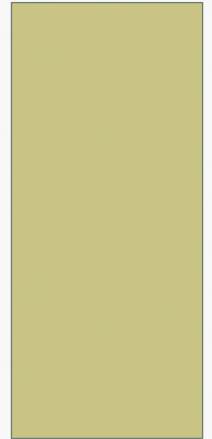


CENTER RIDGE / CANTERBURY ROUNDAABOUT



DIRECTOR OF ENGINEERING ROBERT P. KELLY, P.E.

TRAFFIC STUDIES

- CENTER RIDGE ROAD CORRIDOR STUDY (2012)
- CENTER RIDGE ROAD & CANTERBURY ROAD INTERSECTION IMPROVEMENT STUDY (2013)



TMS Engineers, Inc.



CENTER RIDGE CORRIDOR STUDY

- TMS ENGINEERS, INC. 2012
 - ASSESS EXISTING TRAFFIC CONDITIONS
 - ASSESS FUTURE TRAFFIC CONDITIONS (2034)
 - IDENTIFY TRAFFIC CONGESTION PROBLEMS
 - IDENTIFY GEOMETRIC OR OPERATIONAL IMPROVEMENTS
 - REVIEW CRASH PATTERNS AND THEIR PROBABLE CAUSE
 - INVESTIGATE CENTER RIDGE WITH THREE LANES (CURRENT 4)

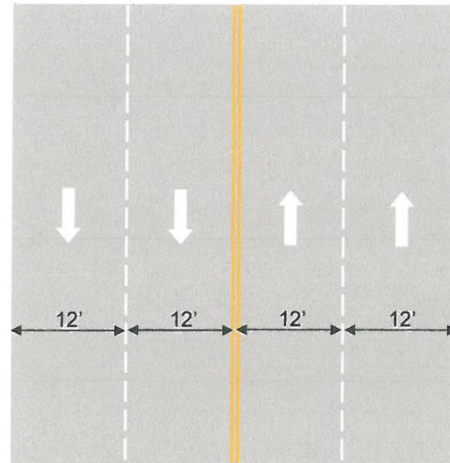


AVERAGE DAILY TRAFFIC

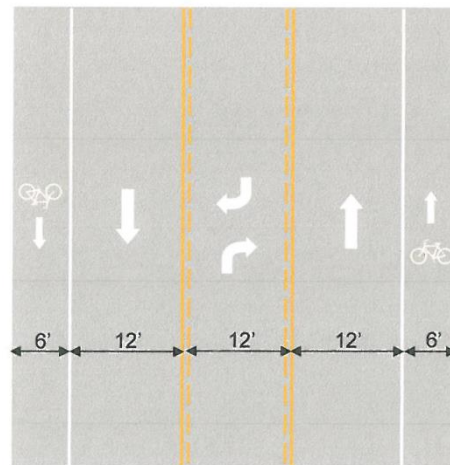
- CENTER RIDGE (15,100 ADT) HAS LESS TRAFFIC THAN DETROIT ROAD (20,500 ADT)

ROADWAY	SPEED LIMIT (Miles Per Hour)	AVERAGE DAILY TRAFFIC (Vehicles per Day)
Center Ridge Road	35	15,100
Bradley Road	35	6,591
Crocker Road/Stearns Road	35	21,194
Porter Road	35	8,148
Health Campus Drive	20	2,195
Schwartz Road	35	5,212
Dover Center Road	35	14,483
Westwood Road	35	5,500
Canterbury Road	35	5,095
Columbia Road	35	17,241
King James Parkway	25	1,369
Walter Road	35	2,138
Achievement Center Driveway	20	308
Clague Road	35	15,433

3 LANE CENTER RIDGE

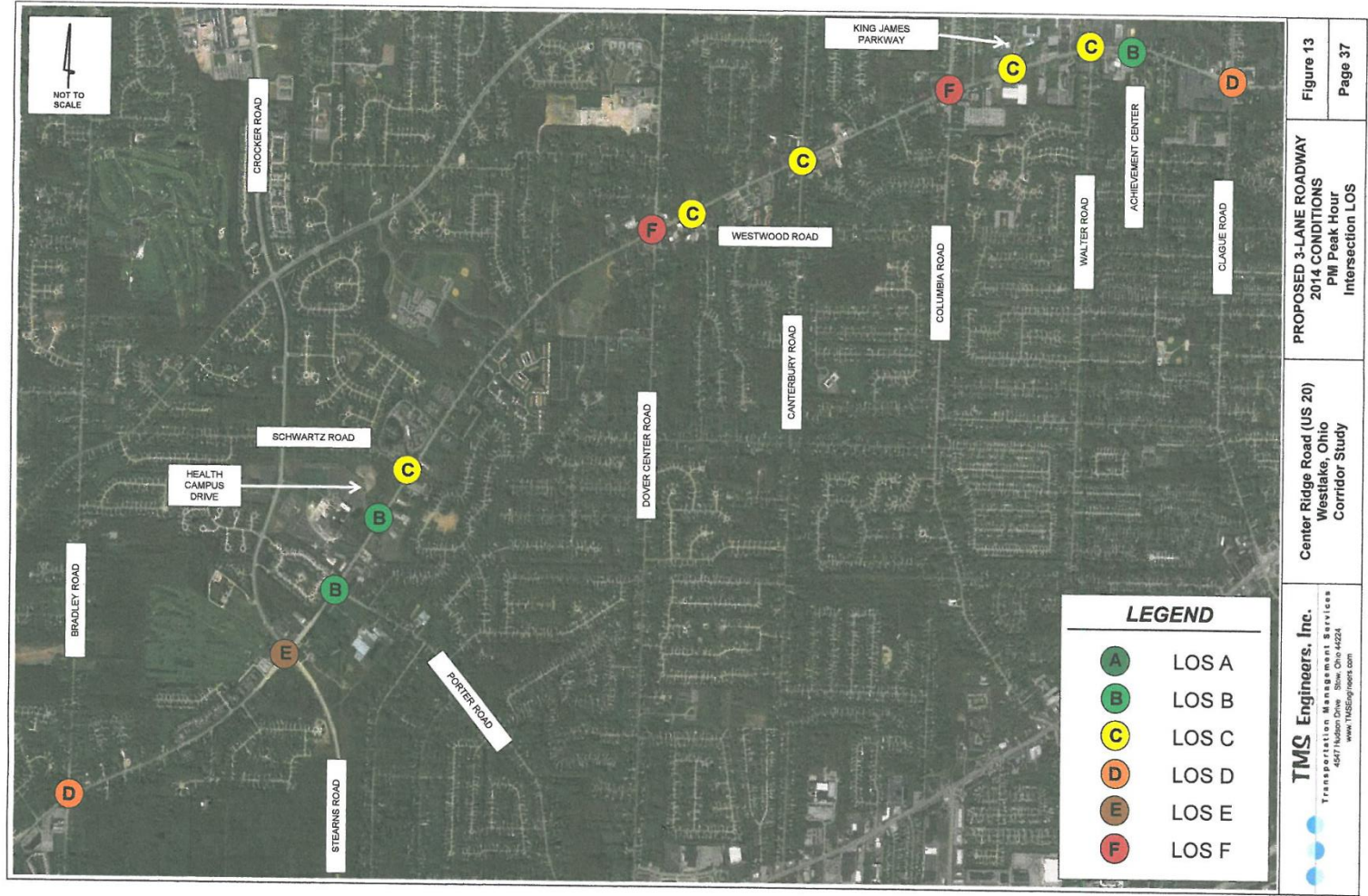


Existing 4-Lane Roadway



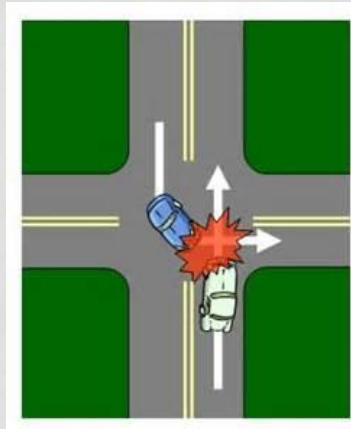
Proposed 3-Lane Roadway

3 LANE CENTER RIDGE



CRASH DATA

- Canterbury Intersection
 - Most injuries
 - Highest crash rate
 - Left Turn Crash Pattern



INTERSECTION CRASH PATTERNS

(2011 - 2013)

CENTER RIDGE @	TOTAL CRASHES (INJURY)	CRASH RATE (MEV*)	MAJOR CRASH PATTERN	TYPICAL CORRECTIVE MEASURE
Bradley Road	6 (0)	0.28	Rear End (5)	Improve Signal Visibility on approaches
Crocker/Stearns	23 (7)	1.32	Rear End (15)	Improve Signal Visibility on approaches Reduce congestion
Porter Road	11 (4)	0.52	Rear End (7)	Improve Signal Visibility on approaches
Health Campus	2 (0)	0.14	Rear End (1) Left Turn (1)	Improve Signal Visibility on approaches
Schwartz Road	7 (0)	0.35	Rear End (3)	Improve Signal Visibility on approaches Reduce congestion
Dover Center Road	38 (8)	0.98	Rear End (30)	Improve Signal Visibility on approaches
Westwood Road	8 (2)	0.41	Rear End (5)	Improve Signal Visibility on approaches
Canterbury Road	35 (8)	1.54	Left Turn (15) Angle (5)	Improve Signal Visibility on approaches Warning Signs Roundabout Control Protected Left Turn Phase
Columbia Road	22 (5)	0.62	Rear End (17)	Improve Signal Visibility on approaches Access management of private drives Reduce congestion
King James Parkway	13 (3)	0.76	Angle (4) Rear End (4) Left Turn (3)	Improve Signal Visibility on approaches Advance warning signs
Walter Road	16 (2)	0.85	Side Swipe (5) Rear End (3)	Improve Signal Visibility on approaches Improve Lane Use Control signing & pavement markings Advance warning signs
Clague Road	27 (3)	0.86	Rear End (21)	Improve Signal Visibility on approaches Reduce congestion

* Crash Rate Per Million Vehicles Entering the Intersection

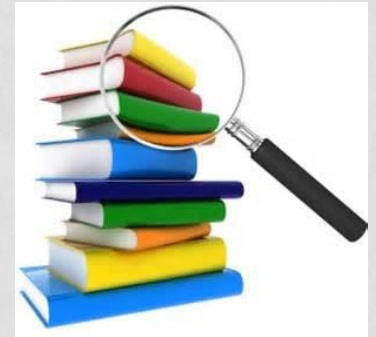
CORRIDOR RECOMMENDATIONS

- INVESTIGATE ROUNDABOUT AT CANTERBURY IN LIEU OF EXCLUSIVE LEFT TURN LANES
- ADD TURN LANE TO CENTER RIDGE ROAD (5 LANES)
- SIGNAL IMPROVEMENTS
 - LED'S
 - DISTANCE FROM STOP BAR
 - BACK PLATES ON SIGNALS



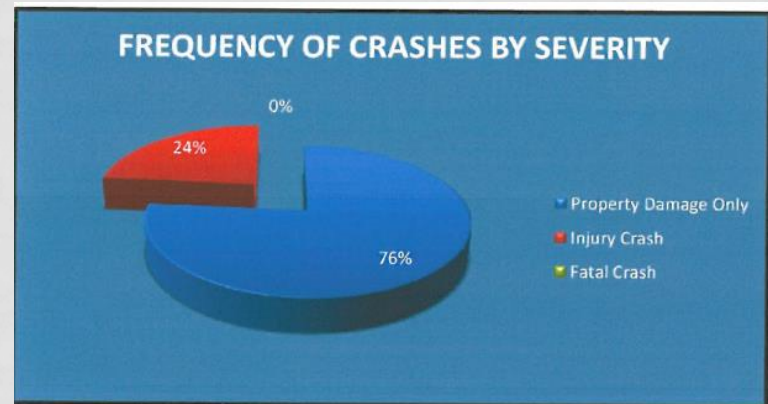
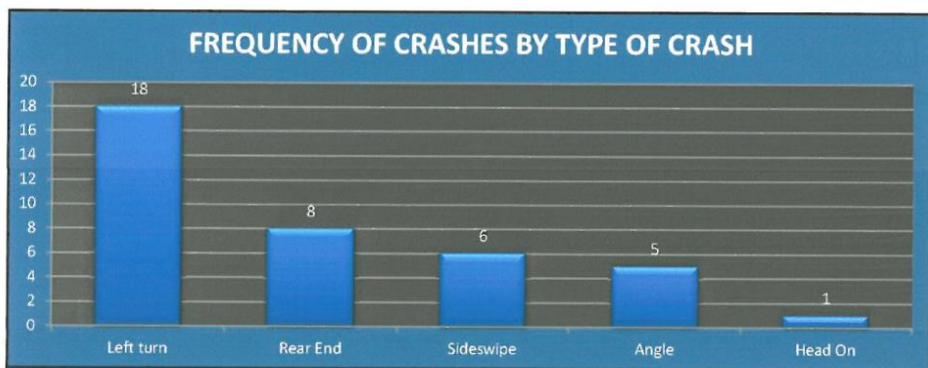
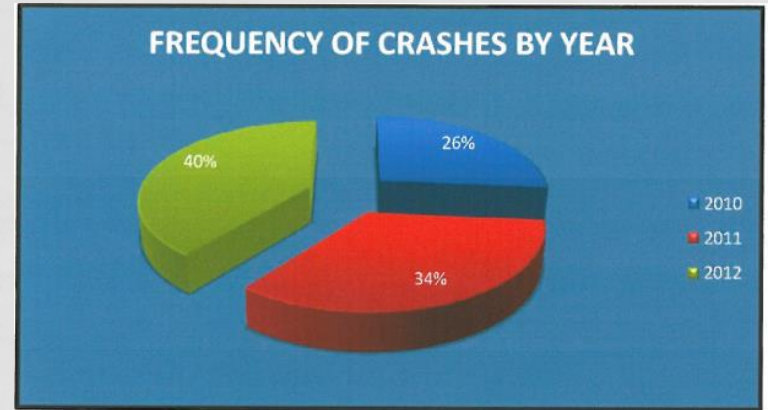
INTERSECTION IMPROVEMENT STUDY

- TMS ENGINEERS, INC., 2013
- NEXT STEP FROM CORRIDOR STUDY
- STUDIED ONLY CANTERBURY / CENTER RIDGE
- STUDY OBJECTIVES
 - ASSESS THE EXISTING TRAFFIC CONDITIONS
 - EVALUATE AND DOCUMENT NEEDS FOR IMPROVEMENT
- INTERSECTION EVALUATION
 - LEVEL OF SERVICE (“WAITING TIME”)
 - CRASH ANALYSIS (CONTROLLING FACTOR DUE SEVERITY)



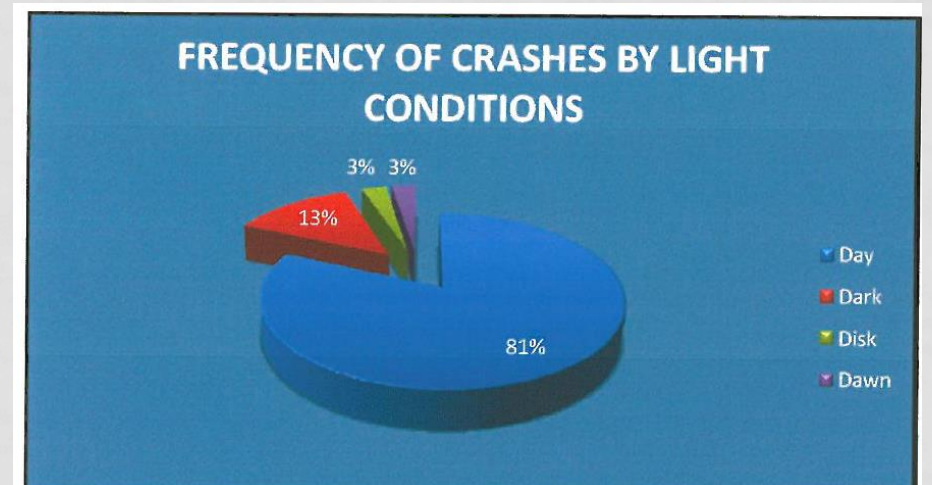
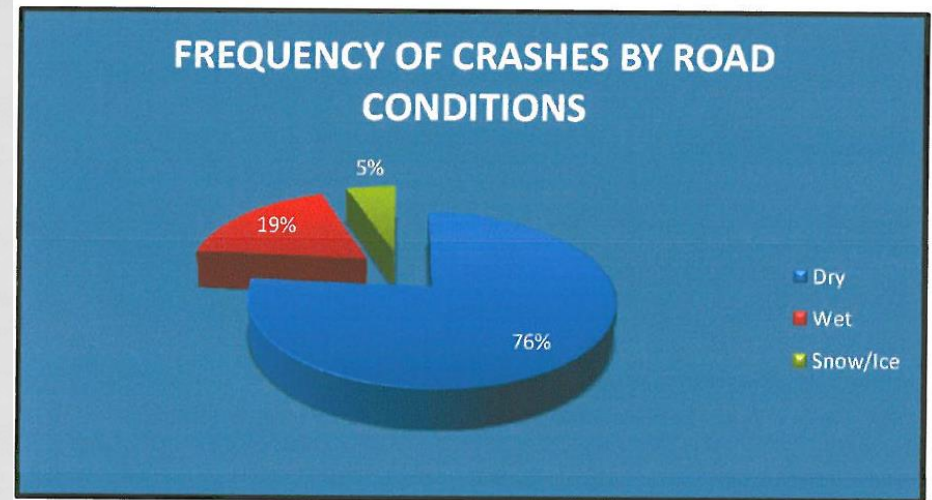
FURTHER ANALYZE CRASH DATA

- CRASHES INCREASED EACH YEAR
- HIGH SEVERITY DUE TO LEFT TURN



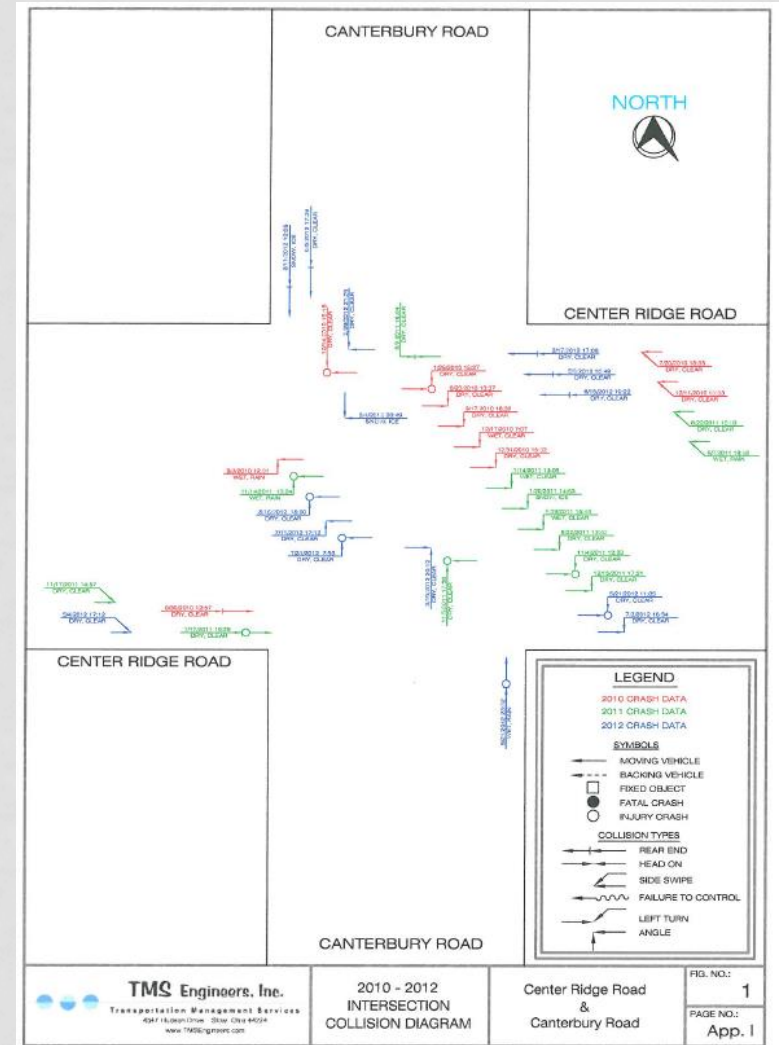
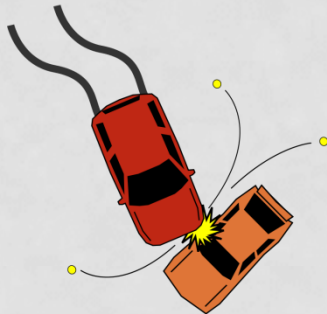
ENVIRONMENTAL CRASH CONDITIONS

- MAJORITY OF CRASHES OCCURRED DURING OPTIMUM CONDITIONS



COLLISION DIAGRAM

- MAJORITY OF CRASHES WERE FOR CENTER RIDGE TRAFFIC
- HILL TO THE NORTH WAS NOT A ROLE



LEVEL OF SERVICE

- LOS IS NOT THE ISSUE.
- SAFETY IS THE DRIVEN FORCE OVER THE IMPROVEMENT

2013 LEVELS OF SERVICE
(Existing Conditions - Signalized Intersections)

LOCATION	MOVEMENTS	AM PEAK LOS (DELAY)	PM PEAK LOS (DELAY)
Center Ridge Road & Canterbury Road	Intersection	B (16.8)	B (19.1)
	Eastbound	B (17.9)	B (17.3)
	Westbound	B (13.7)	C (20.2)
	Northbound	B (18.3)	B (16.4)
	Southbound	B (16.0)	C (20.5)

(XX.X) = Average vehicle delay in seconds per vehicle

INTERSECTION LOS

LOS	UN-SIGNALIZED AVERAGE DELAY PER VEHICLE (sec)	SIGNALIZED AVERAGE DELAY PER VEHICLE (sec)
A	≤ 10.0	≤ 10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	21.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	> 50	> 80

2033 LEVELS OF SERVICE
(Existing Conditions - Signalized Intersections)

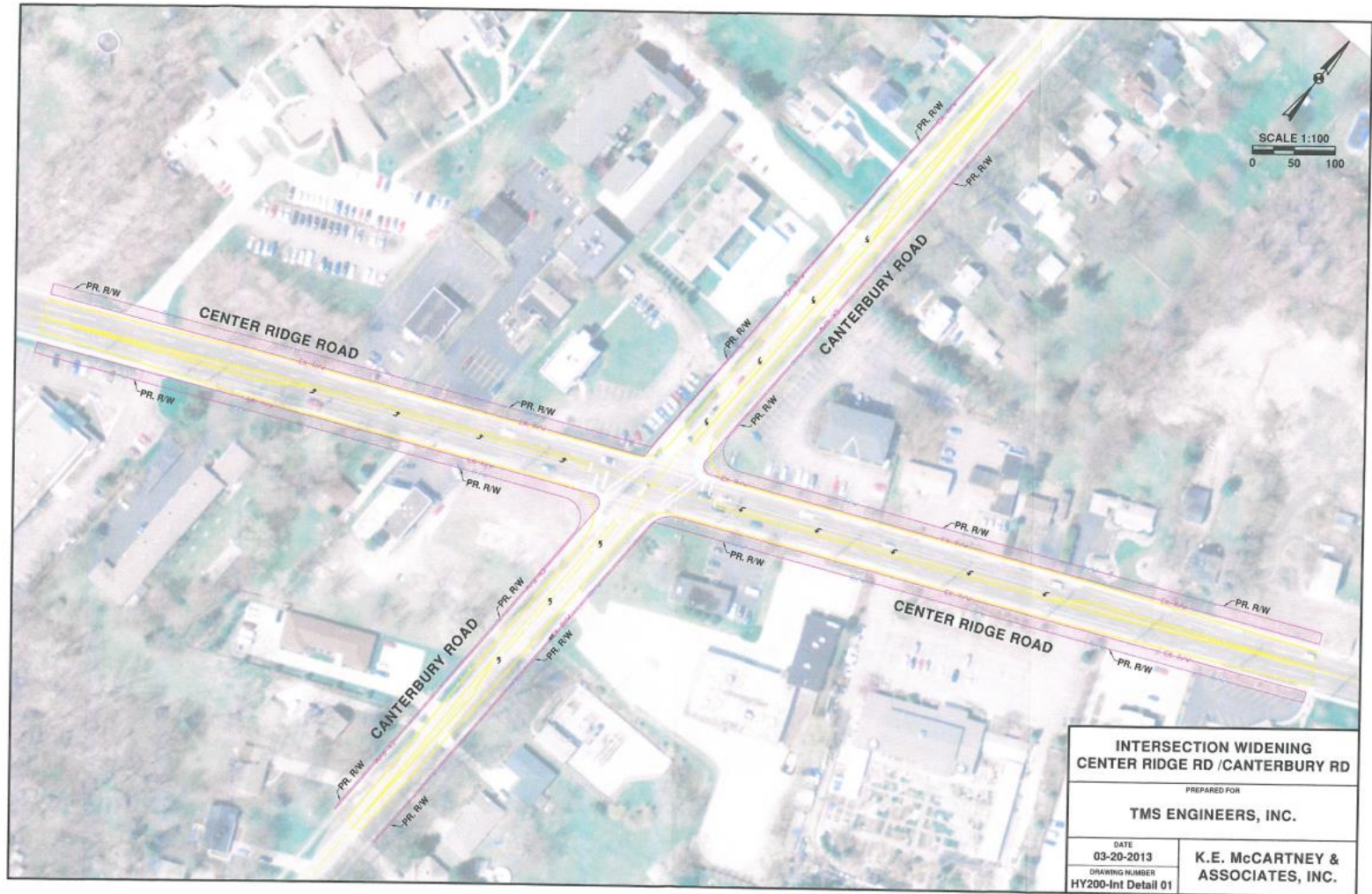
LOCATION	MOVEMENTS	AM PEAK LOS (DELAY)	PM PEAK LOS (DELAY)
Center Ridge Road & Canterbury Road	Intersection	B (18.2)	C (24.7)
	Eastbound	C (20.1)	B (19.3)
	Westbound	B (14.0)	C (27.4)
	Northbound	C (20.0)	C (20.9)
	Southbound	B (17.2)	C (29.3)

(XX.X) = Average vehicle delay in seconds per vehicle

SAFETY ANALYSIS

SCENARIO	CRASHES / YEAR
EXIST. CONFIGURATION (ACTUAL)	12.67
EXIST. CONFIGURATION (TYPICAL)	3.2
PROP. SIGNALIZED INTERSECTION	2.1
ROUNDBABOUT	1.5

SIGNALIZED INTERSECTION

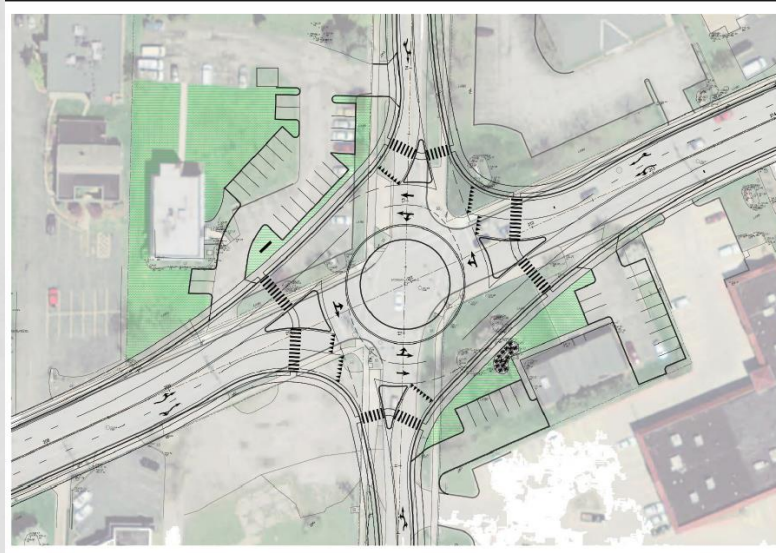


SIGNALIZED INTERSECTIONS

- DOVER CENTER / DETROIT ROAD
 - \$2.2 MILLION (CONSTRUCTION COST 2011)
- BRADLEY ROAD / DETROIT ROAD
 - \$3.3 MILLION (CONSTRUCTION COST 2014)
- CANTERBURY / DETROIT ROAD (UNDER DESIGN)
 - 3.1 MILLION (STAGE 1 ESTIMATE FOR CONSTRUCTION)
 - 19,000 S.F. OF EASEMENT TAKE (\$132,000)
- PROPOSED CANTERBURY / CENTER RIDGE
 - 3.3 MILLION (CONCEPTUAL CONSTRUCTION ESTIMATE)
 - 20,000 S.F. OF ASSUMED EASEMENT TAKE (\$140,000)

ROUNDAABOUT CONTROL

- EASEMENT TAKE IS HALF OF A SIGNALIZED INTERSECTION (10,000 S.F.)
- NO SIGNAL COST (\$175,000) AND NO MAINTENANCE
- ESTIMATED CONSTRUCTION COST IS \$2,300,000
- SAFER THAN SIGNALIZED CONTROL

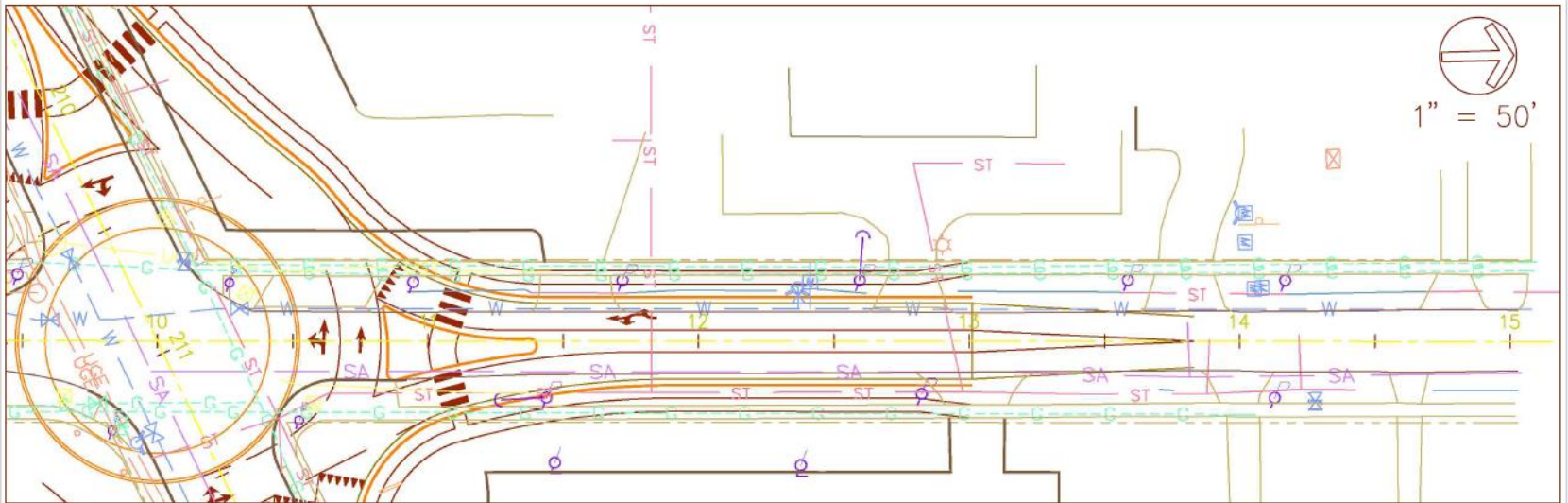


SIGNAL COMPARED TO ROUNDABOUT

- ROUNDABOUT IS CHEAPER TO BUILD
- LESS IMPACT TO PARCELS AND CHEAPER EASEMENT TAKE COST
- THE TWO AFFECTED PARCELS ARE FOR ROUNDABOUT
- ROUNDABOUT IS SAFER
- GATEWAY OPPORTUNITY

	SIGNAL	ROUND-ABOUT
CONSTRUCTION COST	\$3,300,000	\$2,300,000
EASEMENTS NEEDED	26	6
EASEMENT TAKE COST	\$140,000	\$70,000
TOTAL COST	\$3,440,000	\$2,370,000

NORTH HILL



CANTERBURY

ROUNDAABOUT TOUR

- 16 Roundabouts
- Led by Dublin's Assistant City Engineer



ROUNDAABOUT EXAMPLE

- HILLIARD, OH
- SCHOOL CLOSE BY
- NO SPECIAL PROTECTION FOR PEDESTRIANS
- PARKING LOTS ADJACENT TO ROUNDAABOUT



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE



ROUNDAABOUT EXAMPLE

