Darrell Road
Phase I Engineering Study

Stakeholder Involvement Group Meeting #3

February 1, 2017

LakeCounty Division of Transportation

CIVILTECH

Purpose of Meeting

I. Review existing and future conditions.

II. Recap of SIG Meeting # 2, PIM #2.

III. Discuss the Alternatives Carried Forward.

IV. Present concept typical sections.

V. Present intersection improvement treatments and associated benefits and impacts.

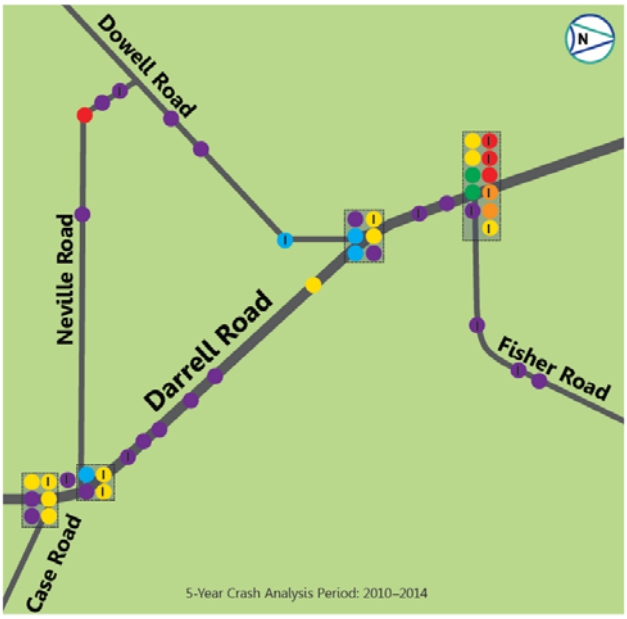
VI. Evaluate and compare intersection improvement treatments.

VII. Discuss next steps.

Project Purpose and Need

- Address existing safety and operational improvement needs.
- Identify long range travel demand and transportation system improvement needs.
- Develop a staged transportation improvement plan.

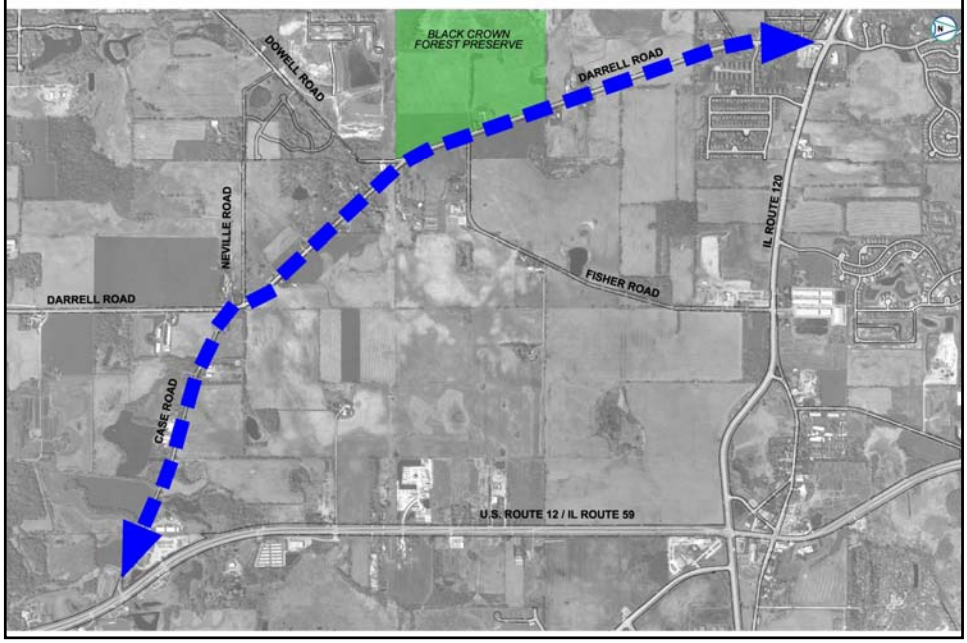
Existing Crash Data



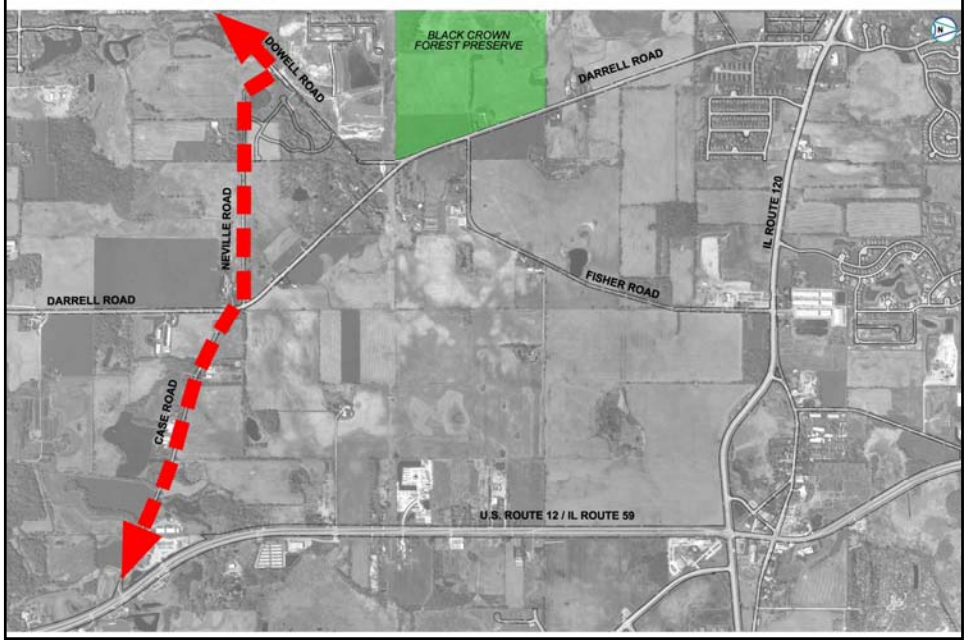
	Legend	Number
Crash Type	Right Angle	4
	Left Turn	2
	Rear End	12
	Sideswipe	2
	Fixed Object	22
	Other	4
Injury	Injury	16
	Property Damage Only	29

Binder Tab 12

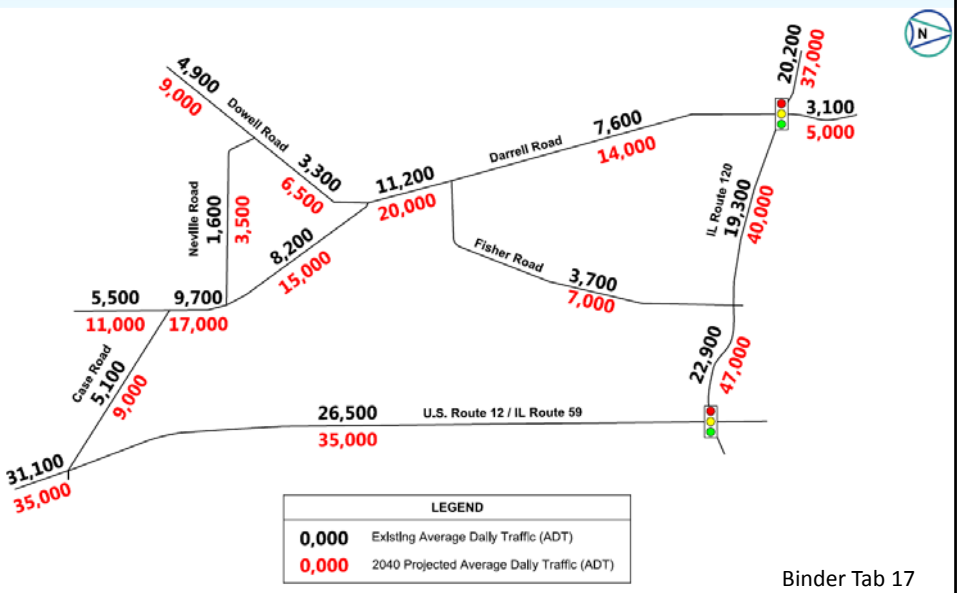
Identified Travel Patterns



Identified Travel Patterns



Existing and Projected Traffic



Binder Tab 17

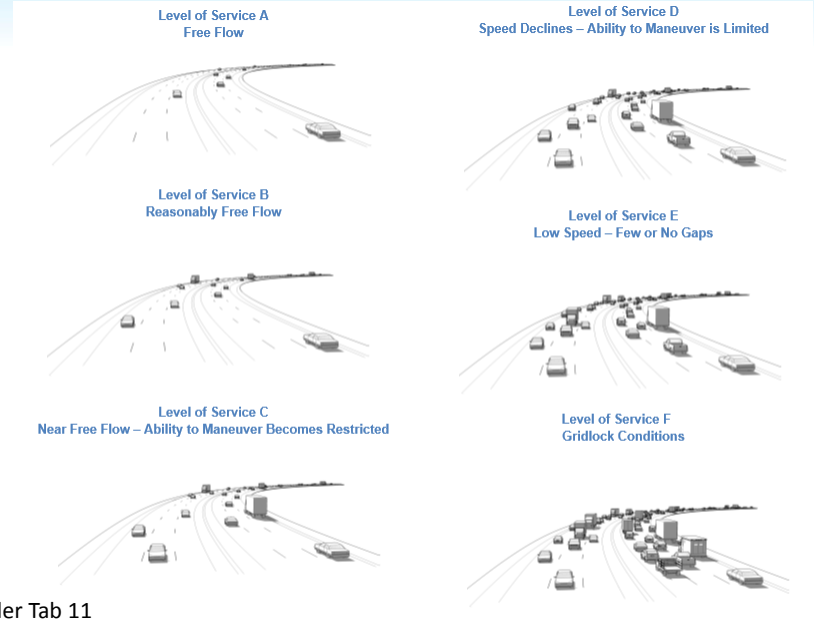
Level of Service and Delay

Level of Service	Control Delay Per Vehicle	Condition
LOS A	≤ 10 seconds	Free Flow
LOS B	>10 and ≤ 15	
LOS C	> 15 and ≤ 25	
LOS D	> 25 and ≤ 35	
LOS E	> 35 and ≤ 50	
LOS F	> 50 seconds	Gridlock

*Control delay shown applies to stop-controlled intersections

Binder Tab 11

Freeway Level of Service

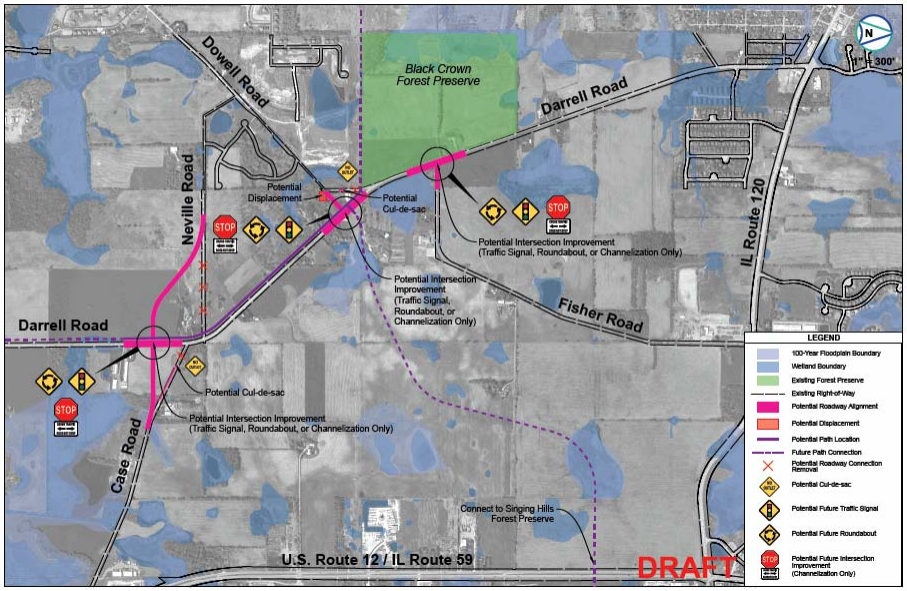


Binder Tab 11

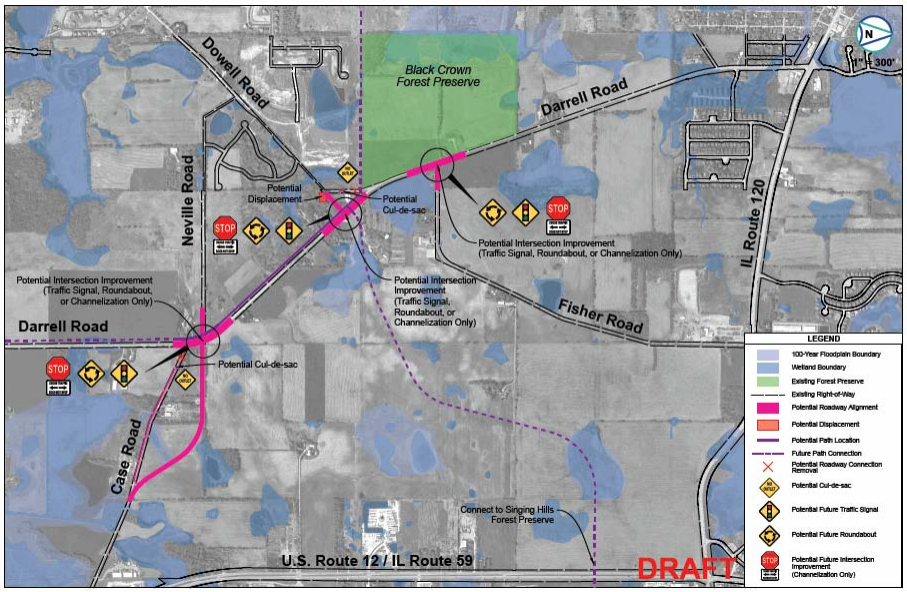
SIG Meeting #2

- December 2, 2015
- Features, benefits, and impacts of initial concept alternatives
- Selected alternatives to present at PIM #2

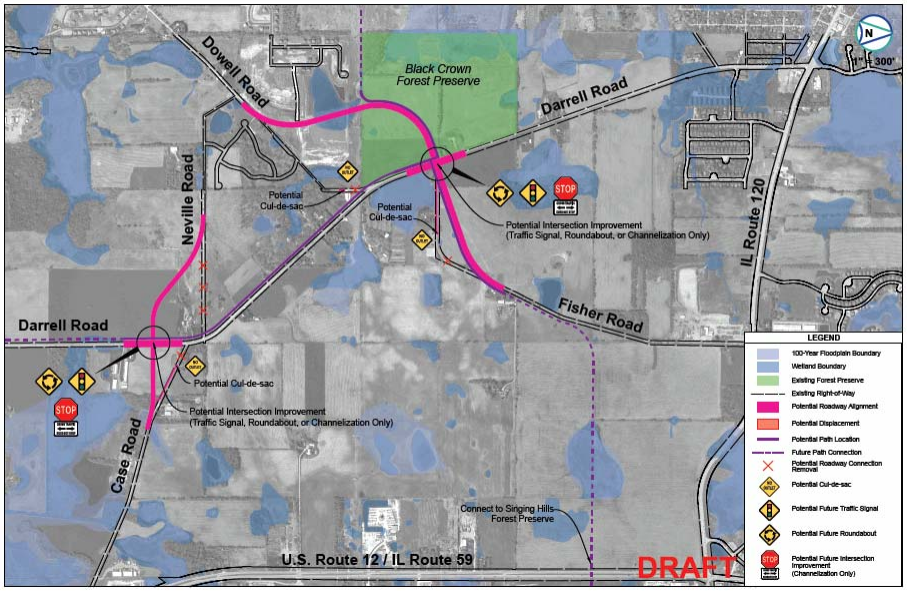
Alternative A-1



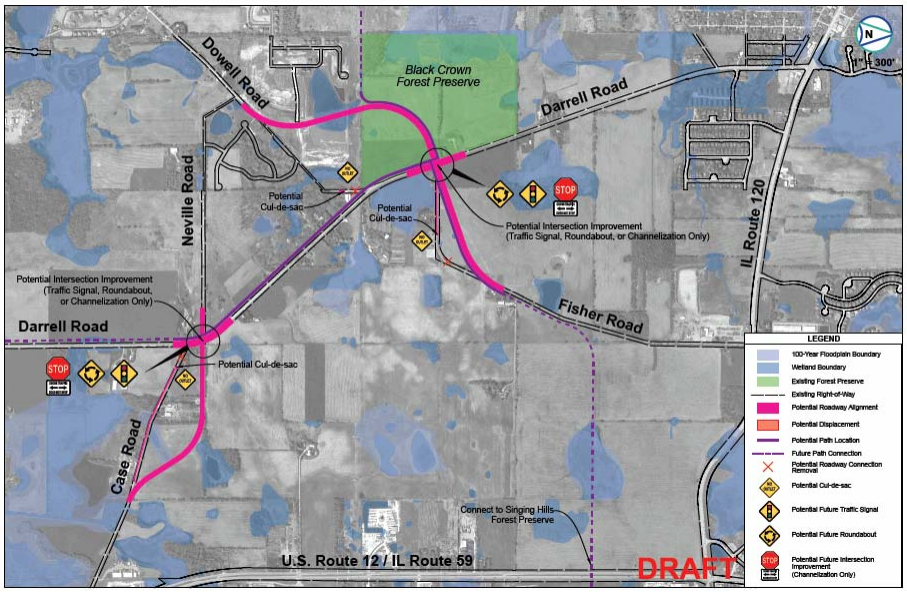
Alternative A-2



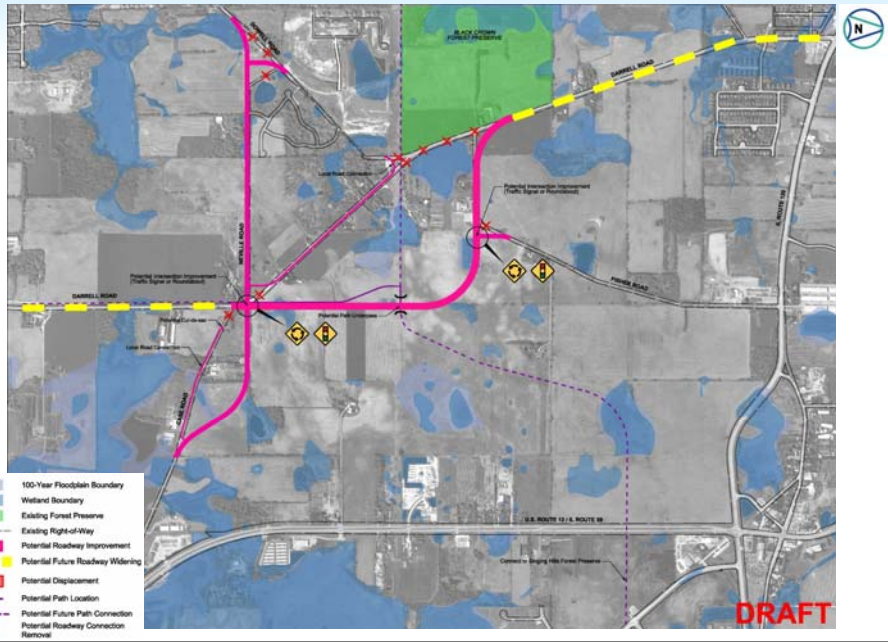
Alternative B-1



Alternative B-2



Alternative C



Recommendation from SIG #2

- Due to significant environmental impacts, it was recommended that Alternative C be dropped from further consideration.
- Alternative A and Alternative B Carried Forward for presentation at Public Information Meeting #2.

Public Information Meeting #2

- March 9, 2016
- 68 attendees
- 8 comments received
- Majority of comments:
  - Intersection safety
  - Intersection treatments
  - Preference for particular alternative(s)
  - Impacts of alternatives

PIM #2 - Analysis of Alternatives

Criteria	Alternative A-1	Alternative A-2	Alternative B-1	Alternative B-2
Transportation Performance	Improves network mobility on County and Local/Township Roadways		Mobility improvements focused on Local/ Township Roadways	
Improved Safety at Intersections	Yes		Yes	
Improved Safety for Pedestrians and Bicyclists	Yes		Yes	
Anticipated Right-of-Way: Black Crown Forest Preserve	Minimal		5 acres	
Anticipated Right-of- Way: Private Property	15 acres	15 acres	22 acres	20 acres
Displacements	1 residence		None	
Tree Removal	30 Trees	45 trees	85 trees	70 trees
Wetland Impacts	0.5 acres	0.5 acres	2 acres	2 acres
Floodplain Impacts	0.3 acres	0.5 acres	0.3 acres	0.5 acres

The impacts listed in the table are approximate quantities based on the Concept Alternatives.
These impacts will be refined as further studies are completed.

Alternatives to be Carried Forward

- County is pursuing Federal funds for this project
- Black Crown Forest Preserve – Section 4(f) protected land
- Federally funded project impacting protected lands may be approved ONLY IF:
  - No feasible/reasonable alternatives exist
  - All possible planning to minimize harm completed

Alternatives to be Carried Forward

- Feedback gathered from SIG #2 and PIM #2
- Alternative B does not accommodate identified travel patterns for the study area.
- Feasible and reasonable alternatives exist with minimal anticipated impacts to the Black Crown Forest Preserve.
- Therefore, ***Alternative B has been dropped from further consideration.***

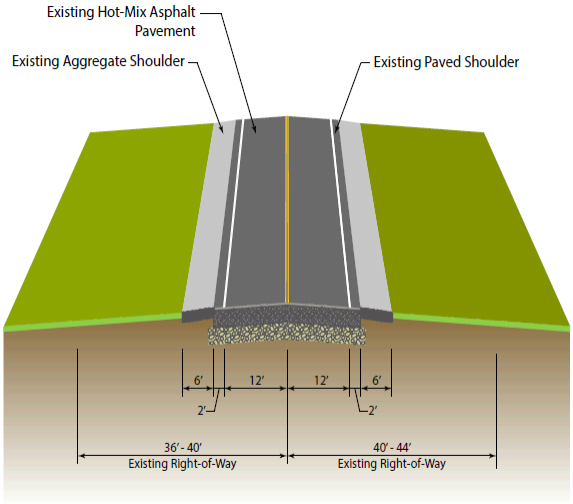
Alternative A

- Further analyses completed, including:
  - Concept Typical Sections
  - Initial Traffic Studies
  - Intersection Improvement Concepts
  - Impacts, Benefits, and Associated Costs

Concept Typical Sections

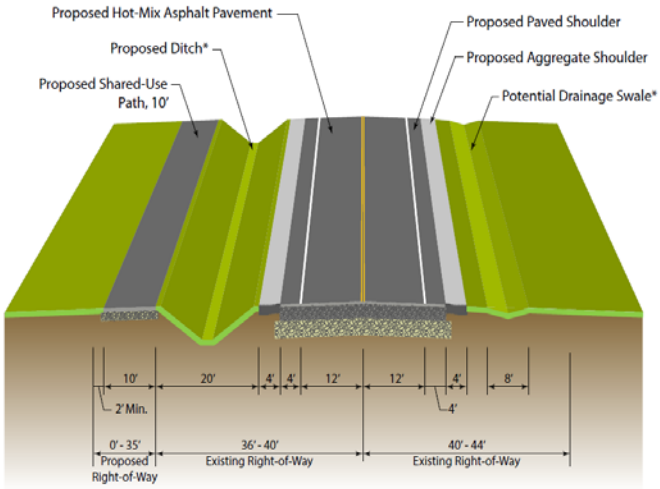
Existing Typical Section – Darrell Road

Southern Improvement Limit to Black Crown Forest Preserve
Looking North



Proposed Typical Section – Darrell Road

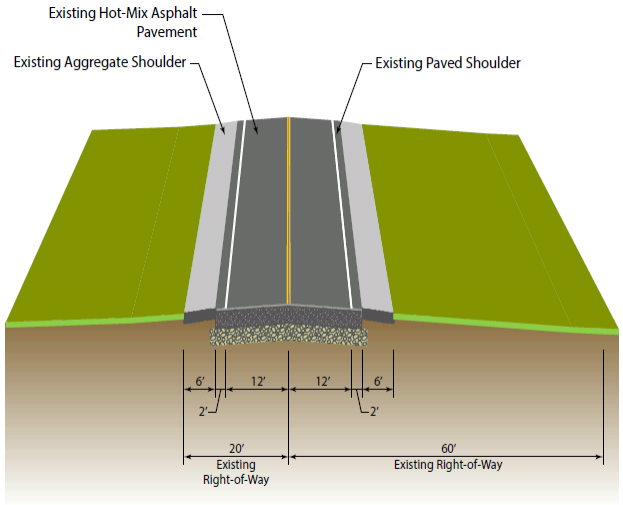
Southern Improvement Limit to Black Crown Forest Preserve
Looking North



*Proposed drainage improvements will be redefined as further detailed studies are completed.

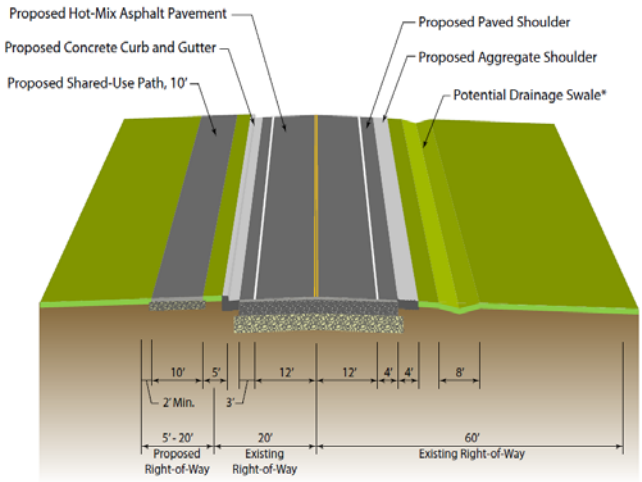
Existing Typical Section – Darrell Road

Black Crown Forest Preserve to Northern Improvement Limit
Looking North



Proposed Typical Section – Darrell Road

Black Crown Forest Preserve to Northern Improvement Limit
Looking North



*Proposed drainage improvements will be redefined as further detailed studies are completed.

Intersection Treatment

Analyses

Alternative A

- Intersection Treatment Types
  - Minor Street Stop-Controlled
  - Traffic Signals
  - Roundabouts
- Assumed one lane in each direction along Darrell Road

Minor Street Stop-Controlled

Intersection Treatment

Initial Traffic Analysis – Minor Street Stop-Control

Intersection	Peak Hour	Existing Minor Approach LOS & Delay (sec/veh)	2040 Build Minor Approach LOS & Delay (min/veh)
Darrell Road/Case Road	AM	B (13.5)	-
	PM	D (25.1)	-
Darrell Road/Neville Road	AM	C (17.1)	-
	PM	A (9.8)	-
Darrell Road/Case Road/ Neville Road	AM	-	F (>10 min/veh)
	PM	-	F (>10 min/veh)
Darrell Road/ Dowell Road	AM	C (24.0)	F (3.5 min/veh)
	PM	D (29.1)	F (7.0 min/veh)
Darrell Road/ Fisher Road	AM	D (26.5)	F (5.9 min/veh)
	PM	D (25.3)	F (4.8 min/veh)

Minor Street Stop-Controlled Treatment

- All intersections fail by 2040
  - Lack of gaps along Darrell Road to allow for turning movements
  - Similar results even when Darrell Road widened to two lanes in each direction
- Does not improve safety, delays may create more hazardous conditions; thus does not meet the purpose and need for the project.
- ***It is recommended to drop minor street stop-controlled intersections from further study***

Traffic Signal

Intersection Treatment

Traffic Analysis – Traffic Signals

Intersection	Peak Hour	2040 Intersection LOS & Delay (sec/veh)
Darrell Road/ Case Road/ Neville Road	AM	A (6.7)
	PM	B (17.3)
Darrell Road/ Dowell Road	AM	B (11.7)
	PM	B (16.4)
Darrell Road/ Fisher Road	AM	C (22.9)
	PM	B (14.1)

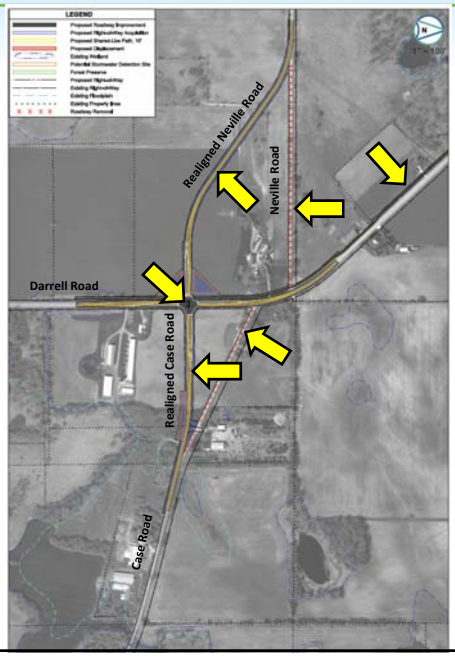
Traffic Analysis

- Traffic signal treatment operates sufficiently in design year (2040)
- Intersection treatment type carried forward for further study

Improvement Concepts

Traffic Signal Treatment

Case Road/Neville Road Shifted South



- Proposed Traffic Signal
- Realigned Case Road, Neville Road
- Road Closure with Relocated Access
- Proposed Shared-Use Path

Case Road/Neville Road Shifted South

Impacts

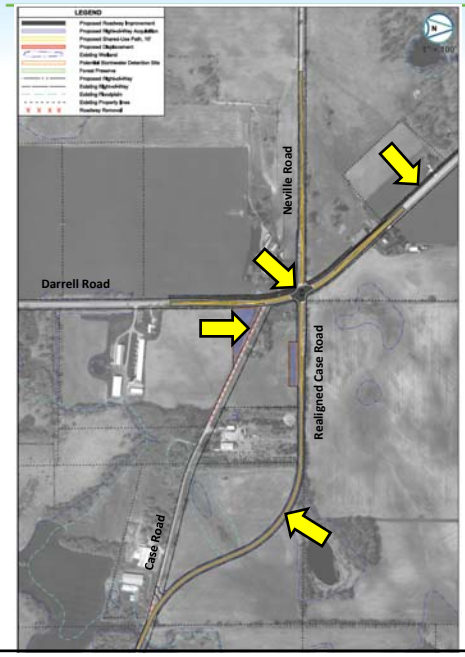
Category	Evaluation
Right-of-Way Acquisition (Total Project)	9.0 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	8 parcels
Displacement(s)	None
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	2.9 acre-feet
Wetlands	0.3 acres
Tree Removal	45 trees
Preliminary Total Cost Estimate	$11.3 million

Case Road/Neville Road Shifted South

Benefits

Category	Evaluation
Combines existing skewed intersections	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

Case Road/Neville Road Shifted North



- Proposed Traffic Signal
- Realigned Case Road
- Road Closure with Relocated Access
- Proposed Shared-Use Path

Case Road/Neville Road Shifted North

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	8.0 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	12 parcels
Displacement(s)	None
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	2.9 acre-feet
Wetlands	0.1 acres
Tree Removal	105 trees
Preliminary Total Cost Estimate	$12.1 million

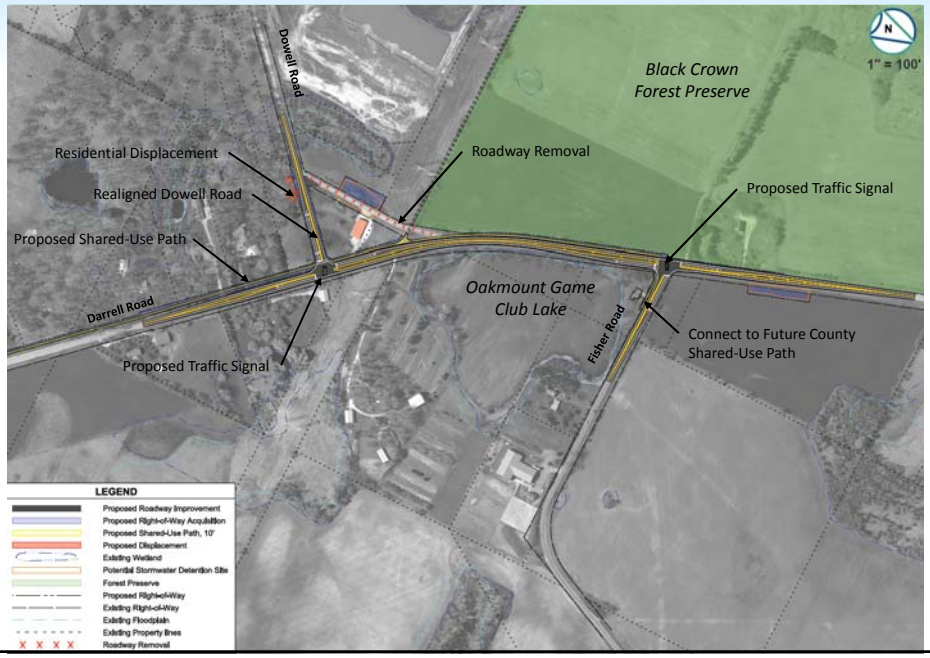
Case Road/Neville Road Shifted North

Benefits

Category	Evaluation
Combines existing skewed intersections	✓
Improves intersection safety and operation	✓*
Reduces speeds through Darrell Road corridor	
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

*A potential for sight distance concern may exist at Case Road/Darrell Road.

Realigned Dowell Road and Fisher Road



Realigned Dowell Road

Realigned Dowell Road

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	2.0 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	5 parcels
Displacement(s)	1 displacement
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	1.0 acre-feet
Wetlands	0.4 acres
Tree Removal	35 trees
Preliminary Total Cost Estimate	$6.5 million

Realigned Dowell Road

Benefits

Category	Evaluation
Eliminates existing skewed intersection	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

Fisher Road

Fisher Road

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	1.0 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	0.5 acres
Number of Impacted Parcels	3 parcels
Displacement(s)	None
Bisection of parcel(s)	None
Stormwater Detention Requirements	0.7 acre-feet
Wetlands	0.1 acres
Tree Removal	35 trees
Preliminary Total Cost Estimate	$5.5 million

Fisher Road

Benefits

Category	Evaluation
Eliminates existing skewed intersection	
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

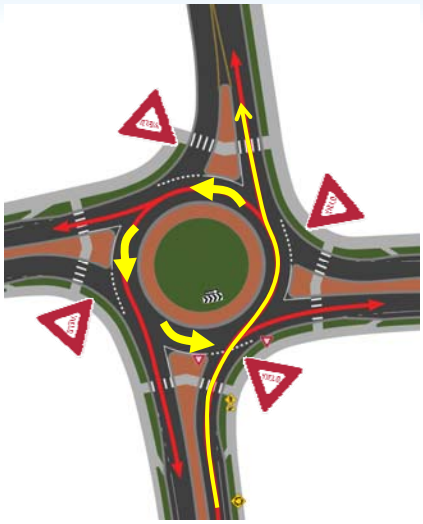
Group Discussion

Roundabout

Intersection Treatment

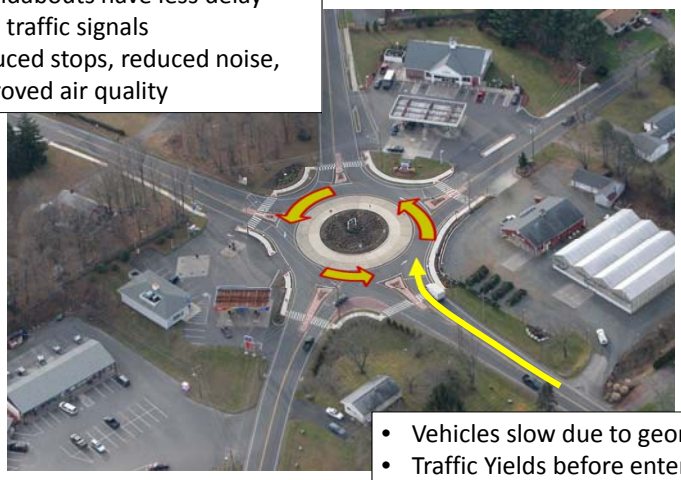
What is a Modern Roundabout?

- A compact circular intersection in which traffic flows counter-clockwise around a center island.
- Entering traffic yields.
- Approaches are channelized to deflect traffic.



Roundabouts

- Roundabouts have less delay than traffic signals
- Reduced stops, reduced noise, improved air quality



- Vehicles slow due to geometry
- Traffic Yields before entering
- Vehicles travel counter-clockwise

Yield Control – aided by entry speed control

Often need to stop at the entry and wait for a gap in the traffic

Roundabouts

- Central island deflects vehicles from a straight-line path.
- Safer for peds
- Aesthetics.

Roundabouts

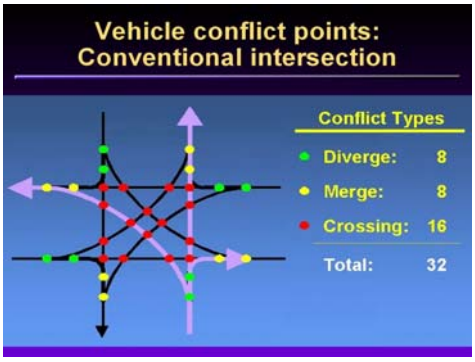
- Where trucks are common, a properly designed apron may be necessary.

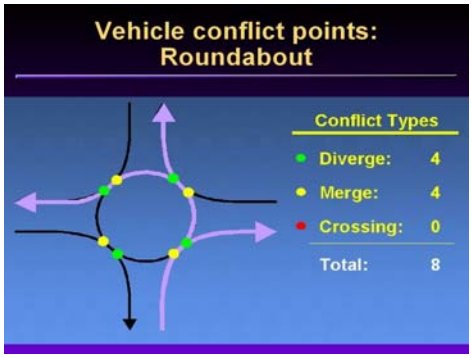
What Isn't a Roundabout

Safety of Roundabouts

- Safest type of at-grade intersection.
- Severe angle and turning movement collisions are avoidable with roundabouts
- Roundabouts have low speeds where vehicles cross paths
- 50% to 80% fewer injury crashes with roundabouts

Safety of Roundabouts





- Crashes of this type are more severe

Safety of Roundabouts

Pedestrian's chances of survival if hit by a motor vehicle

Source: Oregon Department of Transportation

Benefits of Roundabouts

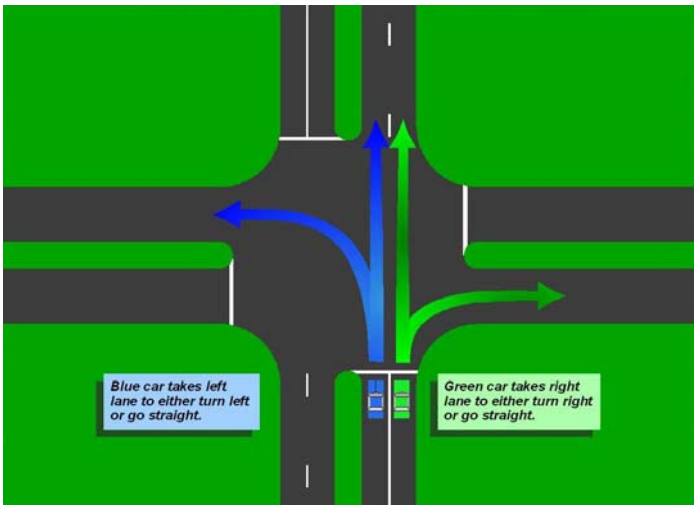
Efficient during peak and off-peak

Stops

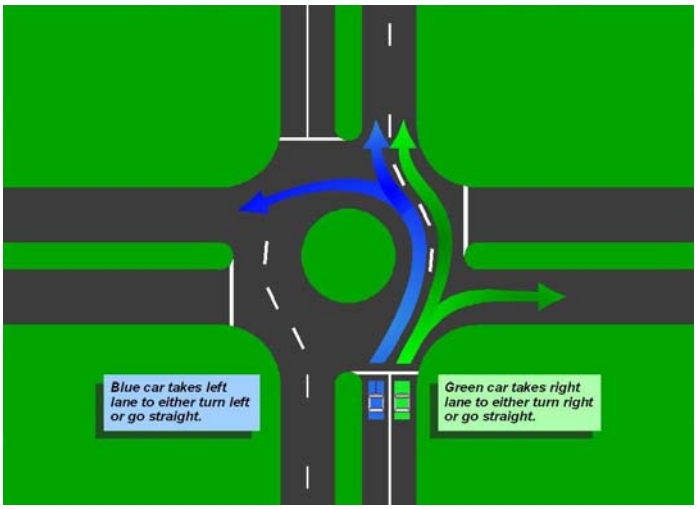
Idling

Delay

Typical 4-Way Intersection



Roundabouts



Lake County Roundabouts

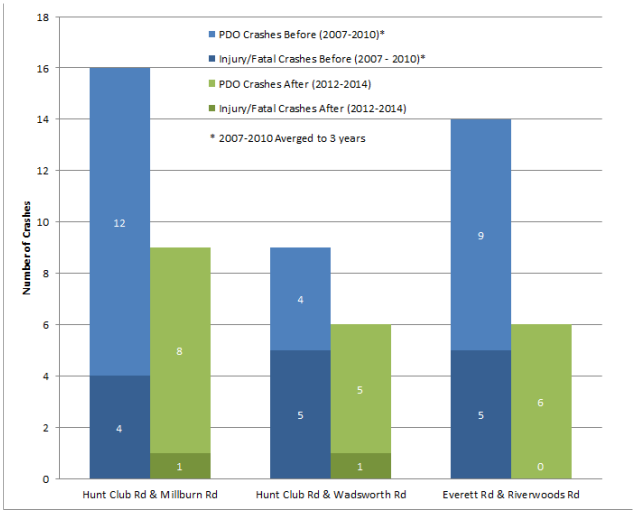
Lake County Roundabouts

- Riverwoods Road and Everett Road
- Wadsworth Road and Hunt Club Road
- Hunt Club Road and Millburn Road

- Monaville Road and Cedar Lake Road
- River Road and Roberts Road

LCDOT Safety of Roundabouts

Before and After Comparison



- All crashes reduced by 46%
- Injury and fatal crashes reduced by 85%

Consistent with National Statistics

Traffic Analyses

Roundabout Intersection Treatment

Initial Traffic Analyses

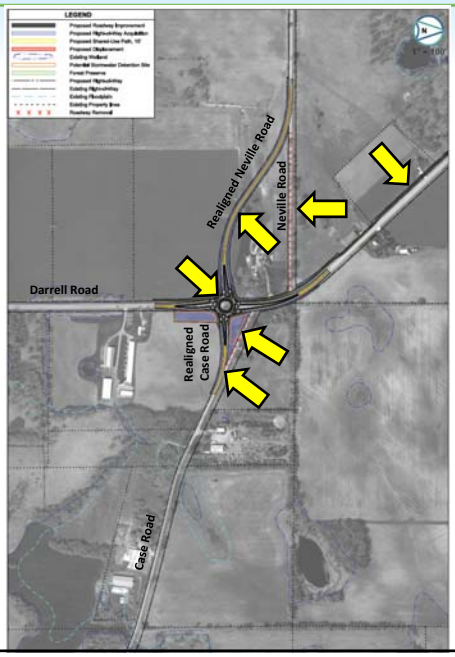
Intersection	Peak Hour	2040 Intersection LOS & Delay (sec/veh) Single-Lane Roundabout	2040 Intersection LOS & Delay (sec/veh) Full Build Roundabout
Darrell Road/ Case Road/ Neville Road	AM	B (11.6)	A (7.0)
	PM	B (14.0)	A (7.1)
Darrell Road/ Dowell Road	AM	F (19.8)*	A (5.4)
	PM	B (17.3)	A (6.0)
Darrell Road/ Fisher Road	AM	F (30.0)*	A (6.2)
	PM	A (8.6)	A (5.9)

*Intersections are shown as LOS F regardless of overall delay if any approach has a volume-to-capacity ratio greater than or equal to 1.0.
- Anticipated year of construction in 2019, subject to change based on the availability of funding and project readiness.

Improvement Concepts

Roundabout Intersection Treatment

Case Road/Neville Road Shifted South



- Proposed Single-Lane Roundabout
- Realigned Case Road, Neville Road
- Road Closure with Relocated Access
- Proposed Shared-Use Path

Case Road/Neville Road Shifted South

Impacts

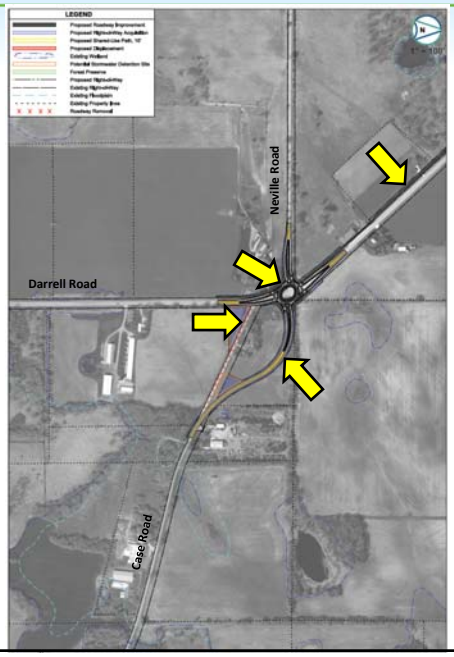
Category	Evaluation
Right-of-Way Acquisition (Total Project)	6.9 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	7 parcels
Displacement(s)	None
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	2.2 acre-feet
Wetlands	0.1 acres
Tree Removal	35 trees
Preliminary Total Cost Estimate	$7.4 million

Case Road/Neville Road Shifted South

Benefits

Category	Evaluation
Combines existing skewed intersections	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

Case Road/Neville Road Shifted North



- Proposed Single-Lane Roundabout
- Realigned Case Road
- Road Closure with Relocated Access
- Proposed Shared-Use Path

Case Road/Neville Road Shifted North

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	5.6 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	10 parcels
Displacement(s)	None
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	1.9 acre-feet
Wetlands	0.1 acres
Tree Removal	55 trees
Preliminary Total Cost Estimate	$6.4 million

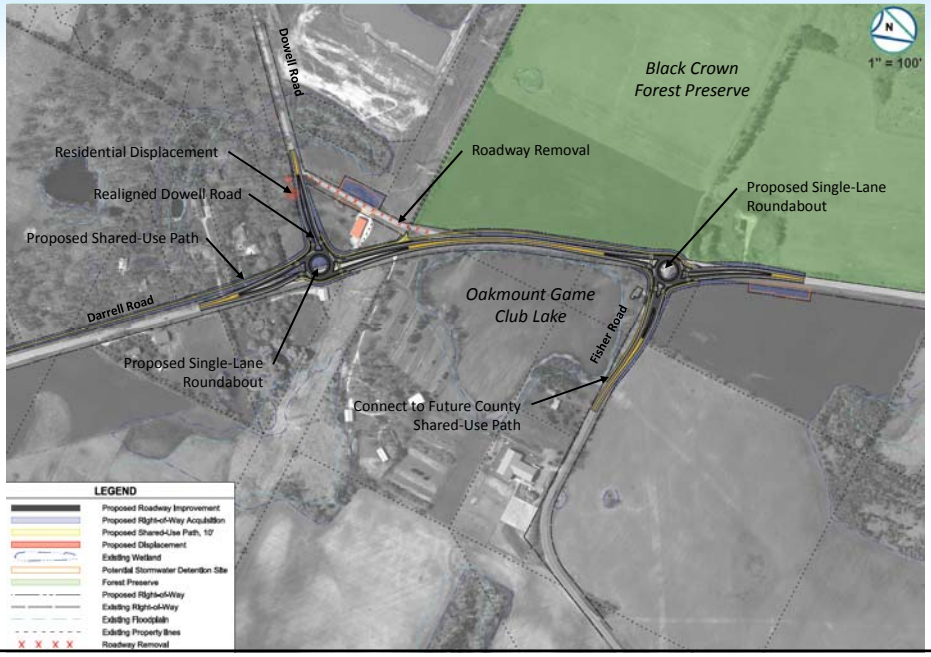
Case Road/Neville Road Shifted North

Benefits

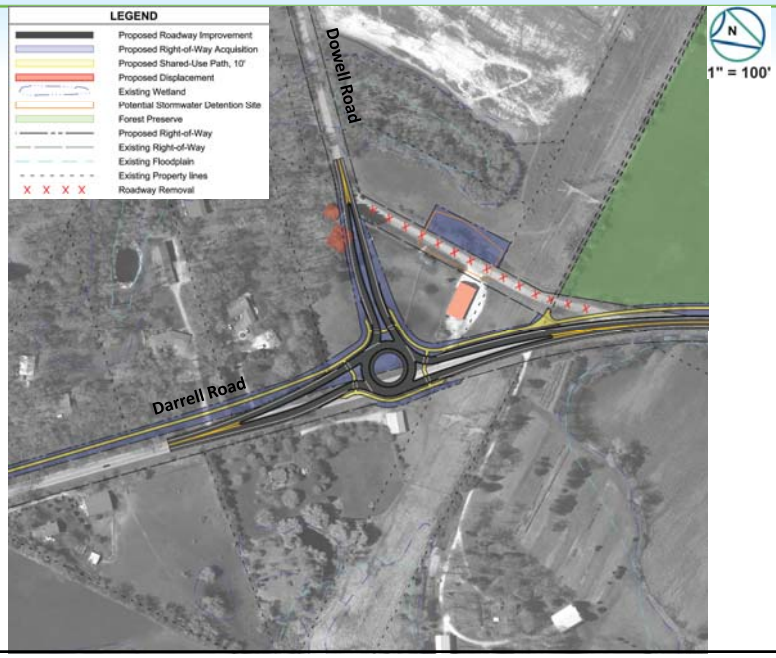
Category	Evaluation
Combines existing skewed intersections	✓*
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

*Curved approach allows for a shorter improvement length along Case Road.

Realigned Dowell Road and Fisher Road



Realigned Dowell Road



Realigned Dowell Road

Impacts

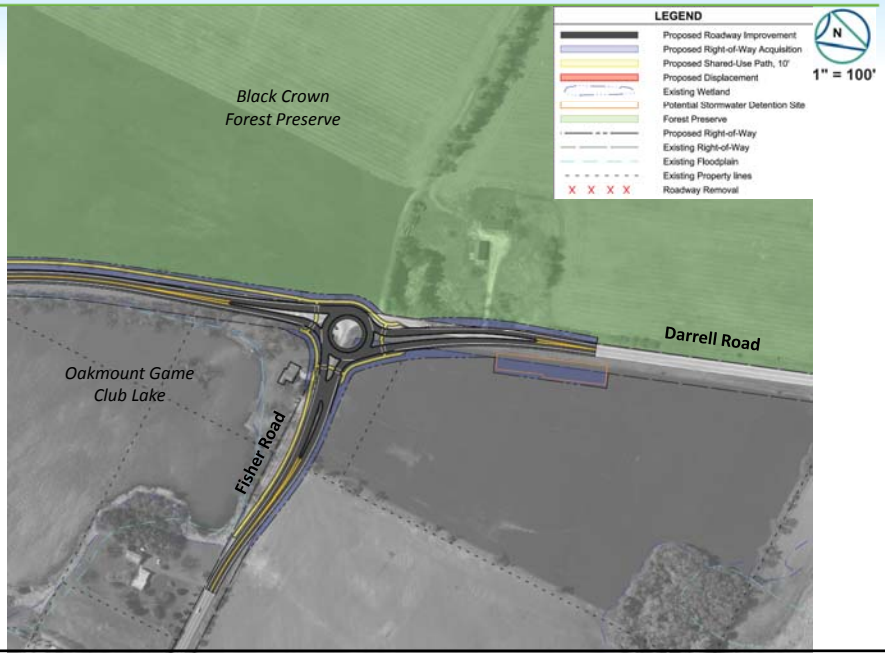
Category	Evaluation
Right-of-Way Acquisition (Total Project)	2.7 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	3 parcels
Displacement(s)	1 displacement
Bisection of parcel(s)	Yes
Stormwater Detention Requirements	1.2 acre-feet
Wetlands	0.1 acres
Tree Removal	60 trees
Preliminary Total Cost Estimate	$5.9 million

Realigned Dowell Road

Benefits

Category	Evaluation
Eliminates existing skewed intersection	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

Fisher Road



Fisher Road

Impacts

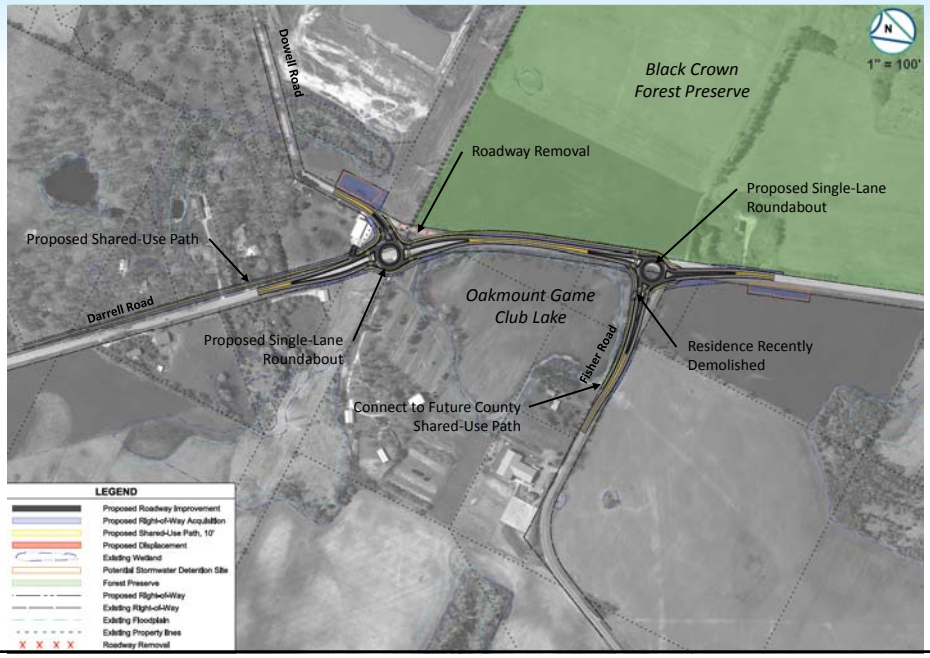
Category	Evaluation
Right-of-Way Acquisition (Total Project)	2.5 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	1.1 acres
Number of Impacted Parcels	5 parcels
Displacement(s)	None
Bisection of parcel(s)	None
Stormwater Detention Requirements	1.0 acre-feet
Wetlands	0.1 acres
Tree Removal	60 trees
Preliminary Total Cost Estimate	$4.6 million

Fisher Road

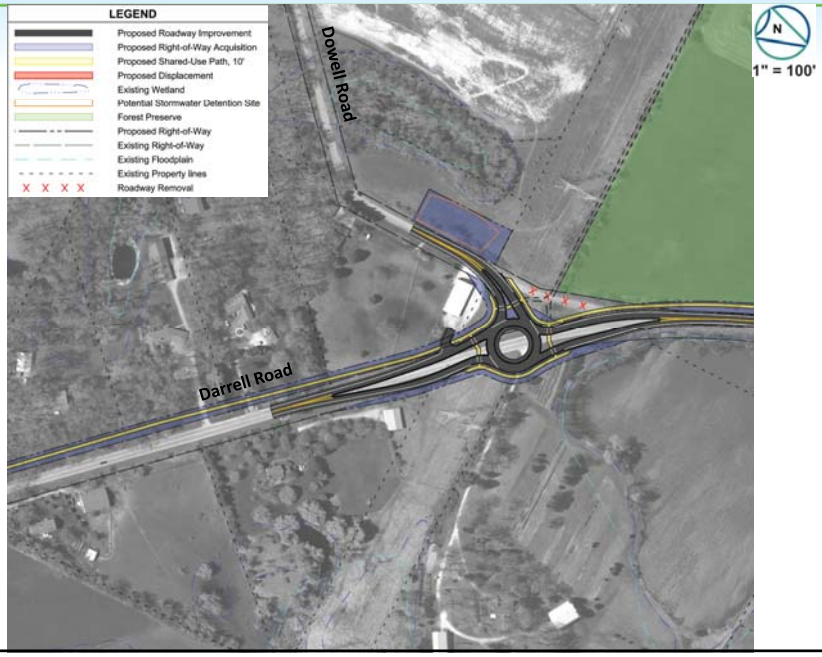
Benefits

Category	Evaluation
Eliminates existing skewed intersection	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

Dowell Road and Shifted Fisher Road



Dowell Road Existing Alignment



Dowell Road Existing Alignment

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	2.3 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	None
Number of Impacted Parcels	6 parcels
Displacement(s)	None
Bisection of parcel(s)	None
Stormwater Detention Requirements	0.9 acre-feet
Wetlands	0.1 acres
Tree Removal	35 trees
Preliminary Total Cost Estimate	$4.2 million*

*Potential cost of gas line conflict within ComEd right-of-way not included.

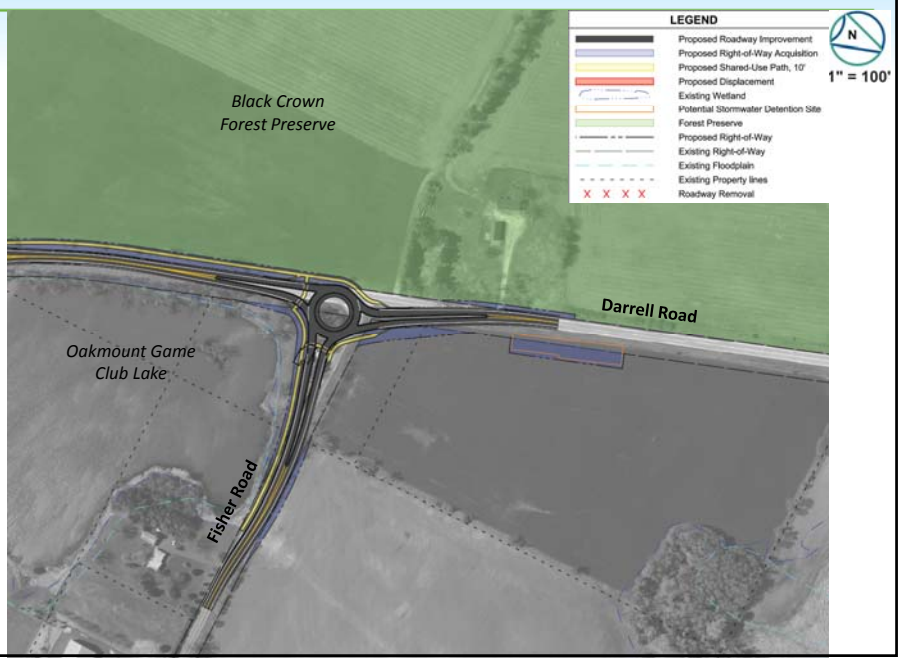
Dowell Road Existing Alignment

Benefits

Category	Evaluation
Eliminates existing skewed intersection	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

*Similar benefits to Realigned Dowell Road roundabout while avoiding residential displacement.

Fisher Road Shifted South



Fisher Road Shifted South

Impacts

Category	Evaluation
Right-of-Way Acquisition (Total Project)	2.2 acres
Right-of-Way Acquisition (Black Crown Forest Preserve)	0.8 acres
Number of Impacted Parcels	6 parcels
Displacement(s)	None
Bisection of parcel(s)	None
Stormwater Detention Requirements	1.0 acre-feet
Wetlands	0.1 acres
Tree Removal	70 trees
Preliminary Total Cost Estimate	$4.5 million

Fisher Road Shifted South

Benefits

Category	Evaluation
Eliminates existing skewed intersection	✓
Improves intersection safety and operation	✓
Reduces speeds through Darrell Road corridor	✓
Provides improved roadway surfaces	✓
Provides consistent roadway widths	✓
Provides pedestrian and bicyclist accommodations	✓

*Similar benefits as Fisher Road roundabout with less overall impacts, including Black Crown Forest Preserve impacts.

Intersection Improvement

Concepts

Summary and Analysis

Intersection Improvement Concepts

- Any concept at Case/Neville Road can be combined with intersection treatments selected at Dowell Road and Fisher Road.
- The intersection treatments at Dowell Road and Fisher Road must be the same (i.e. both traffic signals or roundabouts) due to operational performance.
- The roundabout intersection treatment concepts at Dowell Road and Fisher Road are interchangeable.

Intersection Improvement Concepts Analysis

Intersection	Treatment Type	Property Impacts			Detention Needed	Environmental Impacts		Preliminary Cost Estimate
		Potential Right-of-Way Black Crown Forest Preserve (acres)	Potential Right-of-Way Total Improvement (acres)	Displacements		Wetlands (acres)	Tree Removal (each)	($ million)
Case-Neville Road Shifted South at Darrell Road (Alternative A-1)	Traffic Signal	-	9.0	None	Yes	0.3	45	$11.3
	Roundabout	-	6.9	None	Yes	0.1	35	$7.4
Case-Neville Road Shifted North at Darrell Road (Alternative A-2)	Traffic Signal	-	8.0	None	Yes	0.1	105	$12.1
	Roundabout	-	5.6	None	Yes	0.1	55	$6.4
Dowell Road/ Darrell Road	Traffic Signal	-	2.0	1 Residence	Yes	0.4	35	$6.5
	Roundabout - Realigned Dowell	-	2.7	1 Residence	Yes	0.1	60	$5.9
	Roundabout - Existing Dowell	-	2.3	None	Yes	0.1	35	$4.2
Fisher Road/ Darrell Road	Traffic Signal	0.5	1.0	None	Yes	0.1	35	$5.5
	Roundabout	1.1	2.5	None	Yes	0.1	60	$4.6
	Shifted Roundabout	0.8	2.2	None	Yes	0.1	70	$4.5

- The impacts listed in the table are approximate quantities based on the Concept Improvements. These impacts will be redefined as further studies are completed.
- Any concept at Case/Neville Road can be combined with intersection treatments selected at Dowell Road and Fisher Road.
- The intersection treatments at Dowell Road and Fisher Road must be the same (i.e. both traffic signals or roundabouts) due to operational performance.
- The roundabout intersection treatment concepts at Dowell Road and Fisher Road are interchangeable.

Group Discussion

Project Development Process

Next Steps

- Present the Intersection Improvement Concepts at Public Information Meeting #3 and gather input
- Project Study Group will select Preferred Alternative
- Finalize analyses for the Preferred Alternative and Obtain Approvals
- Hold SIG Meeting #4, Public Hearing
- Complete Phase I, Design Approval

Next Steps

Questions?

Thank you for your participation!