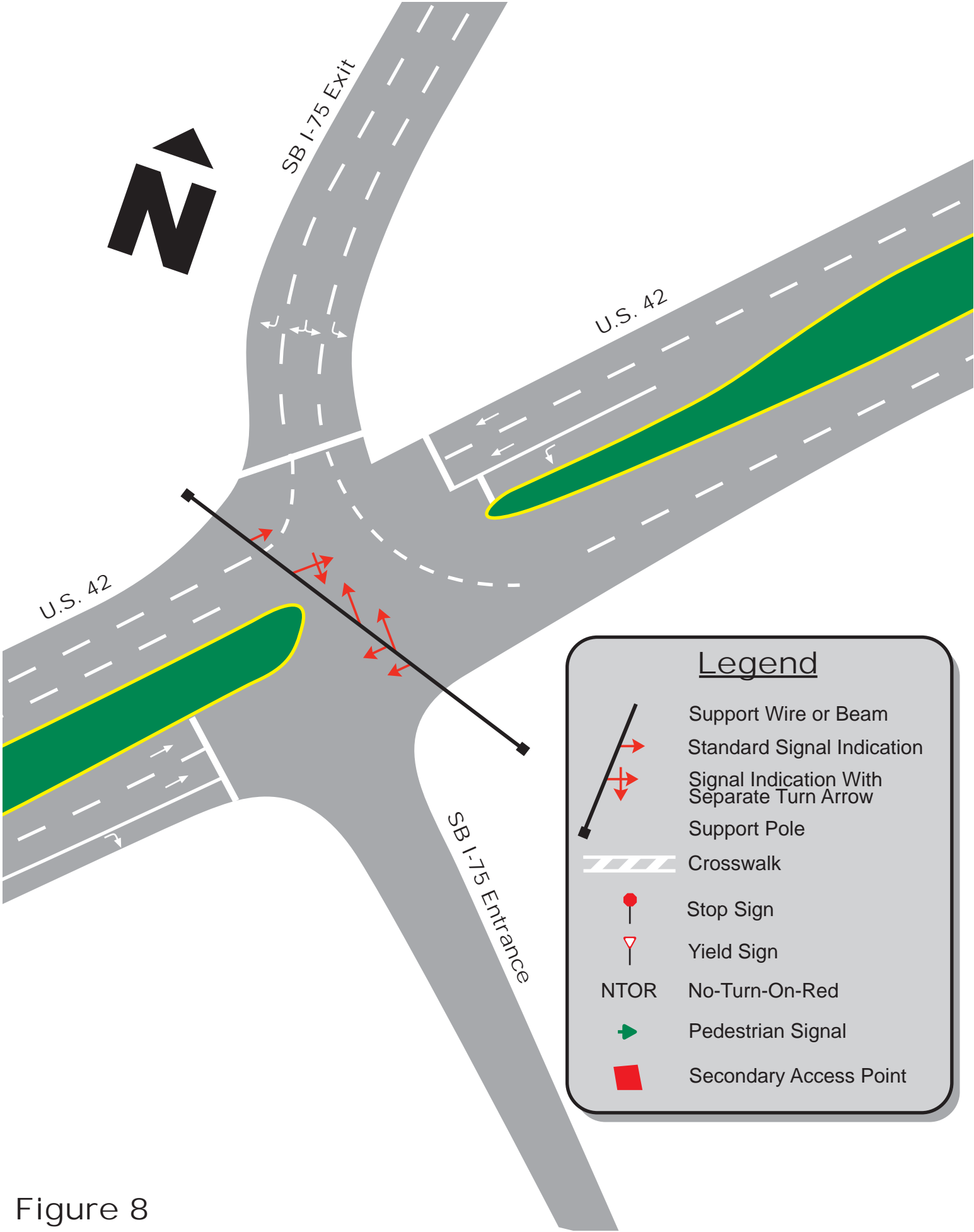


Figure 8

U.S. 42 & LaCresta Drive Intersection

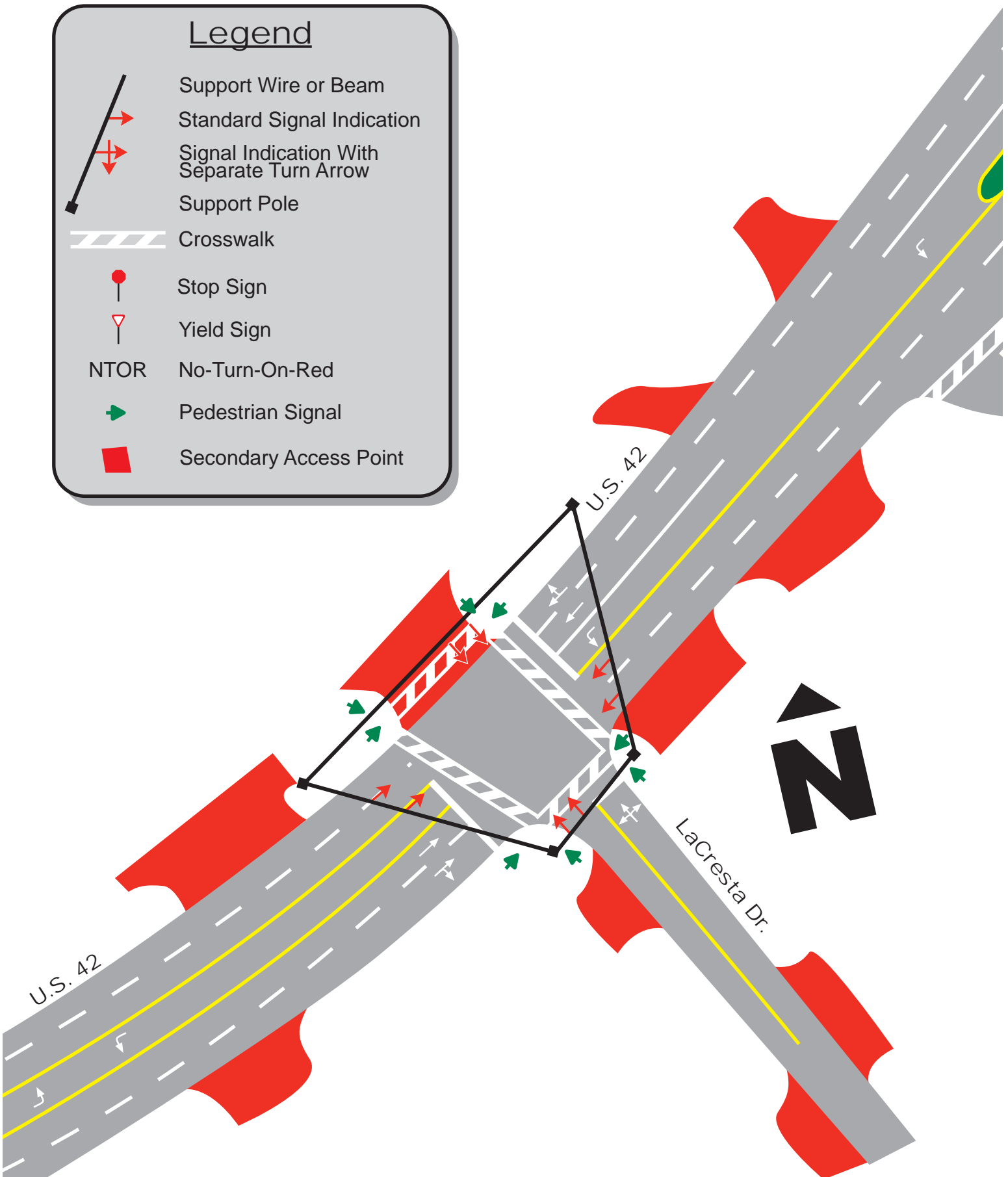


Figure 9

U.S. 42 & Diane Drive / Sycamore Drive Intersection

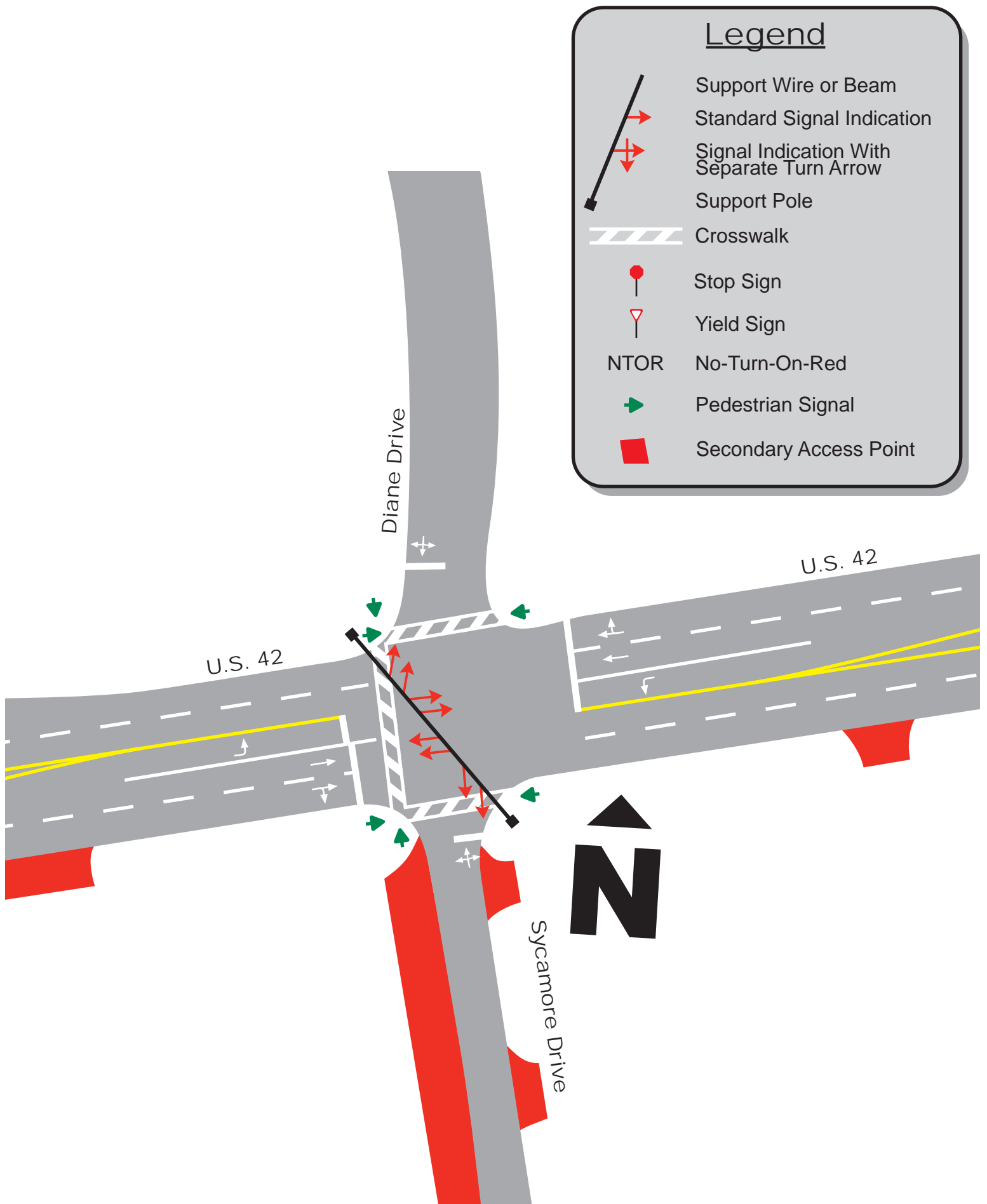


Figure 10

U.S. 42 & Mall Road / Dilcrest Drive Intersection

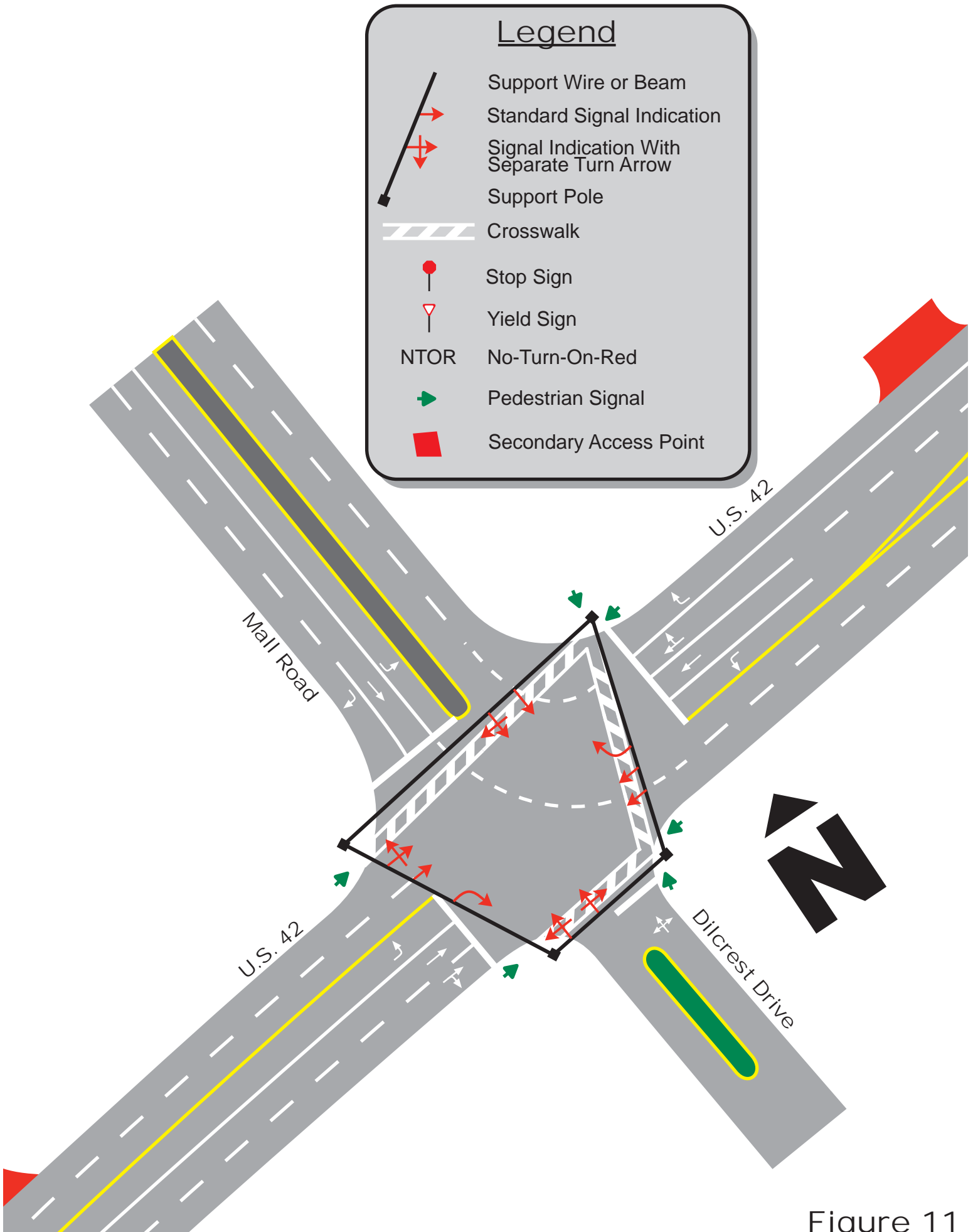


Figure 11

U.S. 42 & Ockerman Drive Intersection

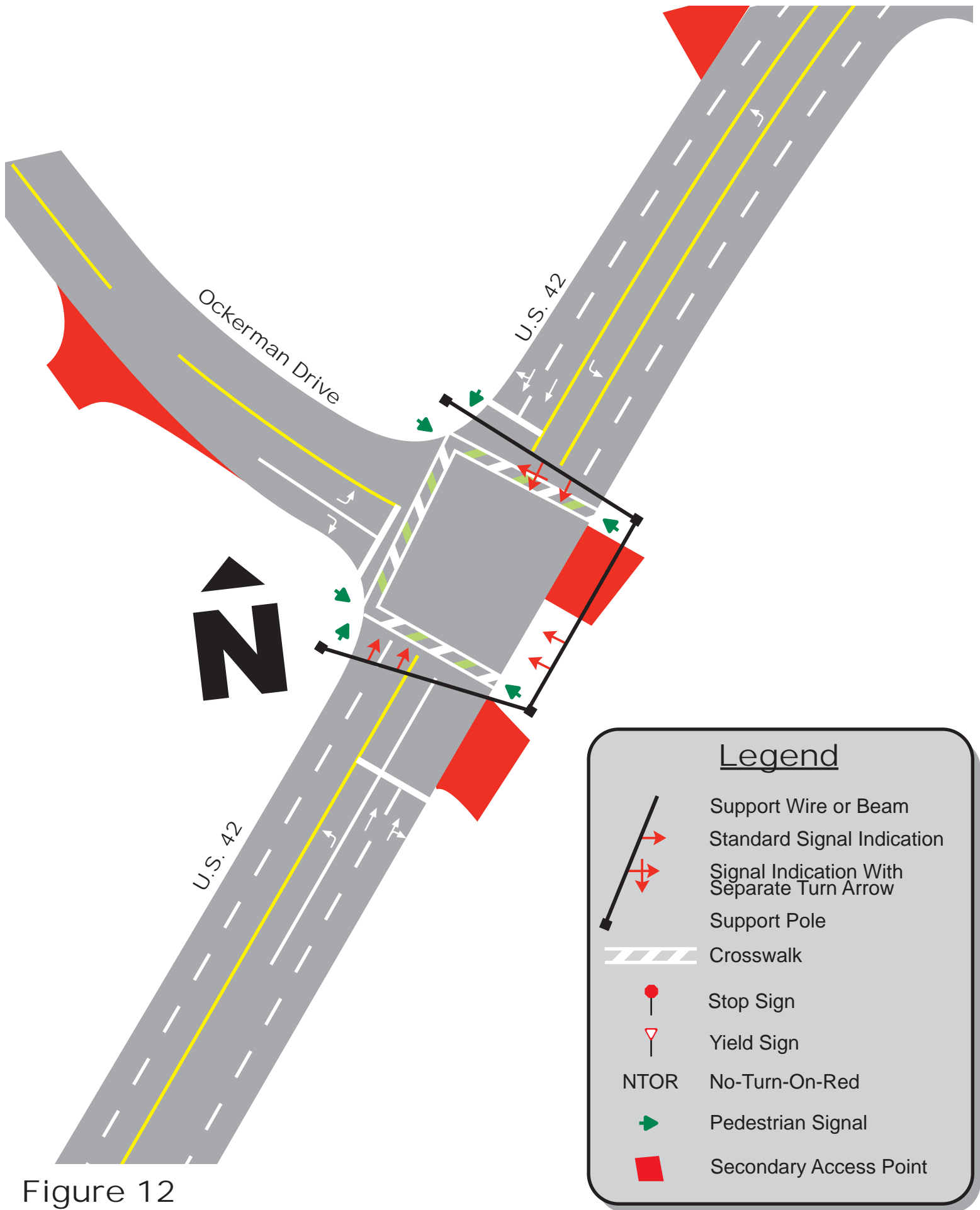


Figure 12

U.S. 42 & Hopeful Church Road /
Weaver Road Intersection

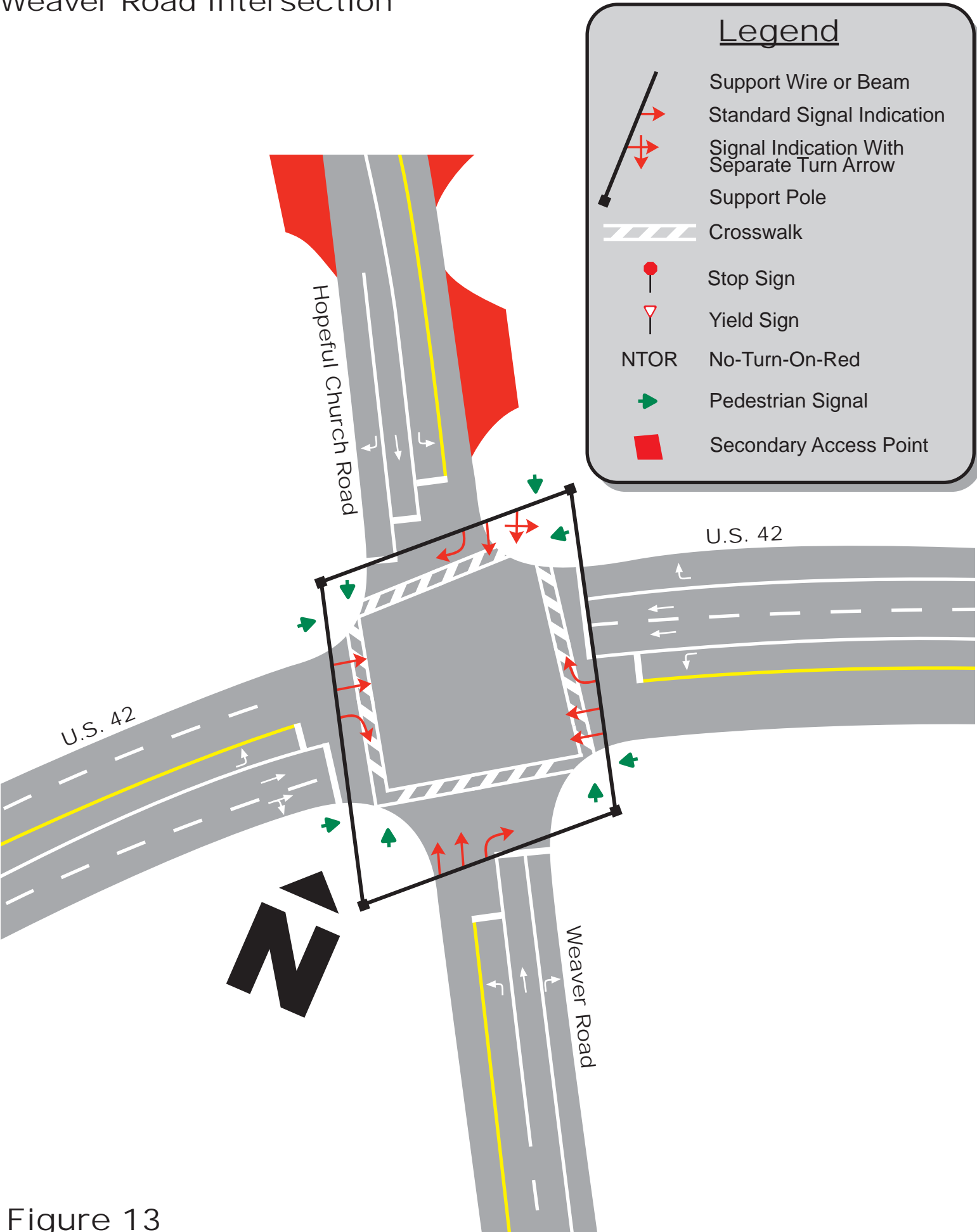


Figure 13

U.S. 42 & Harvey Quast Drive /
Beechwood Lane Intersection

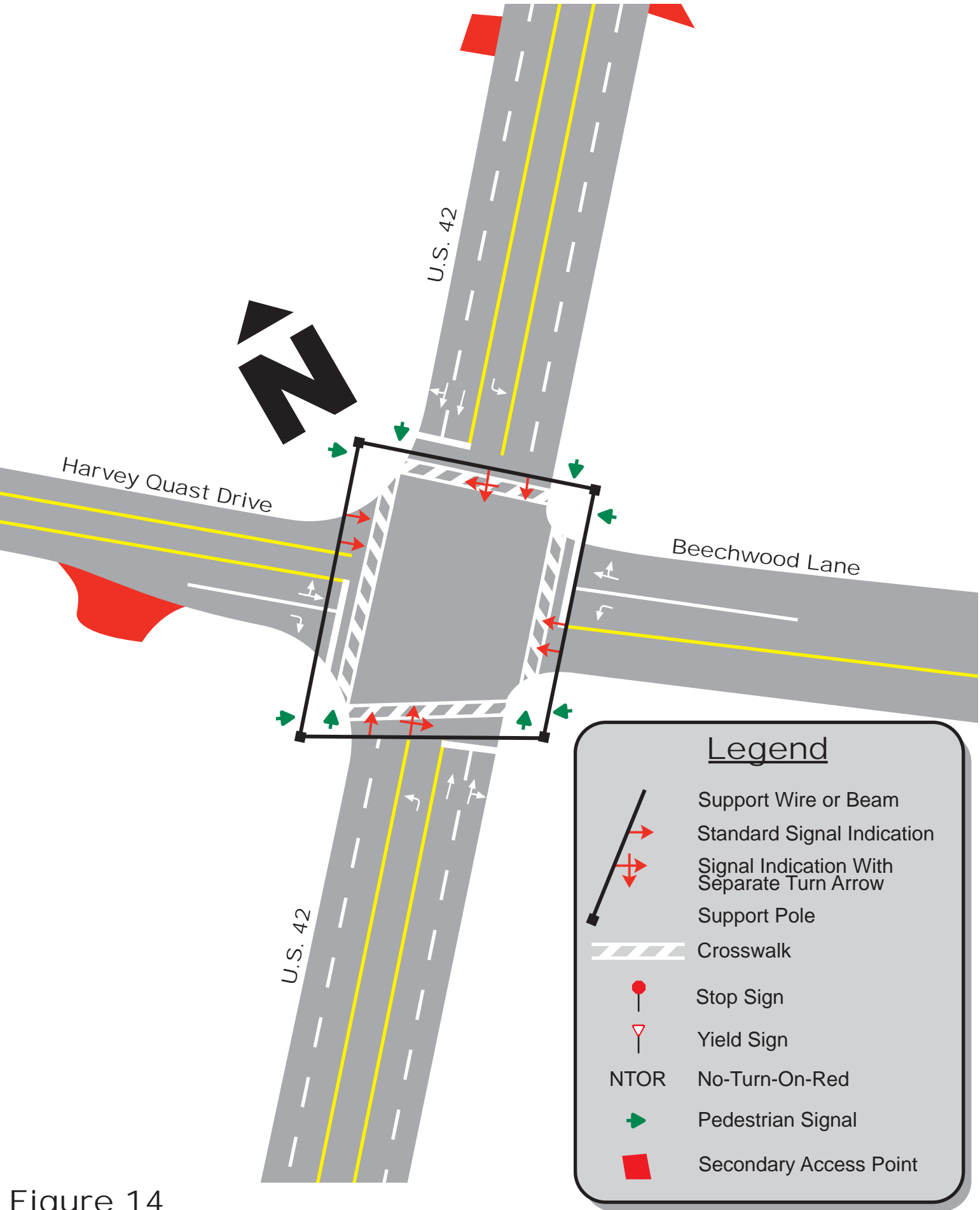


Figure 14

U.S. 42 & Pleasant Valley Road Intersection

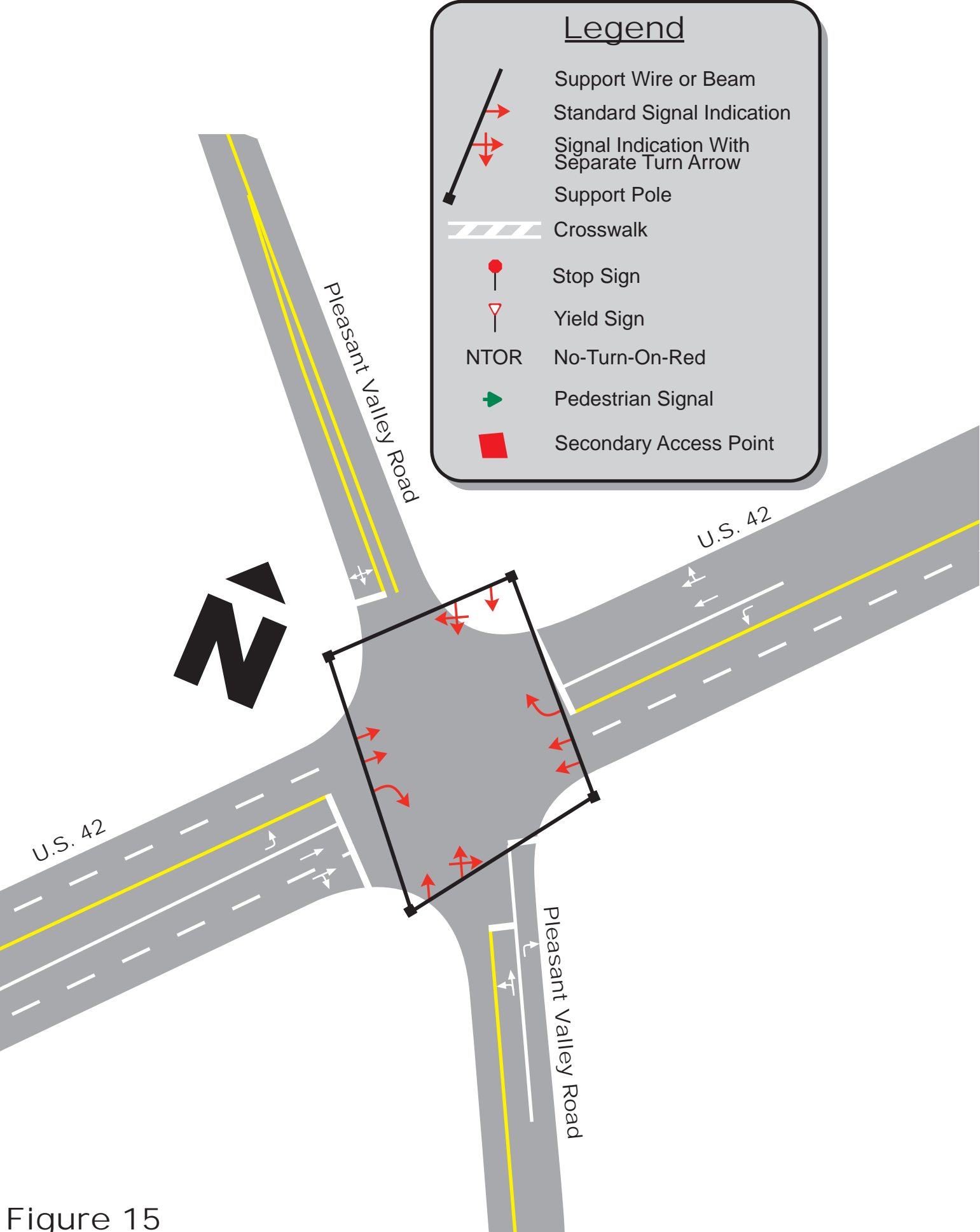


Figure 15

U.S. 42 & Old U.S. 42 / Wetherington Boulevard Intersection

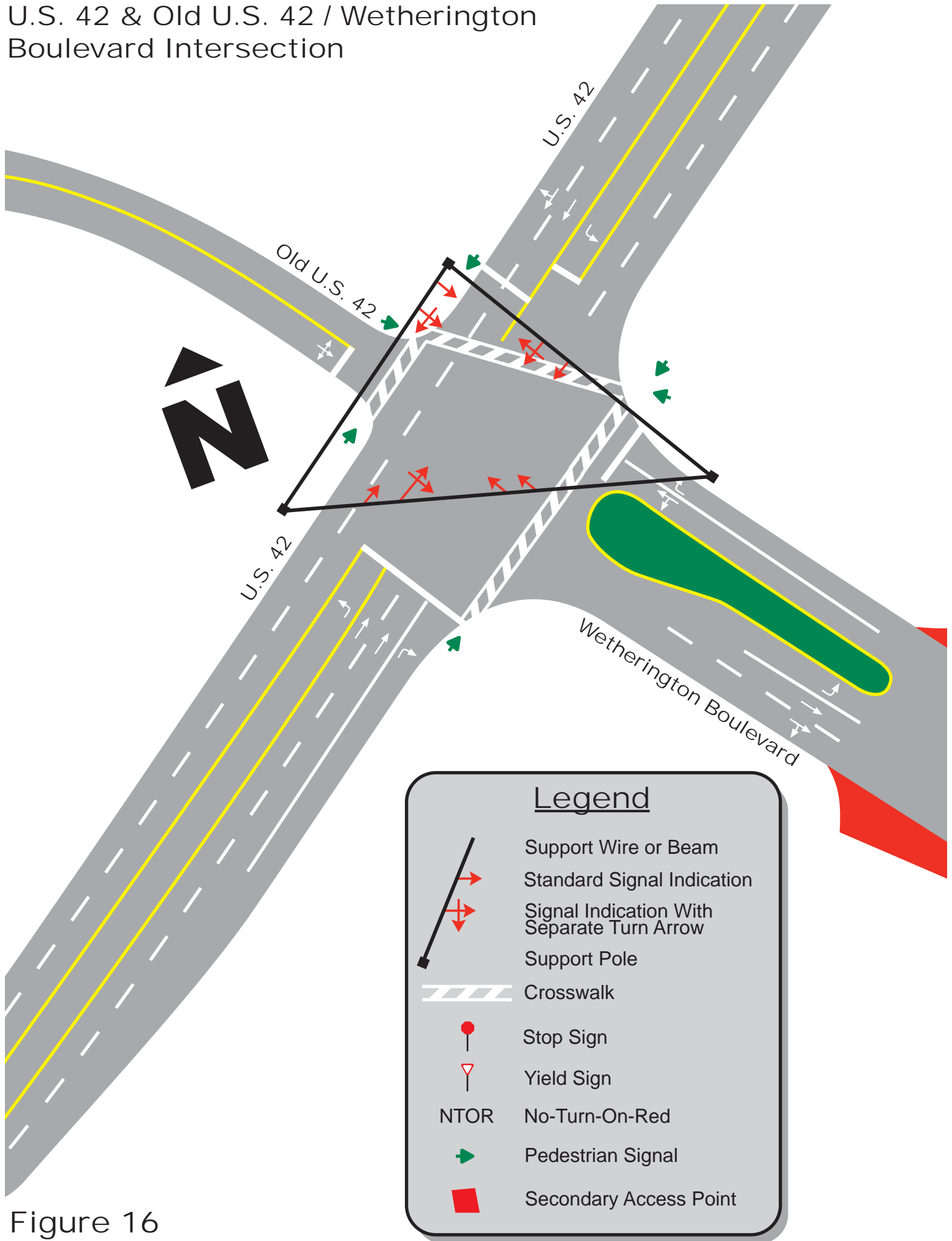


Figure 16

U.S. 42 & Farmview Drive /
Richmond Road Intersection

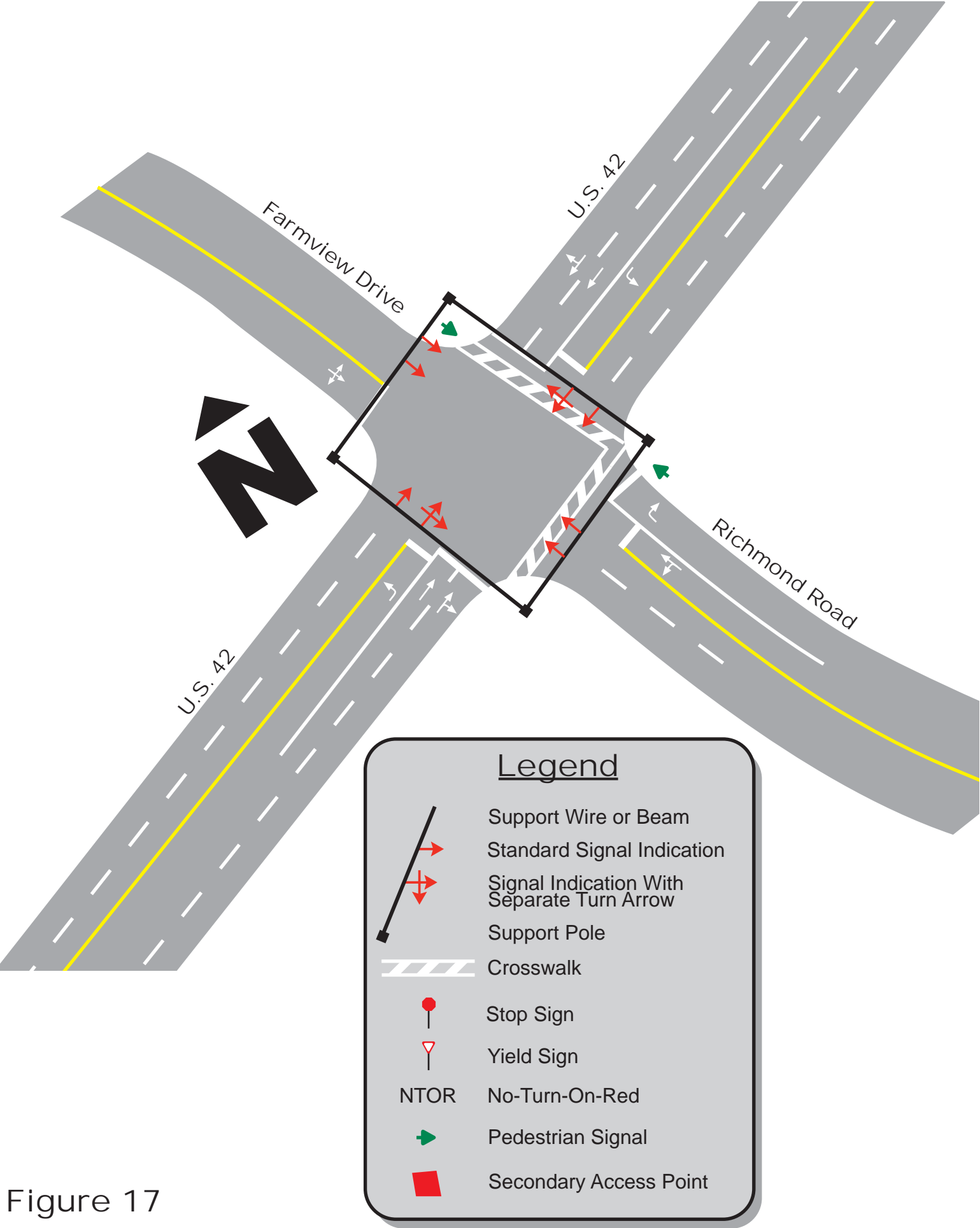


Figure 17

Throughout most of the length of the study corridor, the adjacent land uses are mixed commercial, ranging from decades-old individual retail stores and strip commercial centers, to relatively new mixed-use centers, to wholesaling and light industrial. In addition, there are scattered areas of older strip residential developments, and especially in the southwest, access to newer residential subdivisions.

As Boone County has grown over the last several decades (see Demographic Summary, below), much of the residential growth has occurred generally in the eastern and northern parts of the County. As a result, the US 42 corridor has been called upon to serve increasingly larger volumes of traffic, as many of these new residents depend heavily on I-71/75 as the major access to other travel destinations throughout the region. Furthermore, as has been happening along major roadways throughout the region, again for several decades, commercial interests have focused their growth activities along US 42, resulting in a drastic increase in new driveways and curb cuts over the years. These access points, and their associated vehicular turning movements, contribute to a reduction in capacity and safety in the corridor, even as the residential growth generates an increase in overall traffic levels, with an associated need for more capacity. The cumulative effect of these conflicting needs for access and mobility is the deteriorating traffic conditions which prevail in the US 42 corridor today.

Demographic Summary

Construction and reconstruction of major roadways in Boone County has been a serious problem for several decades because of the rapid residential and non-residential growth in the County, and especially in the northern and eastern portions of the county, including the US 42 corridor. In 1970, Boone County was a quiet, mostly rural county of about 33,000 people (See Table 1). By 1990, it had increased by over 75%, and the population stood at almost 58,000. In the final decade of the century, it increased by another 28,000 persons, to a year 2000 total of about 86,000 persons.

Furthermore, the growth continues unabated. Current projections call for a county population of 158,000 in 2020 (up 84% from 2000), and 188,700 by 2030 (up 119% from 2000).

Traffic Volumes

There are relatively limited data available regarding recent traffic volumes and trends in the subject corridor. OKI traffic records, mostly based on counts taken

Table 1
Boone County Population

Year	Population	Change (#)	Change (%)
1970	32,812		
1980	45,842	13,030	39.7%
1990	57,589	11,747	25.6%
2000	85,991	28,402	49.3%
2010	121,919 (Projection)	35,928	41.8%
2020	158,013 (Projection)	36,094	29.6%
2030	188,652 (Projection)	30,639	19.4%

Source: US Census Bureau (1970-2000); Kentucky State Data Center (2010-2030)

by KYTC, have data for three general locations within the corridor. In the vicinity of I-71/75, traffic volumes have held relatively steady during the period 2002-2006, generally in the range of 39,000 to 40,000 vehicles per day (vpd). At Mall Road, volumes in 2005 were slightly lower, in the range of 35,000 vpd. Near the western end of the study area, beyond Pleasant Valley Road, the largest growth in volumes has been recorded, from around 31,000 vpd in 2002 to about 35,000 in 2005.

Travel Times / Observed Speeds

One measure of performance for traffic movement in the corridor is through travel time studies, which OKI has been conducting throughout the region for the past several years. These studies are conducted through actual vehicular drive-thru's in the corridor during the peak and mid-day travel times on the roadways, while a Geographic Positioning System (GPS) unit records a series of spot locations of the vehicle in real time. The data can then be translated into speeds for morning and afternoon peak periods, as well as for mid-day operating conditions.

For the US 42 corridor, data from 2006 and 2007 were analyzed, and are presented in Tables 2 (Northbound) and 3 (Southbound). Note that these are overall travel times, so slower average speeds can reflect not only more congested travel (i.e., moving) conditions, but also more time spent idling at traffic signals. Significant findings are summarized below, but first, it is important to note a significant caveat. All of these travel time data were collected before KYTC implemented an expanded and updated progressive traffic signal system in late 2007 and early 2008. The extent to which the upgraded system has improved conditions is not yet known, and indeed, on-going adjustments to the system are still being made, as conditions are continuously monitored. Anecdotally, it is significant that the Cabinet reports that motorist's complaint calls about the traffic signals, which had previously been occurring on a fairly regular basis, have dropped to almost nothing since the changes have been implemented.

For the morning peak period, from 7:00 a.m. to 9:00 a.m., traffic in the northbound direction flows quite well (36-38 mph average) up to Pleasant Valley Road. From there to I-71/75 and beyond to Industrial, flows are much more erratic, and are generally in the range of 15-20 mph. In the southbound direction, conditions are generally somewhat better, with speeds typically in the mid-30's, although there is some slowing into the mid- to upper-20's between I-71/75 and Weaver/Hopeful-Church Roads.

Table 2
US42/127 - Travel Time Data by Section 2006/2007

Facility	Section Name	Dist	FF	FF Speed	FF Travel Time	Avg AM Runtime	AM Speed (MPH)	AM Delay (mins)	Avg MD Runtime	MD Speed (MPH)	MD Delay (mins)	Avg PM Runtime	PM Speed (MPH)	PM Delay (mins)	PM Veh Delay	Total Vehicle Delay (hours)
Corridor: Facility # 2.2 Kentucky US42/127 NB																
US42/127	KY338 to KY3060	3.69	42		0:05:16	0:04:19	51	0.00	0:04:16	52	0.00	0:04:42	47	0.00		0.00
US42/127	KY3060 to KY536	0.79	46		0:01:02	0:01:00	47	0.00	0:00:54	53	0.00	0:01:04	44	0.04		0.59
US42/127	KY536 to KY237	2.31	46		0:03:01	0:03:51	36	0.83	0:03:05	45	0.07	0:05:04	27	2.06		49.90
US42/127	KY237 to KY842	0.47	40		0:00:42	0:01:57	14	1.24	0:01:31	18	0.81	0:01:56	14	1.23		150.49
US42/127	KY842 to I-71/75	1.01	38		0:01:37	0:02:37	23	1.01	0:01:44	35	0.12	0:02:22	26	0.75		81.08
US42/127	I-71/75 to KY1829	0.36	26		0:00:51	0:01:24	16	0.55	0:02:00	11	1.15	0:01:40	13	0.82		96.24
US42/127	KY1829 to US25	0.92	32		0:01:45	0:02:01	28	0.25	0:02:12	25	0.44	0:02:25	23	0.66		38.58
US42/127	US25 to KY1017	0.45	37		0:00:43	0:01:29	18	0.77	0:02:28	11	1.75	0:01:02	26	0.32		118.93
US42/127	KY1017 to KY236 (Commonwealth)	1.45	35		0:02:30	0:04:22	20	1.87	0:03:15	27	0.76	0:04:01	22	1.52		170.46
US42/127	KY236 (Commonwealth) to I-275	1.50	35		0:02:33	0:02:57	31	0.39	0:06:08	15	3.58	0:04:24	20	1.84		260.39
US42/127	I-275 to KY1303	0.61	36		0:01:02	0:00:50	44	0.00	0:01:13	30	0.18	0:01:04	35	0.03		7.06
US42/127	KY1303 to KY371 (Buttermilk)	0.38	35		0:00:38	0:00:39	35	0.00	0:01:07	20	0.48	0:00:38	36	0.00		24.31
US42/127	KY371 (Buttermilk) to I-71/75	1.26	35		0:02:11	0:02:03	37	0.00	0:02:31	30	0.33	0:02:18	33	0.12		18.80
US42/127	I-71/75 to KY1072 (Kyles)	0.96	35		0:01:38	0:02:04	28	0.44	0:01:59	29	0.35	0:02:24	24	0.76		31.59
US42/127	KY1072 (Kyles) to west ramps to I-71/75	1.85	34		0:03:14	0:03:28	32	0.23	0:03:31	32	0.28	0:03:34	31	0.32		10.27
US42/127	west ramps to I-71/75 to Main/Pike St.	0.24	29		0:00:30	0:00:52	17	0.37	0:00:33	26	0.05	0:00:40	22	0.17		7.30
US42/127	Main/Pike St. to KY8 EB	0.56	29		0:01:09	0:01:39	20	0.49	0:03:06	11	1.95	0:02:39	13	1.50		40.55
Total		18.81			0:30:23	0:37:31			0:41:33			0:41:57				1106.52

Table 3
US42/127 - Travel Time Data by Section 2006/2007

Facility	Section Name	Corridor	Facility #	2.2	Kentucky	US42/127	SB	Dist	FF	FF	Speed	Travel Time	Avg AM Runtime	AM	Speed	AM Delay (mins)	AM Veh	Avg MD Runtime	MD	Speed	MD Delay (mins)	MD Veh	Avg PM Runtime	PM	Speed	PM Delay (mins)	PM Veh	Total Vehicle Delay (hours)	
Corridor: Facility # 2.2 Kentucky US42/127 SB																													
US42/127	Ohio State line to KY8 EB		0.53	36	0:00:53	0:01:15	25	0.37			36	0:00:53	36	0.01	0:01:27	22	0.57					12.15							
US42/127	KY8 EB to Main/Pike St.		0.59	29	0:01:13	0:01:04	34	0.00			13	0:02:50	13	1.61	0:01:29	24	0.26					24.62							
US42/127	Main/Pike St. to west ramps to I-71/75		0.23	29	0:00:29	0:00:28	31	0.00			28	0:00:30	28	0.02	0:00:35	24	0.09					1.18							
US42/127	west ramps to I-71/75 to KY1072 (Kyles)		1.86	34	0:03:14	0:04:44	24	1.48			33	0:03:22	33	0.13	0:03:55	28	0.67					23.13							
US42/127	KY1072 (Kyles) to I-71/75		0.99	35	0:01:41	0:01:35	37	0.00			32	0:01:50	32	0.15	0:02:03	29	0.36					10.30							
US42/127	I-71/75 to KY371 (Buttermilk)		1.25	35	0:02:10	0:02:26	31	0.26			34	0:02:11	34	0.01	0:03:02	25	0.86					24.89							
US42/127	KY371 (Buttermilk) to KY1303		0.38	35	0:00:39	0:00:49	28	0.17			36	0:00:38	36	0.00	0:00:54	25	0.27					10.19							
US42/127	KY1303 to I-275		0.61	36	0:01:02	0:00:58	38	0.00			32	0:01:09	32	0.12	0:00:59	37	0.00					4.24							
US42/127	I-275 to KY236 (Commonwealth)		1.46	35	0:02:29	0:03:42	24	1.20			30	0:02:53	30	0.40	0:07:02	12	4.54					167.15							
US42/127	KY236 (Commonwealth) to KY1017		1.46	35	0:02:30	0:03:09	28	0.64			25	0:03:33	25	1.04	0:03:16	27	0.75					120.14							
US42/127	KY1017 to US25		0.45	37	0:00:43	0:01:13	22	0.49			32	0:00:50	32	0.11	0:01:54	14	1.18					44.68							
US42/127	US25 to KY1829		0.91	32	0:01:44	0:01:37	34	0.00			19	0:02:56	19	1.20	0:01:58	28	0.24					58.64							
US42/127	KY1829 to I-71/75		0.36	26	0:00:51	0:00:35	38	0.00			21	0:01:01	21	0.16	0:01:34	14	0.71					24.56							
US42/127	I-71/75 to KY842		1.01	38	0:01:37	0:02:52	21	1.25			23	0:02:40	23	1.06	0:02:53	21	1.27					185.83							
US42/127	KY842 to KY237		0.46	40	0:00:42	0:00:44	38	0.03			18	0:01:35	18	0.88	0:01:31	18	0.81					92.38							
US42/127	KY237 to KY536		2.31	46	0:03:01	0:03:52	36	0.85			41	0:03:23	41	0.37	0:03:29	40	0.47					37.69							
US42/127	KY536 to KY3060		0.79	46	0:01:02	0:01:08	42	0.11			51	0:00:56	51	0.00	0:01:14	39	0.20					4.49							
US42/127	KY3060 to KY338		3.69	42	0:05:16	0:04:22	51	0.00			54	0:04:06	54	0.00	0:04:23	51	0.00					0.00							
Total			19.34		0:31:17	0:36:28						0:37:16			0:43:37								846.26						

In the afternoon peak period, southbound conditions are essentially similar (in reverse) to the northbound morning peak, with congestion generally between Industrial and Pleasant Valley (speeds of 15-20mph), but improving considerably (into the mid- to upper-30's) south of Pleasant Valley Road. In the northbound direction, the situation is a bit more irregular, with average speeds in the mid-20's approaching Pleasant Valley and north of Weaver/Hopeful-Church to I-71/75, but dropping into the mid-teens approaching Weaver/Hopeful-Church, and east of I-71/75 to Industrial.

Traffic Crash Data

Traffic crash statistics for the study corridor were analyzed for the years 2002-2004. During this three year period, there were a total of 790 crashes reported between Industrial Road and Farmview Drive. Of this total, 325 were reported as being intersection-related, and 465 were reported at mid-block locations. Given the long traffic queues and congested conditions reported and frequently observed in the corridor, it is likely that many of the non-intersection-related crashes were in reality related to stop-and-go traffic conditions on the approaches to traffic signals. This suspicion can to some extent be confirmed by an analysis of crash type, which is presented below.

The crash data were summarized by type of crash to identify any consistent patterns which might suggest specific problem areas, and related possible solutions which might be applicable to the corridor. The data did indeed reveal a heavy concentration of rear-end crashes, which are typical of congested, stop-and-go traffic conditions. Of the 790 total crashes, there were 126 reported as "rear-end, one vehicle stopped", another 110 as "rear-end, both vehicles moving", and 67 more reported as "rear-end, other", which was not further defined. This is a total of 303 crashes of the rear-end variety, or 38% of the total. In addition, another 114 crashes (14%) were classified as "one vehicle entering/leaving driveway", and another 114 (14%) were "left-turn" crashes, which are typically indicative of poor access management (too many driveways, poorly spaced and designed driveways, etc.). Collectively, rear-end and turning-movement crashes represented 531 of the 790 crashes, or a full 67% of the total. In addition, 75 "other roadway/mid-block" crashes, and 70 "sideswipe-same direction" crashes, were also reported (9% each of the total), which are also indicative of congested roadway conditions.

With regards to location of crashes, the linkage to intersections has already been discussed, but beyond that, there was no evident concentration of crashes at any particular intersections, nor of a concentration in either travel direction. The available data does, however, include a statistic called the Critical Rate Factor (CRF), which is a measure of the crash rate on a particular roadway segment

relative to other similar segments (in terms of functional class of roadway, traffic volumes, urban/rural, etc.) throughout Kentucky. A CRF of 1.00 represents the average for the particular roadway type, a value less than 1.00 suggests safer than average, and a value over 1.00 represents a higher incidence of crashes than the statewide average. The US 42 study corridor includes three segments, defined by milepost markers (See Figure 18). From west to east, the segment in the vicinity of Pleasant Valley Road has a CRF of 0.91, the segment from Weaver/hopeful-Church to Mall Road has a CRF of 1.58, and the segment in the vicinity of I-71/75 has a CRF of 2.11. This progression of increasing rates from west to east is not surprising, because of the increasing number of driveways and cross streets, or, in other words, increasing levels of congestion.

With regards to time of day, 72 crashes (9%) occurred during the 7:00 – 9:00 a.m. peak period, and 161 (20%) occurred during the 4:00 – 6:00 p.m. peak period. This also is not necessarily unusual, as it again reflects the most congested times of the day, when there is the highest likelihood of vehicles coming into conflict with each other.

Synopsis of Citizen's Comments from the Public Meeting

The following paragraphs are intended to summarize and depict, generally in order of priority, the sentiments of the general public from the October 30, 2007 public meeting, which was held at the Ockerman Elementary School on US 42. These include comments from the questionnaire which was made available at the meeting, as well as comments which attendees were encouraged to post on the aerial photos which were on display. Approximately 40 people attended this public meeting.

- 1) Above all else, FIX the intersection of US 42 with Hopeful Church and Weaver Roads! Suggestions included more right and left turn lanes, closure or relocation of driveways, and prohibition (with signing and enforcement) of certain left turns. Citizens' frustrations with conditions at this location spread to the commercial uses (and access thereto) on all four corners, but improving access to the bank drew particular attention, especially calls to relocate the primary access from US 42 to Weaver Road.
- 2) Continue and expand the effort, which has already been begun, to develop a system of service and/or frontage roads, to remove local commercial access traffic from US 42 itself. These comments were directed most frequently to expanding the service road system along the south side of the highway, but also where possible on the north side, such as behind the strip commercial development just west of Hopeful Church Road.

Crash Critical Rate Factor 2002 - 2004

U.S. 42

- 3) Implement access management improvements (driveway consolidations and relocations, turn prohibitions, etc.) wherever possible, but especially in the vicinity of the major intersections in the corridor.
- 4) Plan and construct a new roadway (before continuing new development precludes the opportunity) parallel to and northwest of US 42, beginning as an extension of the I-71/75 entrance/exit ramps at Mall Road, and continuing at least to Pleasant Valley Road, and perhaps continuing on all the way to Union.
- 5) Improve and widen Gunpowder Road between US 42 and Mt. Zion Road, to provide alternate access to I-71/75 from the Union and south Florence areas.
- 6) Along with #5, improve and widen Mt. Zion Road between Gunpowder Road and I-71/75 (a project to do this between I-71/75 and US 42 at Union is currently in the KYTC Six-Year Plan).
- 7) Improve and expand facilities and accommodations for both bicycles and pedestrians throughout the corridor.
- 8) Improve and widen Pleasant Valley Road to five lanes (a project to widen Camp Ernst and Pleasant Valley Roads between Burlington Pike and US 42 is currently in the KYTC Six-Year Plan).
- 9) Improve and extend traffic signal coordination throughout the corridor (this was a high priority recommendation from the public, but is listed last because the system has since been upgraded, and is being adjusted and “fine-tuned” as this report is being prepared.

The public meeting questionnaire is included herein as Appendix A, the complete questionnaire responses are in Appendix B, and the comments from the aerial photographs are in Appendix C.

Planned Roadway Improvements

Prior to, and co-incident with, the request for the preparation of this report, the Kentucky Transportation Cabinet has of course been involved in the on-going planning, programming, design, and scheduling of roadway improvement projects throughout District Six, including several which are located within, or impact, the subject corridor. In this section, these projects-in-development will be summarized, to provide a sense of the extent to which these “pipeline” projects will improve traffic and travel conditions in the corridor as they are

brought to fruition. These improvements are described in relation to the diagrams of existing intersection conditions presented earlier in this report (Figures 5 through 17).

At the northeast end of the corridor, the Industrial Road intersection is programmed for substantial improvements in the near future. This includes widening the northwesterly approach to include one left turn lane, one combined left and through lane, and one right turn lane. The departure side of the intersection will be widened to include two southeasterly departure lanes. Other access modifications and improvements will also be made along Industrial Road at the intersections with Safeway/Hill Crest, Columbia, and Carole Lane, as well as at several commercial driveways.

Immediately west of Industrial Road, westbound US 42 will be widened to three through lanes, extending through the Dream Street intersection all the way to the northbound I-71/75 entrance ramp. At this ramp, two lanes will continue across I-71/75, and the right-most lane will become an exclusive right-turn lane to the northbound ramp. (NOTE: It may be desirable in the future to widen this northbound ramp to two lanes, to further increase capacity entering the freeway.)

At Dream Street, the southbound approach to US 42 will be widened to three lanes, including one left turn lane, one through and left lane, and one right turn lane. The departure will remain as a single lane.

At the Mall Road intersection, eastbound US 42 will be widened to include dual left turn lanes to northbound Mall Road.

Gunpowder Road at US 42 is scheduled to be relocated slightly to the east between Ridgeview Drive and US 42, to enhance capacity and safety, and to improve the alignment with Pleasant Valley Road at US 42.

Along with the Gunpowder relocation will be a complete reconstruction of the intersection at US 42. When completed, all four legs will include two departure lanes. In addition, right and left turn approach lanes will be added as follows:

- 1) The Gunpowder approach will consist of one left turn lane, two through lanes, and one right turn lane.
- 2) The Pleasant Valley approach will consist of two left turn lanes, two through lanes, and one right turn lane.
- 3) The eastbound US 42 approach will consist of two left turn lanes, two through lanes, and one right turn lane.
- 4) The westbound US 42 approach will consist of one left turn lane, two through lanes, and one right turn lane.

Additional work to be done as part of this overall project includes the reconstruction of the intersection of Old Toll Road with Pleasant Valley Road, to improve the alignment of the intersection, and to reduce access to Old Toll Road to allow only right-in and right-out movements.

And finally, a left-turn lane from northbound Pleasant Valley Road into Haines Drive will be added, along with a two-way center left-turn lane on Pleasant Valley Road north of Haines Drive.

Boone County 2030 Transportation Plan Recommendations

In addition to the KYTC's programmed roadway improvements described above, the Boone County 2030 Transportation Plan, published in March, 2005, also includes roadway improvements scheduled for this portion of Boone County. Three of these recommendations echo projects from the KYTC 6-Year Plan, including 1) improvements to Camp Ernst/Pleasant Valley Road (KY 237) between Burlington Pike and US 42, 2) improvements to Mt. Zion Road (KY 536) between US 42 and I-71/75, and 3) improvements to Industrial Road (KY 1829) between US 42 and US 25 and beyond.

Furthermore, the Boone County Transportation Plan references three high priority recommendations, two of which (at SR 237 and US 42, and at US 42 and Mall Road) are already in progress, and were discussed above. The third project calls for short term improvements to the northbound I-71/75 exit ramp at US 42. The Boone County Plan, however, also calls for more substantial long-term improvements to this ramp, along with the southbound exit ramp and the northbound entrance ramp, to provide direct access between Industrial Road and the Interstate. The Plan lists these improvements in the 11-20 year future time frame.

Also included in the Boone County Transportation Plan is a medium to long range (within 10 years) recommendation to widen Gunpowder Road between US 42 and Mt. Zion Road to four lanes, and also to add bike and pedestrian facilities or shared use trails along this section.

Analysis / Additional Improvement Opportunities

One of the objectives of this study was to try to identify relatively simple and low cost solutions which could be implemented to provide a measure of short-term relief until more extensive, and expensive, alternatives could be pursued. Beyond the actions already taken or in the planning stages, however, there are no clearly

evident solutions to the congestion that prevails. The roadway infrastructure simply has not kept pace with the extensive residential and commercial growth which has occurred both within the corridor and to the southwest of it during the past several decades. This is not an unusual situation; similar conditions have been allowed to develop along major roadway corridors throughout the OKI Region and across the country.

The planned roadway improvements outlined previously will go far to improve traffic conditions in the US 42 corridor and surrounding areas. The recent extension and upgrade of the progressive signal system already appears to be producing smoother traffic flow, and as refinements and adjustments continue to be made, it is likely that additional incremental advances will be realized.

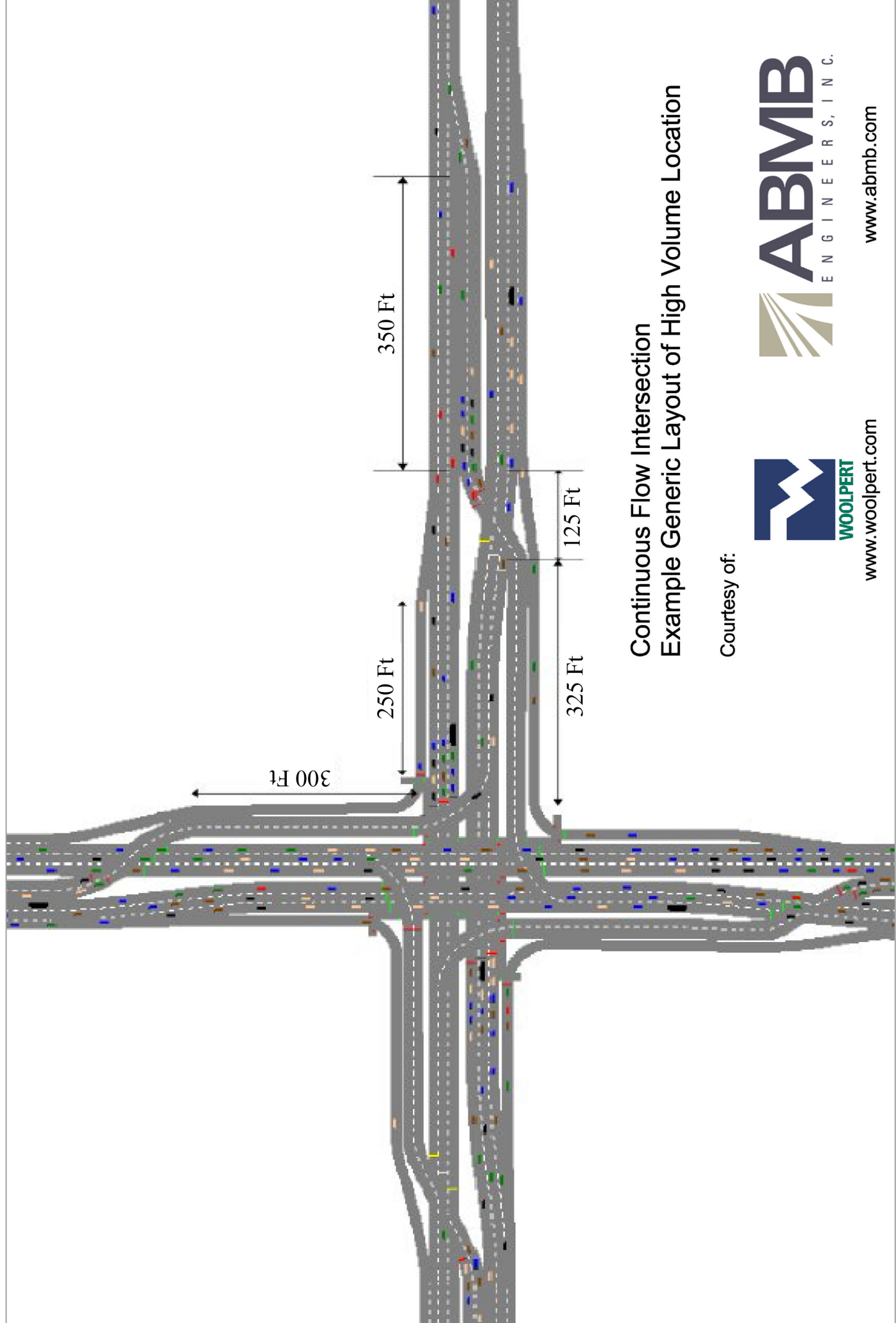
The major problem remaining is that the planned improvements do not address the most problematic location in the corridor, and that is the intersection of US 42 with Hopeful-Church and Weaver Roads. As evidenced in the public comments, this clearly needs to be addressed in some fashion. While access to the bank was cited most often as a major problem, access to the commercial establishments on the three other corners of the intersection also needs to be addressed and modified. In the short term, the access to the bank directly from US 42 needs to be modified with turn restrictions at a minimum, and if possible should be relocated completely to a new drive off of Weaver Road (or, in the future, off of a service or frontage road parallel to US 42 behind the bank).

For the other three corners of this intersection, turn restrictions are also needed (along with appropriate enforcement) to help reduce friction and congestion between through and turning vehicles in the vicinity of the intersection. Given the long vehicular queue lengths which prevail on all approaches at this location, anything that can be done to eliminate or reduce turning movements will marginally help to improve traffic flow at this location.

Consideration should also be given to construction of an exclusive right turn lane on the eastbound approach to this intersection, directly in front of the bank.

For the longer term, consideration should be given to construction of a "continuous flow" or "parallel flow" intersection at this location (See Figure 19). These relatively new forms of intersections have median cross-overs for left-turning traffic in advance of the intersection on each approach, and are designed in such a manner that both left-turning and through-right traffic on opposing approaches can proceed on a common green indication of the traffic signal. By doubling up the movements on a common green phase, the capacity of the intersection is greatly improved. (A partial continuous-flow intersection is currently being designed for the intersection of Beechmont Avenue and Five Mile Road in Anderson Township, Ohio – See Figure 20.)

-Figure 19-
Continuous Flow Intersection



Continuous Flow Intersection
Example Generic Layout of High Volume Location

Courtesy of:

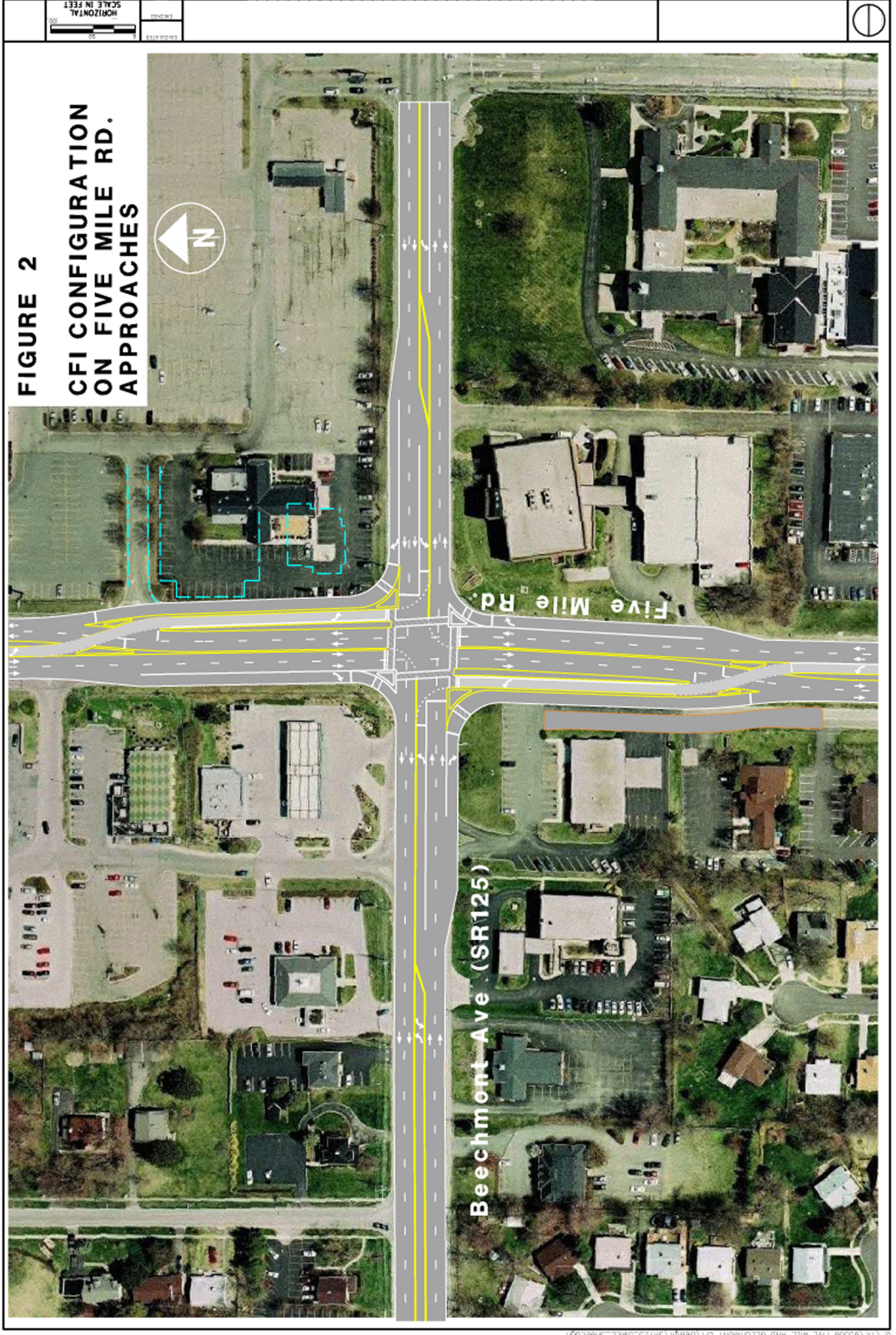


www.woolpert.com



www.abmb.com

-Figure 20-
CFI at Beechmont and Five Mile Roads



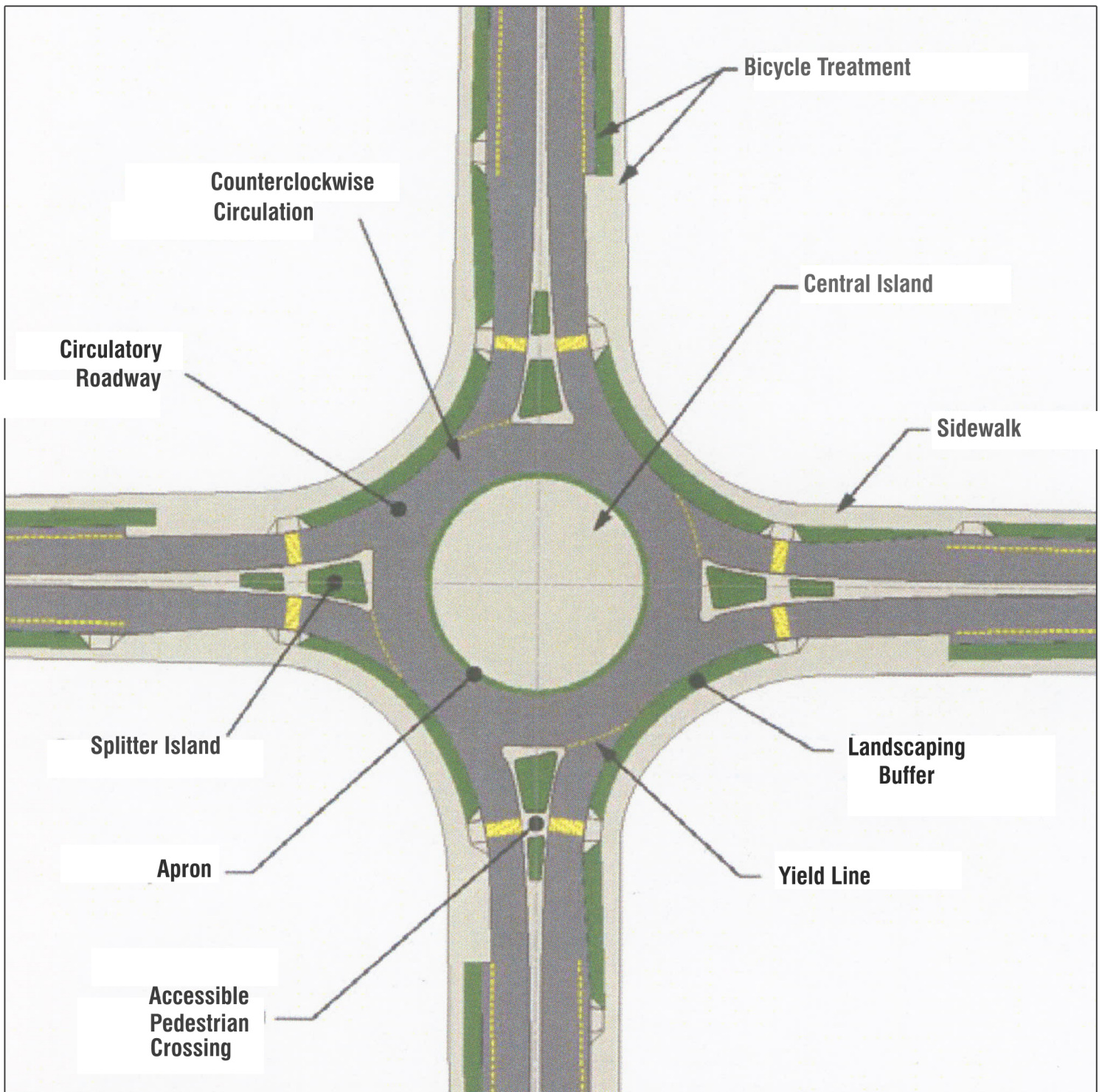
A second innovative alternative that is available is installation of a modern roundabout (See Figure 21). Modern roundabouts are based on relatively new design and operations principals, and are much safer and more efficient than the older rotaries and traffic circles. Hundreds of modern roundabouts have been designed and constructed in the United States in recent years, and they are proving to be a significant improvement over the conventional signalized intersection. Unfortunately, the current state of the art is such that they are essentially untested in the OKI Region, and, more to the point, they have not been established as being suitable for the volumes of traffic that pass through the US 42/Hopeful-Church Road intersection.

Looking at the corridor more broadly, and even beyond to the overall growth occurring in this part of Boone County, the suggestion to construct a new parallel roadway to the north and west of existing US 42, beginning at the intersection of Mall Road with the I-71/75 entrance/exit ramps, would appear to provide the greatest long-term relief in this corridor. This roadway should extend at least to Pleasant Valley Road, and ideally even further to the west and south, to provide additional capacity to serve this rapidly growing area. It was reported at the public meeting that some discussions have already taken place in this regard, and that a generally defined corridor has already been identified.

Recommendations

- 1) Continue to monitor and refine the new progressive signal system in the corridor.
- 2) Begin discussions with property owners on the four corners of US 42 and Hopeful-Church/Weaver Road with the objective of eliminating, reducing, or relocating some of the access points along US 42. Also included in this project should be construction of an exclusive right-turn lane on the eastbound approach to the intersection.
- 3) Continue with the currently planned projects in the corridor, which upon completion will significantly improve travel conditions.
- 4) Also continue with development of the planned widening projects on nearby roadways (Gunpowder, Mt. Zion, Pleasant Valley), which will provide valuable alternate routes for motorists to use to access I-71/75 and other destinations.
- 5) Investigate the feasibility of construction of a continuous flow intersection at US 42 and Hopeful-Church/Weaver Roads.
- 6) Coordinate with the Boone County Planning Commission and the City of Florence regarding the planning and development of a system of frontage or service roads along US 42 as development continues to occur. This should also include contingency plans for retrofitting service roads where

**-Figure 21-
Modern Roundabout**



possible, or at least consolidating and improving existing access points, as redevelopment occurs in the corridor.

- 7) Coordinate with the Boone County Planning Commission and the City of Florence to identify a potential alignment for a new roadway parallel to and northwest of existing US 42, so a right of way corridor can be preserved as development continues to occur. This corridor should extend from Mall Road/I-71/75 at least to Pleasant Valley Road, and ideally even further to the southwest.

Appendix A

PUBLIC MEETING QUESTIONNAIRE US 42 TRAFFIC STUDY October 30, 2007

Help us identify operational, safety, congestion and other issues affecting traffic on US 42 between Wetherington Blvd. and Industrial Road.

Please return this form before leaving or you can request a postage paid envelope today and return the questionnaire by mail no later than two weeks after this meeting date.

Name: _____

Address: _____

Phone Number: _____

How often do you travel the US 42 corridor?

- _____ At least once a day
- _____ Several times a week
- _____ A few times a month
- _____ Less than a few times a month

What do you consider to be the main traffic problems in the US 42 corridor? (For example, safety, congestion, too many trucks, turns in and out of driveways, too many driveways, poor signal operations, too many signals, not enough signals, etc.) Listing them in order of importance would be helpful. Also, please be as specific as possible about locations, times of day, days of the week, directions of travel, etc., where you have observed these problems.

- 1) _____

- 2) _____

- 3) _____

Do you have specific suggestions about possible solutions to these problems?

Thank you for sharing your ideas.

Appendix B

Summary of Public Comments from Questionnaire US 42 Public Meeting October 30, 2007

Too many signals that are not synchronized. During rush hours, allow for major flow of higher volumes of traffic.

Not enough left turn lanes at major intersections.

Too many curb cuts.

Most people are trying to get to Hopeful Road/Mall Road/or North I-75. The most efficient fix is building the Reykamp Road from Pleasant Valley to Hopeful, and continuing to Mall Road/I-75 Ramp. You create a parallel to US42 thru mostly undeveloped land.

+++++

Too much traffic! Many people from Union and subdivisions of Pleasant Valley are trying to get to I-75 and the mall.

Too many driveways on 42.

Need more left turn lanes.

Improve Gunpowder to connect to Mt. Zion Road.

Do not put any heavy usage at corner of Weaver and 42.

Add more retail further south (Union, Richwood, etc.)

Add more bus routes to Union area (park-n-ride?).

+++++

Congestion-especially from I-75 to Pleasant Valley. It's worse during rush hour either direction.

Too many signals – in the approximate 3 miles I travel from I-75 to my community in Union there are 11 signals. Some days I have to stop at almost every one of them. This is usually during rush hour during the week, but it happens on Saturdays as well and it happens going either direction.

Is there a way to fix the signals so they are set to stay green longer on 42 during the heaviest traffic times?

+++++

Poor turning lanes!

1) In front of US Bank at 42 and Weaver. Friday from 4-7 p.m.

2) Left turn lanes from the strip mall side entrance onto Hopeful Church.

3) Left turn onto 42 from expressway--71/75 north.

4) Left turn onto Dream Street.

Stop left turns from strip mall onto Hopeful Church.

The US Bank needs another exit/entrance onto Weaver Road.

+++++

During school year greater number of cars with parents taking children to school.

Left turn off Weaver to Burger King stops too much traffic.

Fix left turn lanes at Weaver/US42 (replace rough pavement)

+++++

Speed limits are too high! With all drive entrances, congestion, trucks, etc. the only time it is possible to safely drive 45 is after 11 pm. (unless you limit access)

Noon-5 pm (M-F), 1-5 pm (Sat-Sun) – Worst times.

Need to limit driveway access near intersections, synchronize traffic lights.

Left turns from Wm. Haines to Pleasant Valley and Pleasant Valley to Old Toll are Bad.

The entire Weaver-42-Hopeful Church is very bad.

Right turn lane 42 onto Weaver.

Crosswalks and bike accessible travel!

Reduce speed limits to make it safe.

Encourage people to walk and ride bikes-the best traffic solution of all!

+++++

42 & Hopeful Church Road-shopping centers and banks seriously hinder flow of traffic and create many dangers daily.

Lack of enforcement of "no turn" signs.

Hopeful Church Road is a narrow funnel between 18 & 42- from Houston & 18, you have 5 lanes dumping into one!

Between Weaver & Industrial - Frontage roads needed with limited access to 42.

Create a road from Hopeful Church to Pleasant Valley to keep residential traffic out of 42 corridor.

Create frontage or backage roads from Pleasant Valley to Mall Road, and limit access points to US42.

Locate new businesses on South 42 from Union and out to limit inbound traffic on 42 N.

+++++

Traffic/congestion (on 42/Hopeful Church) will only be increased when new subdivision in Union completed - if Walmart goes in - what a nightmare!

Too many left hand turns off 42 made without benefit of turn signals/traffic light (into strip mall where Wing Optical is and into US Bank.

Too many signals - just from I-75 SB to Mall Road sometimes takes more than 10 min.

Stop the growth --people complain about emissions from vehicles increasing "Green House Effect". Has anyone thought about all the blacktop we have might have some effect on this global warming issue? How about just putting a hiatus on the growth!

+++++

Poor signage. Need overhead signs at and in advance of major intersections, including PV Road, Mall Road, I-75, Weaver. (Do same for KY18).

Signals: Synchronize them; allow a little more time between vehicles in vehicle detector timing; regularly test detector ability to detect bikes & motorcycles.

Lanes & access: need to widen this road and add a lane each way. Must add bike lanes and sidewalks from Kroger to Mall Road & beyond. More left & right turn lanes at Weaver.

See above for specifics. I'd be pleased to show examples of good signage.

Synchronizing signals: focus on inbound in AM, outbound in PM.

Detectors: Left turn lane N on Weaver/ L on 42 does not detect motorcycles, requires tailgaiting.

With thousands of housing units coming to Union, another lane is essential.

Ability to bike to/from more stores might reduce trips, save \$4 gas.

+++++

Mt Zion from 75 to Gunpowder. Major eastbound congestion in morning between 7-8 am.

Mt. Zion from 75 to Gunpowder E and W; 5-6 pm

Traffic off of Mt. Zion exit 4-6 pm.

Timing of lights in am longer, shorter lights off on exit.

Widen roads.

+++++

Congestion in morning on the way to I-75.

Congestion in afternoon on the way to Union.

Traffic signals.

Working with local business to restrict turn lanes in traffic direction.

+++++

42 & Industrial – 3 pm to 4 pm - people blocking intersection.

Roughness of 42.

Lack of signs for people not familiar with area and blocking up intersections.

Lighted overhead signs state "Do not block intersection"

Concrete barriers to block certain areas to keep people from turning one way or the other in areas that don't need turning on to.

+++++

Congestion – northbound 7:15 - 8 am. Southbound 5:00 – 6 pm.

Poor signal operations - southbound US42 at Mall Road, Weaver Road at 4:30 – 6pm

Rework signal operation

+++++

Access Management - near Weaver/Hopeful Church Road:

- Left into strip center heading west US42 (Burger King)

- Left into BP and AE Door heading east on US 42

- Left out of BP heading east on US42

- Left into strip center heading north on Hopeful Church Road (there is a "No Turns" sign, but need an island)

- Left into US Bank heading west on US42

Access Management - Near Industrial:

- Left into Rally's heading south on Industrial Road

- Entry and Exit at Penn Station along US 42

- Entrance to strip center at Camino Real

- Northbound "Florence" exit ramp turning left to head westbound

- Dream Street turn lane heading east

Synchronize street lights appropriately.

Think about turn lane heading west on US 42 into Pleasant Valley.

Combining entrances to multiple businesses if possible.

Keep the City of Florence involved throughout the process of this study.

+++++

1) The plan to widen 42 to Weaver seems almost obsolete, given the current level of traffic, and probably should be extended as far as Gunpowder.

2) To expand on my previous letter, while most of my arrival to 42 during rush hours is from the freeway, I've on occasion come in from the three main bottleneck intersections: Mall Road, Hopeful Church, and Pleasant Valley. The intersections at 42 from these streets are decidedly no picnic during rush hours, and so I doubt that traffic signal timing changes would seriously ameliorate the total delays.

3) A minor improvement would be to eliminate left turns south of Weaver to the bank and other businesses, requiring cars to wait until they get to the next signal at the ice cream shop. But then one would have to be sure there's Northbound side road access to these businesses. I don't know if such access exists now. Unfortunately, from what

I can see, this is the only on/off access in the stretch from 42 to Wetherington that hurts the overall flow of traffic.

+++++

- 1) Congestion – Especially during rush hours and on Saturday mornings.
- 2) Safety – Getting into/out of US Bank is very difficult.

Build more service roads so access to retail and banks is not directly off US 42 (e.g., the strip mall at corner of Hopeful and US 42 is also a nightmare to get in and out of, and so is Walgreen's and Tire Discounters).

A road connecting Hopeful Church Road to Pleasant Valley Road would be very helpful. Use the land Wal-Mart wanted to build a jug handle – to re-route left and right hand turns onto Hopeful and Weaver (and build a safer access from this road to the US Bank). – OR - Build a new access to the US Bank from Weaver Road.

+++++

- 1) Safety – The numbers of accidents over the past three years along this part of 42 speaks volumes.
- 2) Access management is needed.

A project is needed that will widen and improve the accessibility – possibly 600' minimum spacing. Someone at the meeting suggested creating parallel relief roadways on either side. This is probably impossible due to development. This project needs to be started ASAP (no big surprise!)

Appendix C

Public Comments from Aerial Photographs US 42 Traffic Study Public Meeting October 30, 2007 (Transcribed November 26, 2007)

Build a new road (three lanes minimum) from the Mall Road ramps to/from I-71/75 westward across Hopeful-Church Road to intersect at a reconstructed section of Pleasant Valley Road (this is the Boone County Planning Commission proposal, although more than one alternative general alignment may be worth considering.)

Need a longer left turn lane eastbound at mall Road (NOTE: the planned project for dual LT lanes will address this).

The existing pavement is rough at various locations east of Mall Road.

There is weekday P.M. congestion westbound approaching Ockerman Drive (right turn into school?)

Need big overhead signs on 42 at and in advance of Mall Road (both ways), so motorists know to get in the proper lane in advance.

Don't let Mall Road retail growth go west on 42 (???).

Extend the south side frontage road opposite Farmview Drive further to the southwest.

Need more service roads along south side of 42, northeast from Wetherington Boulevard.

Need bike lanes along 42 like down in Union.

Need south side frontage/service road all the way from Gunpowder to Weaver – and a new connector from this road to 42 in the vicinity of the Wal-mart parcel.

Need an exclusive right turn lane eastbound on 42 at Weaver.

Westbound Old Toll Road is used as a high-speed cut-through to Pleasant Valley Road.

Block the access from 42 to the US Bank.

Prohibit left turns off of 42 (both directions) to retail uses just east of Hopeful-Church/Weaver.

Restrict access to retail on both sides of Hopeful-Church Road immediately adjacent to 42 (close driveways, or right in/right out only).

Widen Hopeful-Church Road to five lanes.

Create a new service road between Old Toll Road and Hopeful-Church Road, routing it behind the strip retail center at 42 and Hopeful-Church Road.

Drivers have problems accessing 42 from the northeast intersection of Old Toll Road.

Prohibit westbound left turns off 42 into the US Bank.

Find a better driveway location (along Weaver) for the US Bank.

Add a right turn lane on eastbound 42 at Weaver.

Will the improvements along Pleasant Valley Road include bicycle accommodation?

Heavy left turns from Pleasant Valley Road to eastbound 42 are a problem (NOTE: The planned intersection improvement will address this).

Need bike lanes along 42.

Drive-through customers at McDonalds (coming out at 45-60 second intervals) cause actuation of the signal at 42 every cycle during busy times – causes delays on 42.

Morning eastbound back-ups from the signal at Weaver extend almost to Pleasant Valley/Gunpowder on some days.

Don't allow new traffic generating land uses on the Wal-mart site and vicinity.

Ins and outs from the US Bank are very dangerous – change to right in/right out only, or relocate the driveway.

Left turn lanes (both directions) on 42 at Hopeful-Church/Weaver have rough, uneven pavement.

Left turns into the strip retail center (at Hopeful-Church Road) from 42 are very problematic.

Left turns from Hopeful-Church Road into the gas station/convenience store/restaurant are a problem.

Need a median barrier on 42 at the Burger King driveway, to force right in/right out movements only.

There is too much traffic already (42 and Weaver), and Wal-mart would make it a nightmare – it doesn't matter how many lanes or how well the signals are coordinated.

Need a new access to the US Bank off of Weaver, opposite the driveway to Burger King.

Left turns from Weaver into Burger King are a problem – prohibit them, or add a left turn lane.

Add a right turn deceleration lane on Weaver approaching the Burger King driveway.

Need a new road to the northwest of 42, all the way to Union.

There are too many driveways to the mixed retail uses opposite Sycamore Drive.

The merge from 42 to southbound I-71/75 is difficult.

The left turn lane from westbound 42 to southbound I-71/75 is too short – causes back-ups onto the bridge.

Left turns from the northbound I-71/75 exit ramp to westbound 42 are difficult.

Need to widen 42 from the southbound I-71/75 ramps at least to Mall Road.

BUT ALSO, from another person,

No widening from here (ramps) to the west.