

CORRINE DRIVE

COMPLETE STREETS STUDY

Technical Report & Design Concepts

January 2018

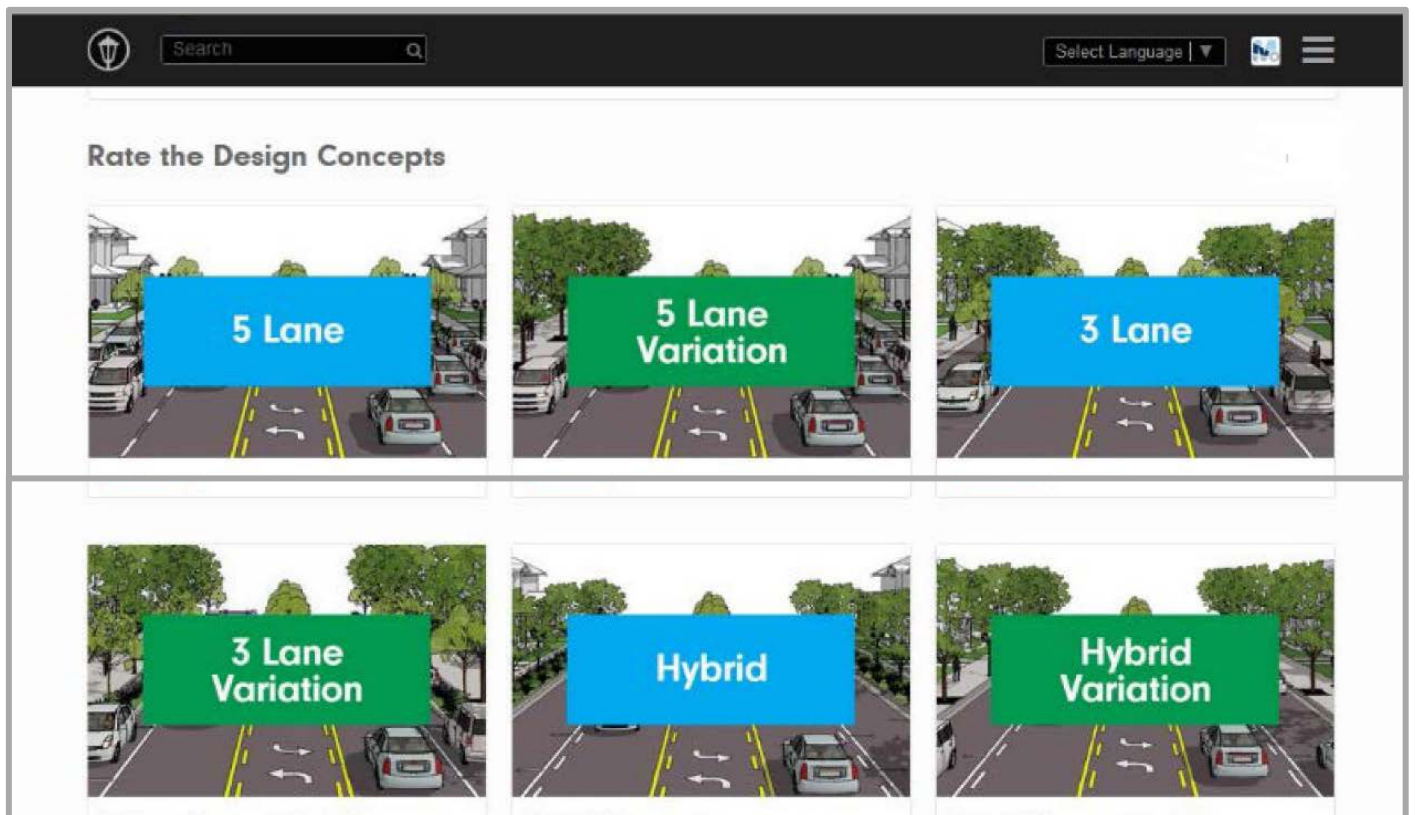




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Possible Paths to Corrine's Future

People who know the Corrine Drive area describe it as energetic and friendly. But the major street through this vibrant neighborhood reflects another place altogether. Those who use the road say it needs maintenance; offers haphazard accommodation for cyclists, pedestrians or those with special needs; and is plagued by speeding vehicles and a lack of safe parking.

The Corrine Drive Complete Streets Study aims to help Corrine – between Mills Avenue and Bennett Road – live up to its potential, by examining and ultimately recommending ways to improve transportation options along the 2-mile corridor. During the past year, the study completed a period of gathering data and listening to those who use Corrine to learn about its challenges and opportunities. Most recently, the study has focused on developing conceptual designs for Corrine Drive. This report describes the study's second phase and provides details about six ideas or possible design concepts that could be refined into a plan for making Corrine Drive friendlier for everyone – a Complete Street.

The design concepts presented here include a **5-Lane** (4 travel lanes plus center turn lane), a **3-Lane** (2 travel lanes plus center turn lane) and a **Hybrid** (5-Lane design on weekdays, switching to the 3-Lane on weekends when traffic is lighter). Each of these has a variation that reconfigures parking and sidewalks to create a shared-use path.

The concepts and their variations are only preliminary ideas, and all would still need refining to become viable plans. No concept has been selected for Corrine Drive, and it's possible that elements from more than one concept might be combined in the final phase of the study as the best way to improve Corrine.

Technical data, public feedback, and planning best practices were used in determining which areas of concern to address along the corridor and in developing the concepts that offer solutions to some of the biggest problems. As with most challenges, **no perfect solution** presented itself. The result is, rather, a series of comparisons and trade-offs. In addition to concepts, this report offers possible improvements and safety solutions that could be made, regardless of the final plan for the road.

As the region's transportation planning agency, MetroPlan Orlando – in coordination with Orange County, the City of Orlando, and City of Winter Park – is conducting this independent analysis.

Recap of Existing Conditions

The Corrine Drive Complete Streets Study has three phases. The first phase, which gathered data and opinions on existing conditions, ended in late summer 2017. MetroPlan Orlando collected data about what is currently on Corrine Drive, what is within a mile of the street, and how the area is likely to evolve in the next couple of decades. The team analyzed data related to traffic, air quality, public health, economic conditions, demographics, utilities, and much more.

MetroPlan Orlando employed a robust public outreach strategy, alongside the data gathering, to identify the community's wishes and learn what improvements people want on Corrine Drive. The main tool for getting public opinion was an 11-question survey, which received 1,705 responses.

Documents from Phase 1 of the study – including the Community Survey Report and the Existing Conditions Report – can be found at CorrineDriveStudy.org under *Phase 1: Corrine Drive's Transportation Story in Data, Images & Video*.

The following table shows how the community’s desires for improving the corridor align with the original study objectives and the data from the Existing Conditions Report.

STUDY OBJECTIVES (Survey Rankings)	RELATED SURVEY RESPONSES	EXISTING CONDITIONS RESULTS
<i>Creating a safe and supportive environment for walking and cycling</i>	85% wanted pedestrian improvements, and 61% asked for bicycle improvements; 80% said Corrine is somewhat unsafe or very unsafe for cyclists; 68% said it is somewhat or very unsafe for pedestrians	Road design encourages speeds higher than posted; 75% of vehicles speed in the area, making walking and cycling less comfortable; Sidewalks are inconsistent, narrow, and often obstructed with utility poles; sidewalks don’t comply with Americans with Disabilities Act; no bike lanes or amenities, little bike parking and inadequate signage; poor lighting; no Safe Routes to School strategies in place, despite K-8 school opening in 2018
<i>Improving the appearance of the corridor</i>	47% asked for beautification along the corridor	Battered pavement (most sections scoring in 20s and 30s on 100-point scale), lack of street trees or landscaping, uneven sidewalks, no public art or gateway features
<i>Ensuring accessibility to destinations and neighborhoods surrounding the corridor</i>	22% mentioned access issues among pedestrian and road design desires, saying access good only for vehicles	Although 35% of households are within 10-minute walk of Corrine commercial hub, many say they do not walk or cycle there because they don’t feel safe
<i>Maintaining minimal traffic in residential neighborhoods</i>	27% mentioned minimizing neighborhood traffic impact as a desire to protect the area’s character	About 50% of the weekday vehicles on Corrine travel through the area without stopping, so they don’t travel on residential streets. 35% start or stop a trip within the area; 15% start and stop a trip within the area
<i>Assessing the parking needs in the area</i>	33% desired more and safer parking; lack of space for parking most often cited (18%) as an obstacle to achieving vision for area	342 on-street parking spots on Corrine, many of them narrower than 7 feet – the City of Orlando code width and a nationally recognized standard width
<i>Connecting trails in the surrounding area</i>	4% specifically noted a desire for trail connections; 16% desired bike facilities that could make connections	Cady Way Trail and Orlando Urban Trail have access points nearby, but do not connect because of a lack of bike lanes or markings
<i>Improving transit service</i>	9% listed improved transit as the #1 or #2 desire for the area	Transit options are limited, with 2 LYNX routes serving the area; bus stop amenities are inadequate; boardings average less than 1 person a day on the corridor

Developing Design Concepts

By aligning community perceptions and desires with objective data, the Phase 1 analysis gave focus to the Phase 2 process – developing Complete Street conceptual designs. MetroPlan Orlando

followed the series of steps below to turn identified priorities and ideas into the concepts presented in this report.

Established Ground Rules: At the start of Phase 2, these guidelines were set out before starting the design process:

- Each concept presented to the public would offer a **simplified, consistent look** for the 2-mile corridor. Currently, there are 10 looks on Corrine between Mills Avenue and Bennett Road.
- Corrine Drive would be **repaved**, improving the appearance and safety of the area.
- **On-street parking** would be incorporated in some way into every concept.
- All concepts would **fit within the existing 80 feet of public right-of-way**. MetroPlan Orlando would not present any concepts that required the acquisition of property.

Reviewed Industry Best Practices to Identify Possible Improvements: MetroPlan Orlando combined the community's ideas with best practices for addressing technical concerns. The transportation industry standards used are outlined in the next section of this report. Taken together, MetroPlan Orlando and the local government partners had a long list of design ideas, which were used to form the concepts.

Develop Concepts: MetroPlan Orlando and its local government partners turned the long list of design ideas into several concepts and potential location-specific solutions to address safety concerns. Then details in each concept were examined to determine how they addressed Corrine Drive's issues. Specifically, the concepts were analyzed through a Complete Streets lens – addressing the experience, regardless of how someone travels, their age, or possible mobility issues.

Finalize Concepts: In order to prepare the basic design concepts for public feedback, MetroPlan Orlando analyzed each one against a set of criteria and how each contributed to a person's experience walking, biking, or driving. This included calculating vehicle drive times for all the concepts, along with sidewalk widths and bike facilities. Safety was a particular consideration as well as the ability of each concept to reduce speeding.

Gather Feedback: Public outreach in this second phase of the study uses a digital platform and a series of pop-up meetings to hear from the community. The public is being asked to provide input on the different road designs through Neighborland, an online forum that presents the design concepts and possible safety solutions so people can compare their attributes.

In Neighborland, users can see concept and improvement sketches and provide detailed feedback. We'll also have in-person opportunities to learn more. Versions of the design concepts and safety solutions are also on MetroPlanOrlando.org and available in printed copies. MetroPlan Orlando will use public reactions to the preliminary design concepts to help shape the draft plan that will be presented in the next phase of the study, which will be the third and final phase.

Criteria for the Concepts

In addition to technical data and community priorities, MetroPlan Orlando reviewed best practices resources and research reports related to Complete Streets, health, and Safe Routes to Schools in preparation for developing the Corrine Concepts.

Among the criteria for the concepts is making Corrine comply with the Americans with Disabilities Act (ADA), which mandates that public spaces accommodate people with disabilities. Federal law requires any public right-of-way to be ADA-accessible once it is repaved. The ADA standards can differ, depending on what's around the area and where obstacles might be located. Generally, planners try to identify characteristics that support universal design – the idea that you can create an environment usable for anyone, no matter their ability. The Federal Highway Administration (FHWA) says that a minimum of 4 feet of space must be available in the pedestrian travel zone, but 6-8 feet is preferred in areas with a high amount of pedestrians.ⁱ

Corrine Drive is an urban minor arterial with 23,000 cars on the average weekday and a 35 mph posted speed limit in most sections. This means that Corrine requires different design elements and safety improvements than local streets in surrounding neighborhoods, which have fewer cars and lower speeds. MetroPlan Orlando wanted to know what elements would create a safe and supportive environment for walking and biking. Design strategies to help children walk or bike to the Audubon Park K-8 School, opening in 2018, were of particular interest.

MetroPlan Orlando relied heavily on the resources from the [National Association of City Transportation Officials](#) (NACTO). [The ITE Context-Sensitive Guide](#) and the World Resources Institute's [Cities Safer by Design](#) report also informed the design elements featured within the Corrine Concepts. These sources pointed toward the design elements needed to create the safest and most supportive environment possible for cycling and walking on Corrine Drive.

Recent studies have linked dedicated bicycle facilities to positive health behaviors, such as increased physical activity. In 2016, the Community Preventive Services Task Force published its review of 90 research studies. Its main finding confirmed the vital connection between health and our built environment. Transportation improvements, like sidewalks and bike lanes, combined with a mix of land uses and parks can help the public lose weight, reduce their risk of chronic disease, and improve mental health.ⁱⁱ

One of the biggest safety needs for Corrine Drive is to slow down vehicles to the posted speed of 35 mph, since 75% of vehicles in some areas are traveling above the speed limit. Several road design improvements could encourage cars to travel the existing speed limit, such as:

KEY TERMS

Here are some terms used in the design concept descriptions:

Shared-Use Path: Paved path that supports multiple forms of non-motorized transportation, such as walking and biking

Cycle Tracks: Bike lanes that provide a horizontal or vertical separation between cars and bikes. They are the recommended bicycle facility for streets with more than 6,000 cars and speeds greater than 25 mph.

Sharrows: Shared lane markings that offer directional and wayfinding support for cyclists and are best suited for streets with less than 3,000 cars per day and a speed limit of 25 mph or less

Bulbouts: Extension of the sidewalk or corner of an intersection, that often include trees, located in spaces with higher numbers of pedestrians, and considered a traffic calming measure

Bicycle Boulevard: Street with low traffic and freight volumes, marked with signs and pavement markings

Quality of Service: Traveler-based perception of how well a service or facility is operating

- **Narrowing Lanes:** Width of travel lanes has an effect on vehicle speed, according to NACTO. Wider lanes – 11 to 13 feet – often encourage vehicles to travel at higher speeds. Lanes 10 or 10.5 feet promote slower speeds without impacting traffic operations.
- **Reducing the Number of Lanes:** This narrows the travel path for vehicles and is considered a design feature to reduce speeding. Studies show streets with fewer lanes tend to be slower.
- **Raising Pavement:** This slows cars at certain locations, and is used for speed humps, raised crosswalks, and raised intersections. The raised pavement also increases a driver’s awareness of someone crossing the street and can give the appearance of a pedestrian-friendly zone, according to the World Resources Institute’s Cities Safer by Design report.
- **Adding Trees:** This can make a street appear narrower, and the visual technique can help reduce vehicle speeds and crashes, according to NACTO. Additionally, street trees improve air quality, reduce storm water runoff, and enhance mental well-being.
- **Creating an Inviting Pedestrian Environment:** The space beyond the travel lane can have an effect on how fast cars drive. Such features as plazas, wide sidewalks, benches, and tables, are evidence of a vibrant street with economic activity. An inviting pedestrian realm can decrease the number of cars traveling above the posted speed and reduce injuries from crashes, according to the Cities Safer by Design report.

After reviewing this information, MetroPlan Orlando established a set of objective criteria for evaluating each concept. Three criteria were selected to make it easier to present the concepts simply and objectively. Once a single concept is advanced to the next phase of the study, more complexity and evaluation will be included related to the community’s priorities and key technical issues.

Concepts were evaluated individually, not against each other. The criteria focus on quality of service, which is defined by performance from a specific perspective. More information about this technique is in the Florida Department of Transportation [Quality/Level of Service Handbook](#). For the Corrine Drive study, quality of service was examined from three points of view: the pedestrian, the bicyclist, and the driver. Safety is embedded within each perspective.

For pedestrians, these elements were analyzed:

- **Separation Between Travel Lane and Sidewalk:** The presence of a vertical barrier protects pedestrians on the sidewalk from cars in the travel lane. For a Complete Street, these barriers can be trees, planters, or another type of aesthetically-pleasing feature.
- **Width of Sidewalk:** Minimum sidewalk width to meet ADA standards is 5 feet. The City of Orlando and Orange County have varying required sidewalk widths, based on what surrounds the street. MetroPlan Orlando considered how many people can walk side by side or if someone in a wheelchair can travel unimpeded in determining sidewalk width.
- **Speed of Vehicles:** This can influence someone’s decision to walk to a destination, so designs were evaluated on whether they encouraged slower vehicle speeds.
- **Crossing Distance at Intersections:** The distance and time it takes for someone to cross the street can affect their desire to walk. The shorter the crossing distance, the less time a pedestrian is exposed to vehicle traffic.
- **Shade and Lighting:** These are important for creating a safe and supportive environment for walking. Shade can come from street trees or bus shelters. Lighting helps make pedestrians more visible at night.

For bicyclists, these were the considerations:

- **Separation Between Travel Lane and Dedicated Bicycle Facilities:** A barrier enhances the comfort of riding a bicycle on a dedicated facility. The type of barrier depends on the type of

street. For Corrine Drive, the recommended barrier is a vertical buffer, such as a bollard, between a travel lane and dedicated bicycle facility.

- **Type of Bicycle Facility:** The type of facility often affects whether someone chooses to ride a bike. Bicycle facilities include sharrows (see Key Terms box for definition), bike lanes, cycle tracks, shared-use paths, or multi-use trails. The facility that provides a bicyclist a safe and comfortable riding environment depends on the number and speed of cars on the street.
- **Potential for Cyclists to Ride in the “Door Zone”:** When bicycle lanes are next to parking spots, there’s a chance that someone getting out of a vehicle will create a hazard by opening the door into the path of someone riding a bike.
- **Vehicle Speed:** The speed of vehicles can influence someone’s decision to ride a bike on that street. The designs were evaluated based on if they encouraged slower vehicle speeds.
- **Lighting:** Proper lighting should illuminate the bicyclist, providing them light to ride but also to increase driver awareness.

For drivers, quality of service includes:

- **Capacity & Vehicle Drive Times:** The ability of the travel lanes and intersections to handle current and projected vehicle volumes is a key factor in traffic operations.
- **Traffic diversion:** The potential for cars to divert from traveling on Corrine Drive to using a neighborhood street and the number that would do so per hour during rush hour was measured.
- **Parking:** The presence of parking spots wide enough to meet current requirements helps avoid sideswiping and crashes with parked vehicles.
- **Queuing at intersections:** The length of the line of cars stopped at a traffic signal during the red light phase affects how much time it takes to get through the intersection. This is associated with rear-end collisions.

Safe Routes to School Strategies

The opening of the Audubon Park K-8 School in August 2018 put a priority on making it safe for a young student to walk or bike to school. A Safe Routes to School program includes a variety of policies, design interventions, and educational efforts. For the Corrine Drive Complete Streets Study, MetroPlan Orlando focused on design features that would make it easier and safer to walk or bike around the new school. These design features include signage, pavement markings, sidewalks at least 5 feet wide, a buffer between the sidewalk and vehicle travel lane, lighting, elements that reduce the distance to cross the street, and more.ⁱⁱⁱ

What If We Do Nothing?

Doing nothing and keeping Corrine Drive as it currently is would be what we call the No-Build option. If selected, this option would require MetroPlan Orlando to stop the study. The key issues identified in the first phase – speeding, lack of pedestrian facilities, and poor pavement conditions – will worsen. Additionally, the corridor would not comply with the Americans with Disabilities Act.

Some current conditions on Corrine are shown below, including the width of sidewalks, average time it takes a pedestrian to cross, landscaping features, special bike facilities, regional trail connections, the vehicle drive time at morning and evening rush hours, and availability of on-street parking.

Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

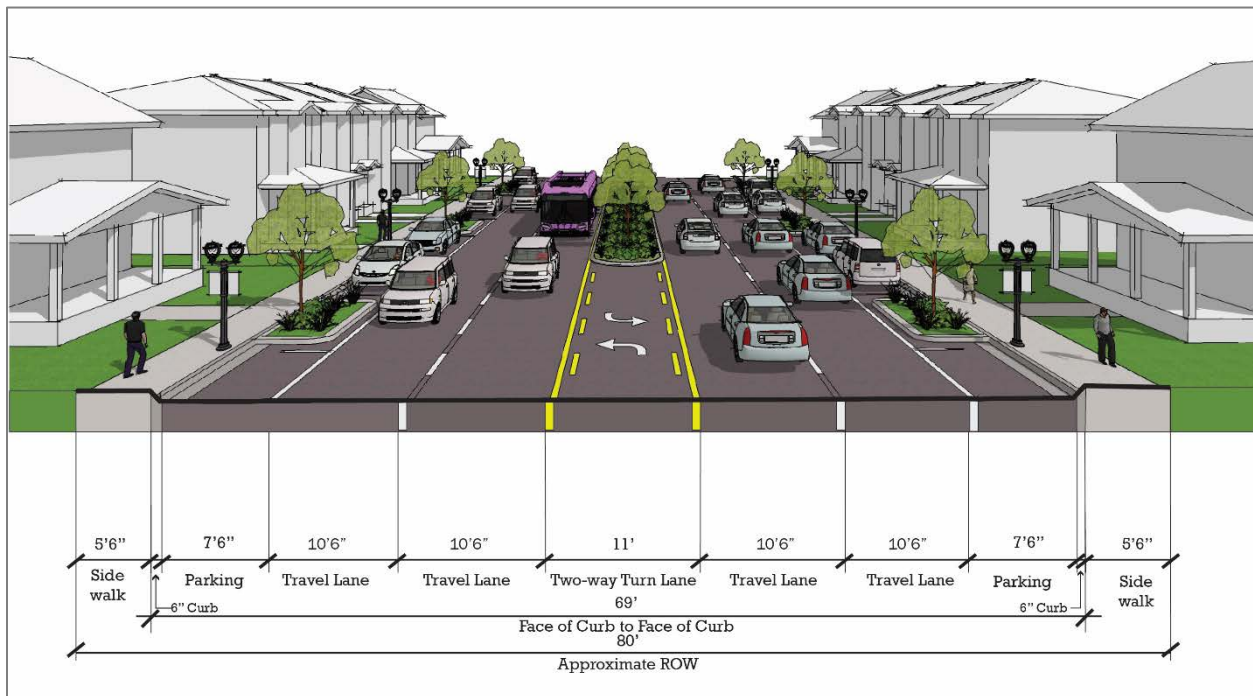
Preliminary Design Concepts

A Complete Street safely and comfortably accommodates people of all ages and abilities. Each of the three concepts presented in this report contains design elements that address speeding, pedestrian safety, and other key issues identified in the first phase of the study.

MetroPlan Orlando is presenting a 5-Lane Concept, 3-Lane Concept, and Hybrid Concept (5 lanes on weekdays, 3 lanes on weekend). Each concept has a variation.

Each of the concepts and variations is accompanied by a table showing: width of sidewalks, average time it takes for a pedestrian to cross at intersections, what landscape features would be added, dedicated bicycle facilities, connections to regional trails, vehicle drive times at rush hour, and availability of on-street parking. This information is compared to the conditions on Corrine today.

5-Lane Concept



This concept provides 4 travel lanes plus a center turn lane, with periodic landscaped medians. It offers parallel parking, a sidewalk, and trees on each side of the road.

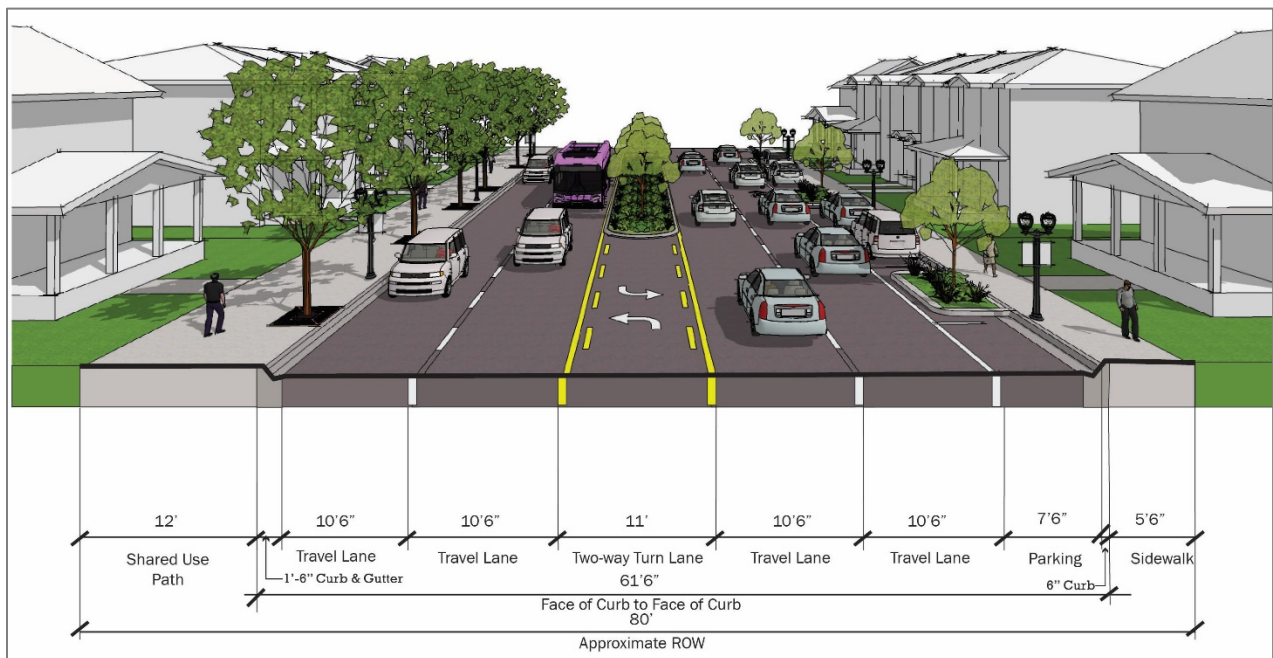
Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
5.5 feet, both sides	19 seconds	Tree grates in parking lanes, both sides	None	No	6.3-7.5 minutes	Both sides
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

The two travel lanes in each direction support the existing and projected traffic volume – roughly 23,000 cars each day Monday through Friday. If implemented, rush-hour drive time stays about the same as it is right now – 6 to 8 minutes to travel the two miles. The narrow lanes, 10.5 feet wide, are designed to enforce the existing speed limit.

The 11-foot center turn lane allows for comfortable left turns into driveways and businesses throughout the two miles. Two people can walk side by side on the 5.5-foot-wide sidewalk. The 7.5-foot-wide parking lane separates the sidewalk from the travel lanes. The width of the parking lane complies with the City code for Corrine, which requires a minimum of 7 feet for on-street parking.

Trees would be in the bulbouts, interspersed throughout the parking lane. With five lanes of pavement (68 feet) to cross, it will take about 19 seconds for an able-bodied adult to cross the street. The 5-Lane Concept has no space for dedicated bike facilities within the public right of way.

5-Lane Concept Variation

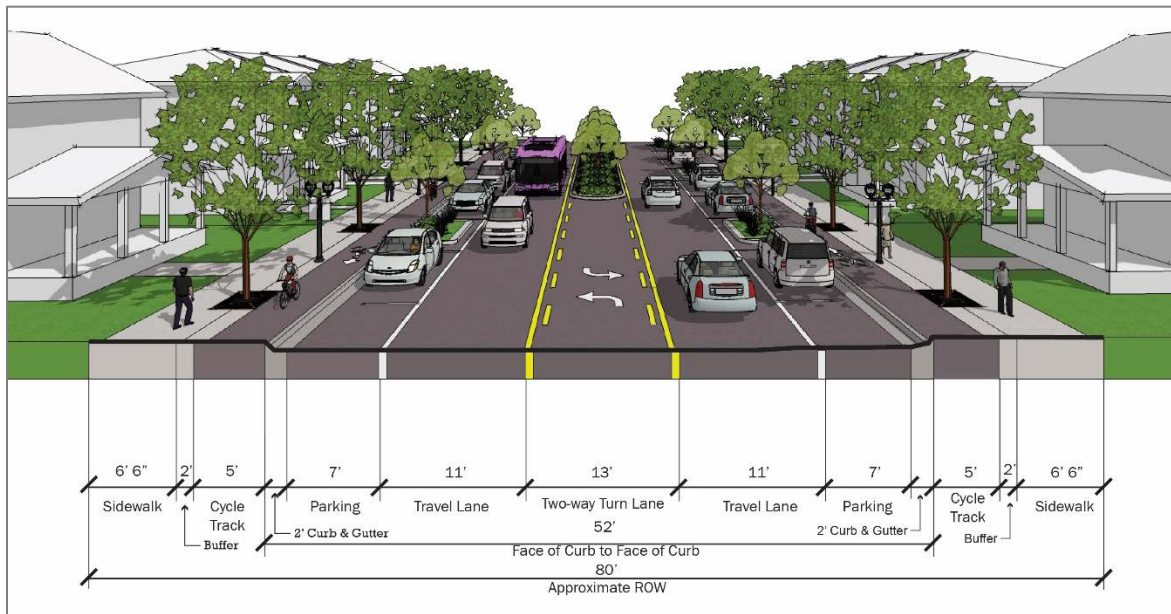


The 5-Lane Concept Variation turns the sidewalk and on-street parking on the north side of the street into a 12-foot shared-use path. The path offers space for people to walk side by side or for families

to ride their bikes — while separated from cars. The changes result in no on-street parking in front of all the businesses and homes on the north side of Corrine Drive. Street parking would be available on the south side of the road. With a shared-use path, the crossing distance at intersections is 17 seconds for the average person. Rush-hour drive times would remain roughly the same as today.

Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
5.5 feet, south side; 12-foot shared-use path, north side	17 seconds	Tree grates in parking lanes, both sides	12-foot shared-use path, north side	Via shared-use path	6.3-7.5 minutes	South side only
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

3-Lane Concept



This concept provides 2 travel lanes plus a center turn lane, with periodic landscaped medians. It offers a sidewalk with trees and a cycle track on each side of the road that is separated from moving vehicles by a barrier and parked cars. The cycle track is separated from pedestrians by tree grates along the sidewalk.

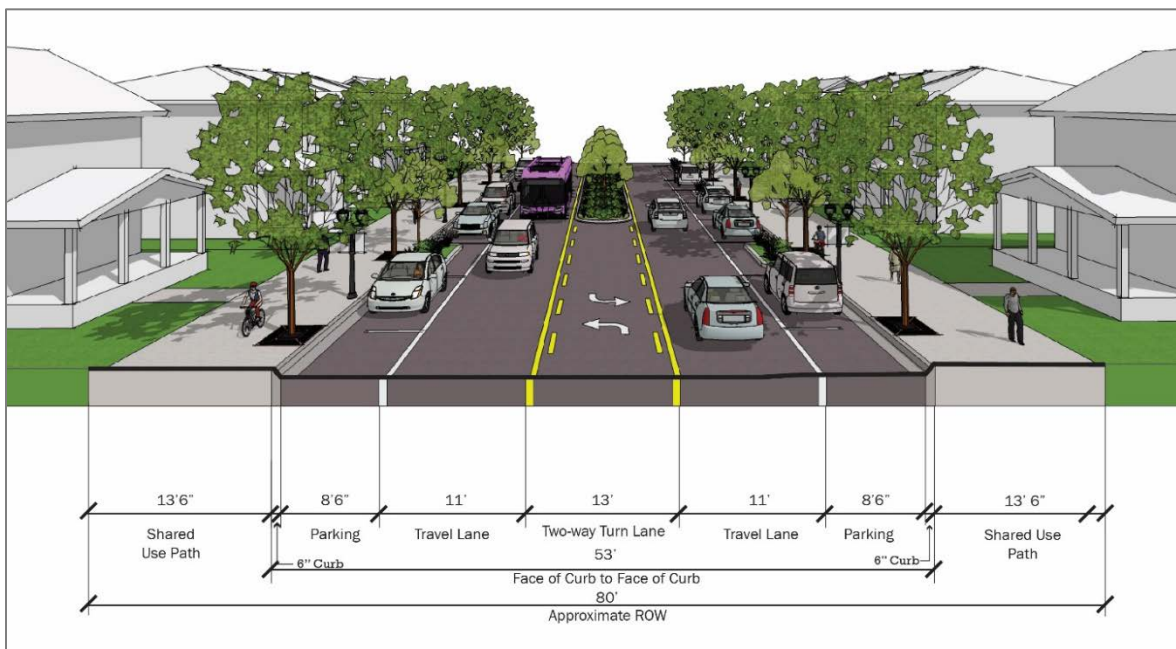
Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
6.5 feet, both sides	14 seconds	Tree grates between sidewalk and cycle track	5-foot separated cycle track, both sides	Via separated cycle track	23.8-27.3 minutes	Both sides
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

The 3-Lane Concept offers the biggest change from the Corrine Drive of today. Removing 2 travel lanes affects current rush hour drive times significantly, adding almost 20 minutes to the travel time for the corridor. The projected time it would take for someone to drive the entire two miles goes up to 27 minutes westbound in the morning and 24 minutes eastbound in the evening. It is possible drivers would use local neighborhood streets to avoid driving on Corrine Drive. To travel the corridor at today's rush hour drive time, 300-400 cars per hour would need to divert to local streets during the peak driving times in the morning and evening.

The drive times have the potential to affect an emergency vehicles' ability to get where it needs to go. Additionally, the potential is high for a lengthy line of cars waiting to move through the intersections, which could increase the likelihood of rear end crashes.

This concept offers the most accommodations for pedestrians and cyclists. Six and a half feet of sidewalk on each side allow for three or more people to walk side by side. For an able-bodied adult to walk from one side of the street to the other, the time is approximately 14 seconds—a crossing distance of 49 feet. A cycle track – 5 feet wide – is located on both sides, offering cyclists space to ride separated from the travel lane. Trees would be planted in grates between the sidewalk and the cycle track. Seven feet on each side is dedicated to street parking.

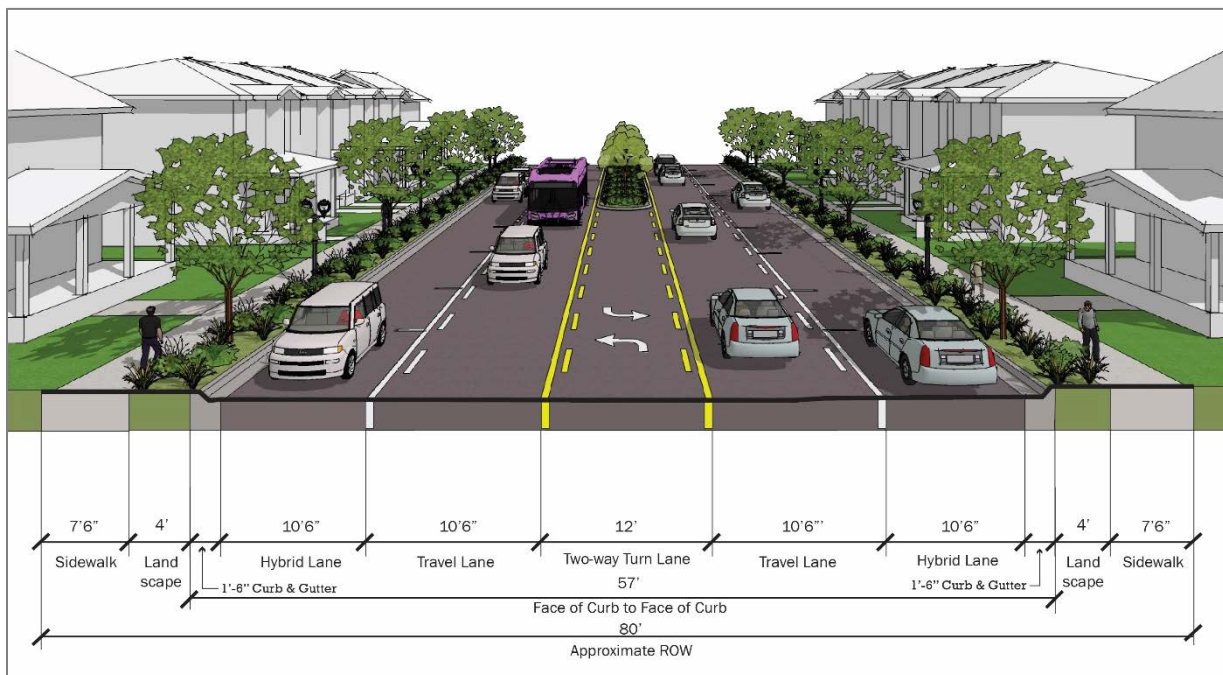
3-Lane Concept Variation



With the 3-Lane Concept Variation, the separated cycle track and sidewalk on each side of the road are replaced with a 13.5-foot shared-use path. This change decreases the crossing distance to 43.5 feet, meaning an able-bodied adult should be able to cross the intersection in 12 seconds. Everything else stays the same as with the 3-Lane Concept.

Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
13.5-foot shared use path, both sides	12 seconds	Tree grates as part of shared-use path	13.5-foot shared-use path, both sides	Via shared-use path	23.8-27.3 minutes	Both sides
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

Hybrid Concept



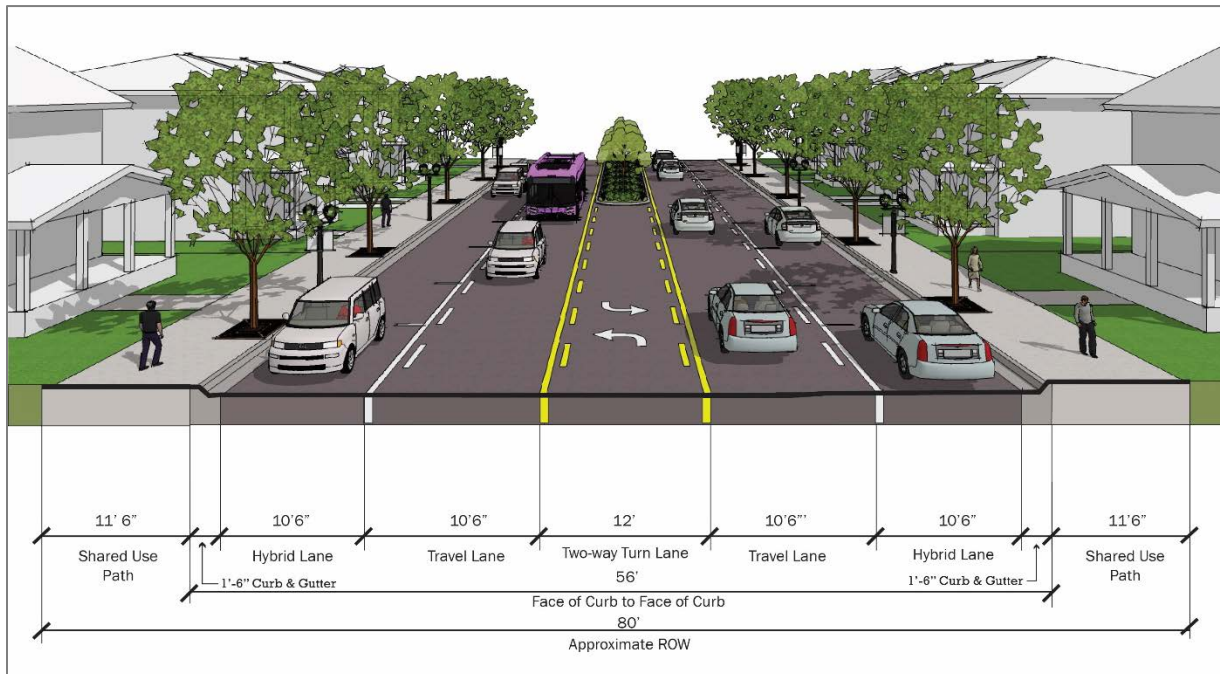
On weekdays, this concept provides 5 lanes (4 travel lanes plus a center turn lane). On weekends, when traffic is lighter, the 2 outside travel lanes are converted to parallel parking. This is currently done in other places in Orlando – including downtown on Orange Avenue and in the Milk District on Robinson Street. The concept offers a sidewalk on each side of the road, with landscaping.

Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bicycle Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
7.5 feet, both sides	15 seconds	4-foot planting strip, both sides	None	No	6.3-7.5 minutes	Both sides, weekends only
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

Called the Hybrid Concept because it combines features of the 5-Lane and 3-Lane concepts, it changes the function of the outside lanes on weekends. This configuration supports current and future traffic volume – 23,000 cars Monday to Friday and fewer than 18,000 on the weekend. The reduction in the number of lanes on the weekend would support existing traffic volume, while making it harder to travel above the posted speed limit. Rush hour drive times stay about the same as today – 6-8 minutes to travel the 2 miles.

The Hybrid Concept is possible through a policy tool informally known as Cinderella Parking. This is a parking regulation that enforces a no-parking rule during certain hours of the day or week, while allowing parking at other times. No on-street parking is available during the week, however there is a wide parking strip (10.5 feet) on the weekends. The 7.5-foot sidewalk allows for three people to walk side by side. An able-bodied person could walk across the street in 15 seconds. A 4-foot buffer with trees and other landscaping separates the sidewalk from the outside travel lane/parking strip. There is no change in existing travel times – 6-8 minutes for the 2 miles every day of the week. There is no room within the public right-of-way for dedicated bicycle facilities with the Hybrid Concept.

Hybrid Concept Variation



The Hybrid Concept Variation provides for a separated bicycle and pedestrian facility via an 11.5-foot shared-use path on both sides of the road. This is accomplished by replacing the sidewalk and landscape buffer from the Hybrid Concept. Landscaping is still a vital element, though. It is incorporated into the Hybrid Concept Variation through tree grates within the shared-use path. Rush hour drive times would remain roughly the same as today. Like the Hybrid Concept, this variation has 5 lanes on the weekdays and 3 lanes on weekends.

Sidewalk Width	Intersection Crossing Time	Landscaping & Shade	Bike Facilities	Connect to Trails	Rush Hour Drive Time	On-Street Parking
11.5-foot shared-use path, both sides	15 seconds	Tree grates as part of shared-use path	11.5-foot shared-use path, both sides	Via shared-use path	6.3-7.5 minutes	Both sides, weekends only
Compared to Corrine Today						
0-4 feet, intermittent	19 seconds	None	None	No	6.3-7.5 minutes	Only on some sections

Matrix

Corrine Drive today has a variety of issues – from speeding vehicles to lack of facilities for cyclists and pedestrians. The concepts presented here address the issues and the community’s ideas to varying degrees. None perfectly addresses everything, and each would require trade-offs if advanced to the next phase of the study. This matrix offers a side-by-side comparison of all the concepts and their variations. This makes it easier to see the trade-offs associated with implementing each concept.

<i>What the concepts offer:</i>	No-Build	5-Lane	5-Lane Variation	3-Lane	3-Lane Variation	Hybrid	Hybrid Variation
FOR THE WALKING EXPERIENCE							
Sidewalk Width	From 0-4 ft. (a 6-ft. section, Forest Ave.)	5.5 ft. on both sides	5.5 ft. on south side; 12-ft. shared-use path on north side	6.5 ft. on both sides	13.5-ft. shared-use path on both sides	7.5 ft. on both sides	11.5-ft. shared-use paths on both sides
Intersection Crossing Time	19 seconds (68 ft.)	19 seconds (68 ft.)	17 seconds (60 ft.)	14 seconds (49 ft.)	12 seconds (43.5 ft.)	15 seconds (54 ft.)	15 seconds (54 ft.)
Landscaping & Shade	None	Tree grates on both sides	Tree grates on both sides	Tree grates between sidewalk, cycle track	Tree grates on both sides	4-foot planting strip on each side	Tree grates on both sides

FOR THE CYCLING EXPERIENCE							
Designated Bike Facilities	None	None	12-ft. shared-use path on north side	5-ft. separated cycle track on both sides	13.5-ft. shared-use paths on both sides	None	11.5-ft. shared-use paths on both sides
Connection to Regional Trails	No	No	Yes, via shared-use path	Yes, via separated cycle tracks	Yes, via shared-use paths	No	Yes, via shared-use paths
FOR THE MOTOR VEHICLE DRIVER							
Rush Hour Drive Times (Time to drive 2 miles using current traffic numbers in direction of most traffic)	6.3 min. AM	6.3 min. AM	6.3 min. AM	27.3 min. AM	27.3 min. AM	6.3 min. AM	6.3 min. AM
	7.5 min. PM	7.5 min. PM	7.5 min. PM	23.8 min. PM	23.8 min. PM	7.5 min. PM	7.5 min. PM
On-Street parking	Some portions of the road	Yes, on both sides	Yes, only on south side	Yes, on both sides	Yes, on both sides	Weekdays, No; Weekends, Yes, on both sides	Weekdays, No; Weekends, Yes, on both sides
Parking Space Width	6-7 ft.	7.5 ft.	7.5 ft.	7 ft.	7 ft.	10.5 ft., on weekends only	10.5 ft. on weekends only
Travel Lanes (number and width)	4 travel lanes, 10-15 ft.; Center lane, 11-18 ft.	4 travel lanes, 10.5 ft.; Center lane, 11 ft. with medians	4 travel lanes, 10.5 ft.; Center lane, 11 ft. with medians	2 travel lanes, 11 ft.; plus center lane, 13 ft. with medians	2 travel lanes, 11 ft.; plus center lane, 13 ft. with medians	4 travel lanes on weekdays , 10.5 ft.; 2 travel lanes on weekends , 10.5 ft.; plus center turn lane, 12 ft. with medians	4 travel lanes on weekdays , 10.5 ft.; 2 travel lanes on weekends , 10.5 ft.; plus center turn lane, 12 ft. with medians

Ideas That Were Eliminated

The Phase 2 process yielded more ideas than the ones presented to the public. As the concepts and possible safety solutions were refined, several designs were discarded because they did not conform to the ground rules established at the beginning of Phase 2. A popular idea – roundabouts – is discussed below.

4-Lane Concept

This concept had four travel lanes with no center lane to accommodate turns. Sidewalks and dedicated bicycle facilities would be included. A 4-to-6-foot concrete barrier would separate vehicles traveling in opposite directions. The barrier would limit left turns and U-turns between Bumby and General Rees avenues. Trucks making deliveries to local businesses would not be able to turn left.

MetroPlan Orlando made the decision to not advance this option as a public concept. The concept would create an inconsistent look between sections of the corridor, because it couldn't be implemented on the entire two-mile road. It would be impossible to implement the 4-Lane Concept in the business district, since left turns are a necessity to access each parking lot or alley. The 4-Lane Concept could not be objectively analyzed in the Synchro traffic analysis software, and it did not demonstrate an ability to slow speeding vehicles.

5-Lane Concept without Parking

A 5-Lane Concept with slightly wider travel lanes – at 11 feet – was considered. The concept offered a 6-foot wide sidewalk on both sides and a 4-foot landscape buffer between the travel lane and sidewalk, but it did not include on-street parking at any time. This was eliminated because it did not meet the ground rules established at the beginning of Phase 2.

Roundabouts

Roundabouts were suggested at several intersections as part of the public feedback. Intersections along Corrine Drive were examined to see if roundabouts could be installed without purchasing additional right-of-way. MetroPlan Orlando concluded that additional land would have to be purchased at every intersection. This is true for every concept proposed (5-Lane, 3-Lane, and Hybrid). The best candidate for a roundabout is the intersection at the Leu Gardens curve from Forest to Corrine. According to [NCHRP Report 672 – Roundabouts: An Informational Guide, Second Edition](#), the minimum amount of land needed for a roundabout at the Leu Gardens curve is 120 feet. Obtaining the extra space would require using the City of Orlando-owned greenspace parcel currently designated for recreational use across the street from the Leu Gardens entrance.

Reversible Lanes

Reversible lanes are used in some areas of the country where vehicle traffic is heavier in one direction than the other. One or two lanes of the road switch directions at different times of day to accommodate the traffic flow. Some prime locations for reversible lanes are streets near large event venues, such as football stadiums, or bridges, such as the Golden Gate Bridge. Corrine Drive is not a viable candidate for reversible lanes, because they would hamper left turns and cut off access to homes and businesses on Corrine Drive during peak hours. This idea was eliminated because reversible lanes are typically intended to keep vehicles moving fast, which is the opposite of the study objectives for Corrine.

Traffic Operations

The Synchro studio suite is a type of computer software that enabled MetroPlan Orlando to analyze traffic operations currently on Corrine Drive and for each proposed concept.

Synchro is the base program that determines intersection level of service, or how well an intersection functions. It rates performance on a scale of A-F, with E being the lowest letter deemed acceptable per both Orange County and the City of Orlando's comprehensive plans. SimTraffic is a traffic simulation program that is part of the Synchro studio suite. It acts as an extension on the Synchro program to determine drive times. MetroPlan Orlando used the software to determine drive times in the morning rush hour (7:30-8:30 a.m.), at mid-day (11:45 a.m.-12:45 p.m.), and in the evening rush hour (5-6 p.m.) The specific steps used in the Synchro and SimTraffic analyses are below.

Synchro/SimTraffic Steps

Steps 1-8 were conducted during the first phase of the study.

- 1) Obtained Orange County's existing Synchro files, which are the approved base for analyzing traffic operations.
- 2) Performed quality assurance to ensure signal timings and speed limits were correct.
- 3) Analyzed data from the Orange County historical traffic count program, counts collected by MetroPlan Orlando in May 2017, and the turning movement count numbers from May 2017. The traffic counts and turning movement counts enable Synchro to determine how many cars can pass through each of the traffic signals.
- 4) Input traffic count data into the existing Synchro files.
- 5) Ran Synchro and its SimTraffic extension to determine the intersection level of service and travel times for Corrine Drive today. This analysis can be found at CorrineDriveStudy.org under Phase 1: Corrine Drive's Transportation Story in Data, Images & Video.
- 6) Input growth rate for each segment of Corrine Drive between Mills Avenue and Bennett Road. The approved growth rate between Mills and Winter Park Road is 1.5%. It is 1% between Winter Park Road and Bennett. See section below for how MetroPlan Orlando determined the growth rate.
- 7) Ran Synchro and its SimTraffic extension to determine the intersection level of service and travel times in the year 2040 if no changes are made. This analysis can be found at CorrineDriveStudy.org.
- 8) Sent analysis to Orange County and the City of Orlando for review and validation of results. Each government independently reviewed and supported the analysis.

Steps 9-11 were conducted during the second phase of the study:

- 9) Once the potential concepts were identified, MetroPlan Orlando determined the variables within each concept that affect traffic operations.
- 10) Changed the identified variables, and ran Synchro and its SimTraffic extension for each concept.
- 11) Sent analysis to Orange County and the City of Orlando for review and validation of results. Each government independently reviewed and supported the analysis.

The 5-Lane Concept and its variation did not have any changes that affect traffic operations. This means that no variables were changed within the Synchro/SimTraffic analysis. The Hybrid Concept and the 3-Lane Concept required changes. For the hybrid, the variable was the removal of the outside travel lane on the weekend. In the 3-Lane concept, permanently having 3 lanes was the change. Nothing else was changed.

Corrine Drive's Growth Rate

The growth rate determines how many cars could be using Corrine Drive in the year 2040. Here is how it was determined:

- 1) Reviewed Orange County historical traffic counts, the May 2017 counts, the region's travel demand model, and traffic studies from recent developments including Baldwin Park, the Yards, and the Audubon Park K-8 School. This is the same step as Step 3 in the Synchro/SimTraffic Analysis.
- 2) Identified the growth rates in the recent traffic studies.
- 3) Developed a trend line from all the traffic counts and the region's travel demand model.
- 4) Averaged the growth rates from recent traffic studies and the trend line.
- 5) Reviewed the averaged growth rate with Orange County, the City of Orlando, and the City of Winter Park. Each local government approved the growth rate: 1.5% between Mills Avenue and Winter Park Road; 1% between Winter Park Road and Bennett Road.

Potential Safety Solutions for the Area

The Corrine Drive Complete Streets Study is about more than the two miles between the lights at Mills Avenue and Bennett Road. It also considers the streets in surrounding neighborhoods and how they interact with the main corridor. We are considering a person's entire trip and the transportation options that could support a healthy and safe journey. That's why, as part of the Phase 2 process, several additional safety solutions are proposed. MetroPlan Orlando has identified a potential bicycle network and lighting suggestions. Additionally, changes to specific locations in the study area are proposed. These changes could be implemented, regardless of which concept is advanced to the next phase.

Raised Intersection at Winter Park Road



A raised intersection at Winter Park Road and Corrine Drive would be a significant pedestrian safety design element. In a raised intersection, the pavement increases in height to be level with the sidewalks and curbs at each corner. The slight increase in pavement elevation at the intersection is designed to slow a car's speed, and it draws attention to someone crossing the street.

The raised intersection addresses these community concerns:

- Slowing speeding vehicles
- Pedestrian safety
- Safety of children walking or biking to new Audubon Park K-8 School

The design of the intersection would help by:

- Adding a physical design feature that reduces a car's ability to drive fast
- Drawing attention to someone crossing the street and helping make them more visible to drivers who are farther away
- Making crosswalks level with the sidewalks and curbs, so it's easier to cross the street – particularly for children, older adults, families with strollers, or people who use wheelchairs
- Placing bollards at corners to protect pedestrians from vehicles that may take the turn too sharply
- Incorporating an approved Safe Routes to School infrastructure improvement, which is particularly relevant as the new K-8 school opens nearby

Signalized Crosswalk at East End Market



Through both the community survey and the feedback at the July 2017 workshop, more than 100 people suggested a crosswalk near East End Market. MetroPlan Orlando proposes adding a signalized crosswalk on Corrine between East End Avenue and Northwood Terrace Drive.

The signalized crossing addresses these community concerns:

- Safe street crossing for pedestrians
- A design feature to slow vehicles between General Rees Avenue and Winter Park Road, the part of Corrine with the most speeding
- Opportunity to enhance surrounding aesthetics

The design of the crossing would help by:

- Providing either a push-activated traffic light (HAWK) or pedestrian signal, which would give vehicles a red light – similar to the one on Robinson Street in front of Howard Middle School
- Creating pavement markings to clearly show the pedestrian crossing area
- Including possible opportunities for public art
- Shortening the distance to cross Corrine Drive through sidewalk extensions
- Placing bollards at the extensions to protect people waiting to cross

Adjust Traffic Signal Timings

The traffic signals along Corrine have inconsistent timing and lack sufficient pedestrian considerations. MetroPlan Orlando is proposing to retime traffic signals in the two-mile Corrine Drive corridor. With the Audubon Park K-8 School opening in 2018, traffic signals that support kids walking or biking as well as schools are a key need.

The retiming of the traffic signals addresses these community concerns:

- Poor traffic light timing along Corrine Dr.
- Safe street crossing for pedestrians
- Choppy traffic flow

The retiming of the traffic signals would help by:

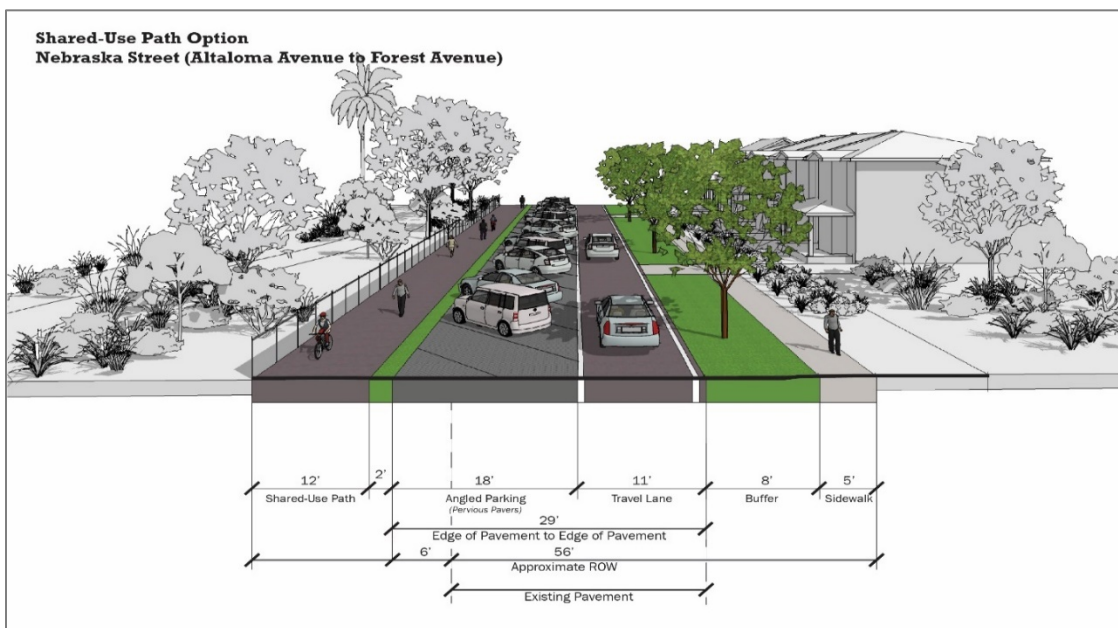
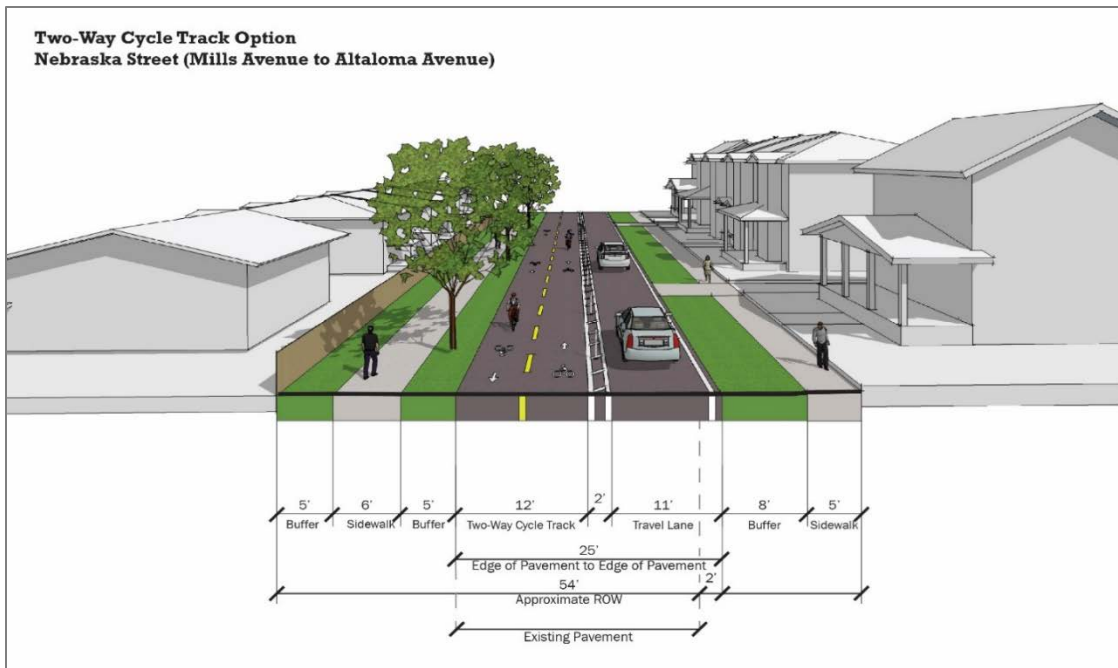
- Updating signal timings to provide smoother vehicle flow and ensure pedestrians have sufficient crossing time
- Adjusting the signal timings to include giving pedestrians a ‘head start’ at intersections, allowing them to start crossing before lights turn green for cars

Nebraska Street Redesign

The Nebraska Street proposal would make a more significant change. The map identifies a shared-use path proposed for Nebraska between Mills Avenue and Forest Avenue. This is approximately a half-mile of a combined separated cycle track and shared-use path. A separated two-way cycle track is proposed from Mills Avenue to Altaloma Avenue, on the north side of the road. At Altaloma – the start of the Leu Gardens property – the cycle track turns into a shared-use path along the Leu Gardens property line. Angled parking spaces would be located between the shared-use path and the vehicle travel lane.

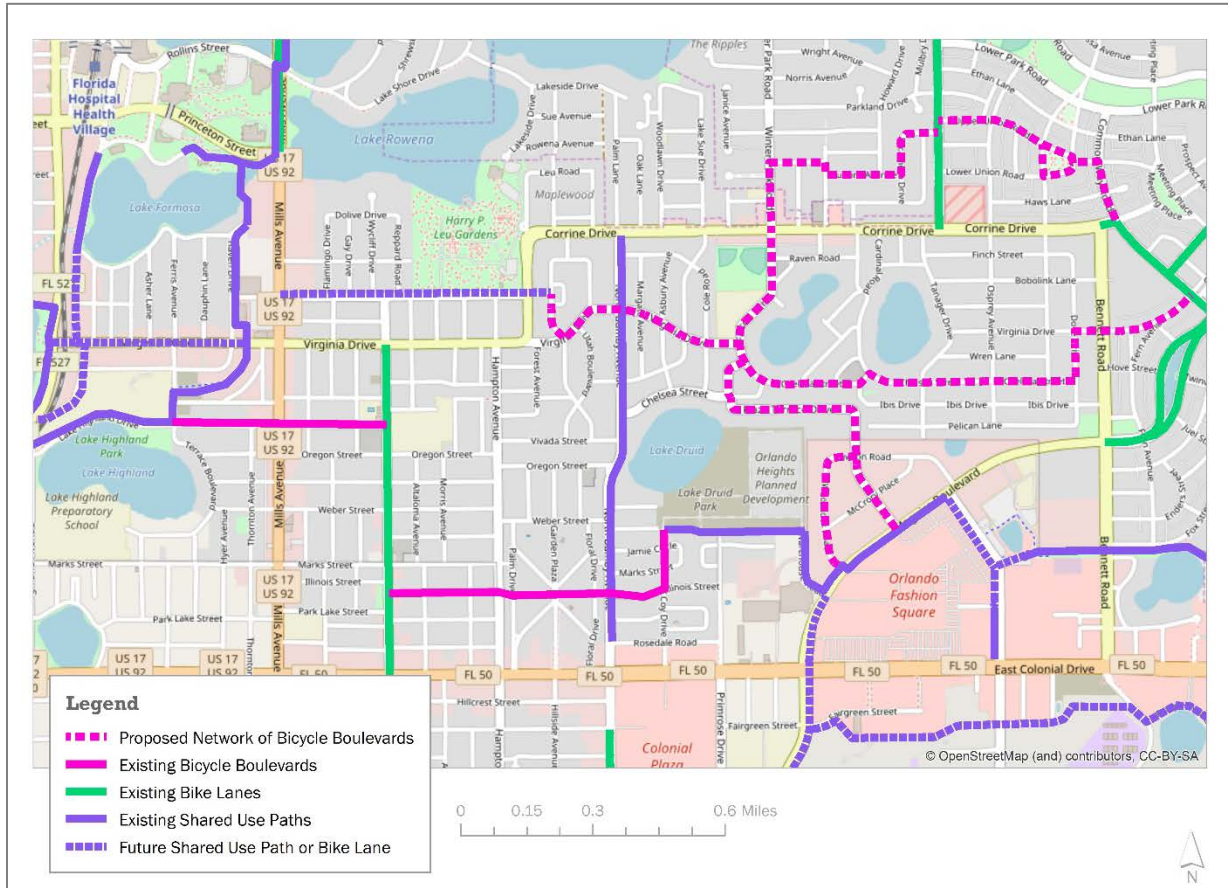
Adding a cycle track requires Nebraska Street to be one-lane for east-bound vehicle traffic only. The cycle track would replace the existing westbound travel lane. All westbound traffic would be able to use Virginia Drive. This has the potential to add a minute or two to travel times from Mills to the Leu Gardens curve.

The change would provide 50-80 permanent parking spots. The spots will formally be used for Leu Gardens events, but they will be available to the public as well. Additionally, a bicycle-specific traffic light could be added to the traffic signal at the Forest and Nebraska intersection. If this idea were to go forward, it would require more public input and coordination with the neighborhood.



Network of Neighborhood Bicycle Boulevards

As mentioned earlier, bicycle infrastructure that fosters a safe and supportive environment differs by the type of street. The local streets that intersect or parallel Corrine Drive are prime candidates for sharrows. MetroPlan Orlando is proposing a network of neighborhood bicycle boulevards to help cyclists ride from points west to points east and vice versa without using Corrine Drive. The bicycle boulevards would feature a robust wayfinding system and sharrows. (See Key Terms box, page 4.)



The proposed sharrows and wayfinding system would connect Leu Gardens and Colonialtown North to points east, such as the Cady Way Trail or downtown Baldwin Park. One sharrow route would be north of Corrine Drive connecting to the bike lane on General Rees. Another would use Chelsea Lane to connect Audubon Park to downtown Baldwin Park. The southern sharrow route would connect the study area to the Orlando Bike Beltway and the Cady Way Trail.

Leu Gardens Connection

This design proposes building a 125-foot-long road connection between the Leu Gardens driveway and North Forest Avenue, creating a signalized exit for Merritt Park residents. If implemented, this design would relocate the Leu Gardens gate to a spot further back toward the Garden House and restripe the driveway leading to the light. To implement, this road connection requires significant coordination between all the departments in the city of Orlando and residents of N. Forest Avenue.

The new road addresses these community concerns:

- Difficulty accessing Corrine Drive from Merritt Park

The design of the crossing would help by:

- Allowing residents in Merritt Park to access Corrine Drive via the Leu Gardens traffic signal
- Improving residents' ability to turn left onto Corrine, particularly during rush hour

Better Lighting

Lighting is necessary to create the safe, walkable areas the community desires. Further details regarding lighting for the future Corrine Drive will be determined in Phase 3. The lighting recommendations will stay the same no matter which concept is advanced. A good lighting plan will illuminate both the road and the sidewalks, improving safety for walkers, bicyclists, and drivers. Pedestrian-scale lighting is closer to the ground and evenly lights spaces where people walk, improving visibility and safety for pedestrians. LED lights will minimize light pollution while brightening sidewalks and travel lanes.

Future Consideration: Transit Stops

The neighborhoods surrounding Corrine Drive are ill-served by public transit. The LYNX routes pass through the area to connect downtown Orlando with north and east Orange County. However, the transit agency is in the process of changing all its routes and service options. MetroPlan Orlando is working with the LYNX team to identify a potential route that better serves residents in the Corrine area. If feasible, the new routes will be incorporated into Phase 3 of the Corrine Drive Complete Streets Study.

The new routes could help make transit a more important part of life along Corrine Drive. Bulbouts would make good locations for bus stops. Amenities, such as a shelter, also could be added.

Next Steps

MetroPlan Orlando is presenting three concepts—and three variations—in this phase of the Corrine Drive study. Next, gathering public feedback is the focus. MetroPlan Orlando will engage members of the community through a digital platform — learning what they like, do not like, and suggest as options. We will also host informal pop-up meetings in the area and meet with local government officials.

The feedback from the public on the possible design concepts will help narrow the selection of elements to include in the final design. That design, which will bring together technical data, industry best practices and public desires, will be presented to the public in summer 2018. No design concept is selected at this time. The final design plan may draw from two or more of the concepts presented here.

The plan will include details on how a design can be implemented in the short-term (2 years), medium horizon (5 years) and long-term (10-15 years). The design plan will then be presented to local governments, so that possible funding sources can be identified. The first step toward constructing any project is approval of a final plan.

To this end, the Corrine Drive Complete Streets Study is the foundation upon which comprehensive changes to Corrine Drive can begin.

Endnotes

ⁱ Accessible Sidewalks and Street Crossings – an informational guide. Federal Highway Administration. Available at: http://www.bikewalk.org/pdfs/sopada_fhwa.pdf

ⁱⁱ Physical Activity: Built Environment Approaches Combining Transportation System Interventions with Land Use and Environmental Design. The Community Preventive Services Task Force. Available at: <https://www.thecommunityguide.org/sites/default/files/assets/PA-Built-Environments.pdf>

ⁱⁱⁱ Safe Routes to School Guide. National Center for Safe Routes to School. Available at: http://guide.saferoutesinfo.org/pdf/SRTS-Guide_full.pdf