

Overall Considerations

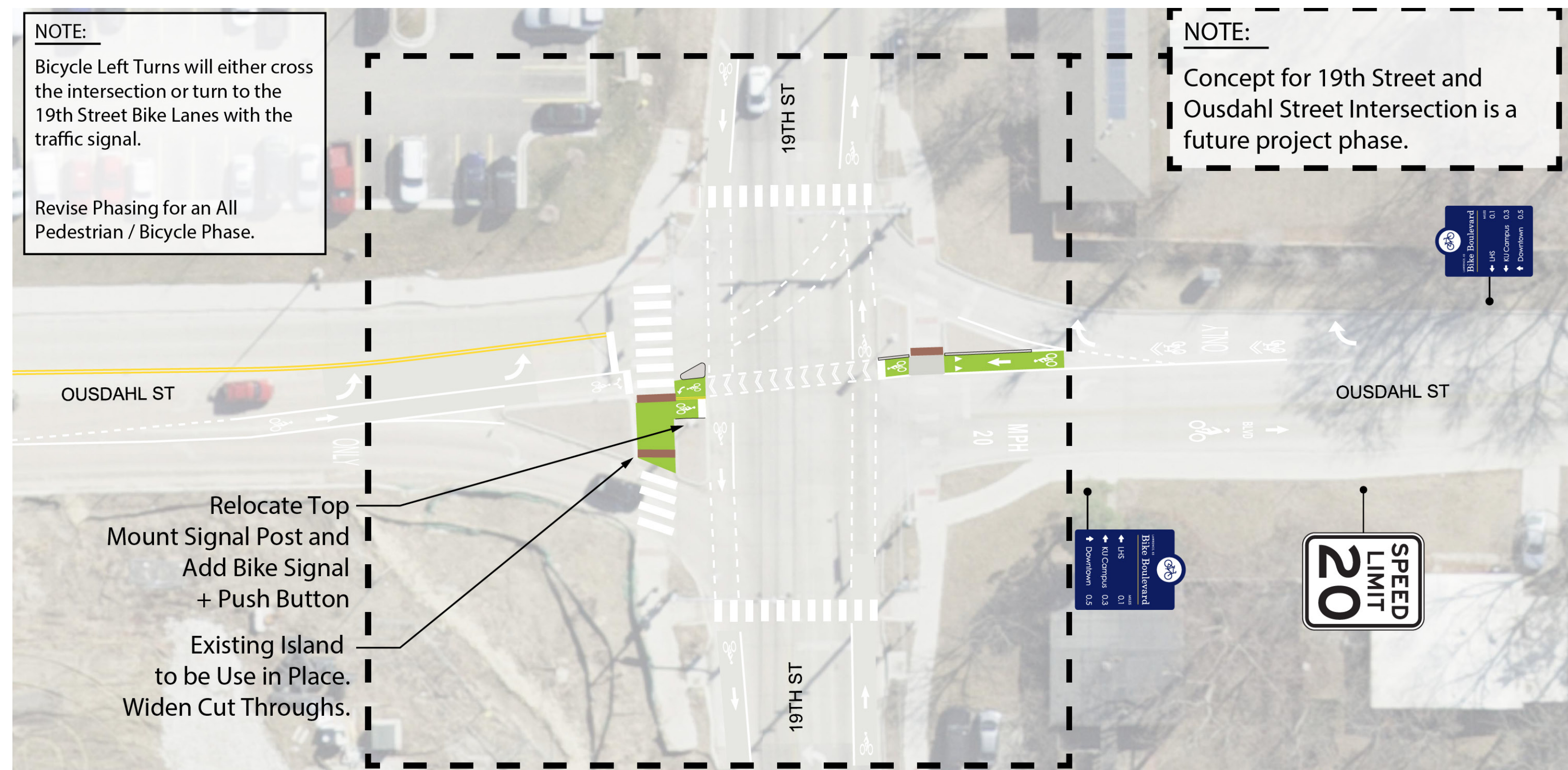
- Current **Speeds** for both 21st St. and 13th St. are higher than desired speeds for a bicycle boulevard (25 miles per hour or less, 20 miles per hour preferred). Establishing a Bicycle Boulevard requires reducing speed to operating speeds 25 miles per hour or less and daily vehicle volumes less than 1500 preferred and less than 3000 allowed.
- **Parking** throughout the corridors is maintained, except where limited due to chicane placement. Parking, when present naturally narrows the roadway and calms traffic.
- **Chicane** design: Following the demonstration project, an additional bump out was added to the Chicane design to achieve the desired speed reduction.
- **Speed limit signs and markings** are used throughout the corridors to notify and reinforce the 20 miles per hour speed limit for speed reductions.
- **Bike Boulevard pavement markings** are used throughout the corridor to indicate to motorists that a roadway is intended as a shared space for people driving and bicycling. They also support proper lane positioning for people bicycling, which can reduce improper passing and door zone conflicts.
- **Wayfinding** signs provide valuable wayfinding guidance and reinforce the intention of priority for bicyclists along a given route. Signs can take the shape of modified street signs that contribute to the identity of the roadway as a bicycle boulevard, and wayfinding signs that direct people bicycling (and walking) to nearby destinations along the route.
- **Spacing of elements** meets the desired 650 ft. between traffic calming elements along the corridor which is a best management practice.
- **Major Street Crossing Improvements** and **Speed Management** were the top features that survey respondents stated they would like to see as part of the Bicycle Boulevards.
- **Median Islands** and **Traffic Circles** were the least desirable design elements identified by attendees at the February open houses. Neither of those elements are proposed in this design.

Context Sensitive Design

This process required planners and engineers to weigh the competing values and needs of users for these streets. All of the things that were considered and weighed in on the proposed designs presented are:

- Public input from the neighbors, bicyclists and residents at large
- Travel needs of the neighborhood
- Street classifications
- Emergency vehicle access
- Transit operations
- Street sweeping and snow plowing
- On street parking
- Crash history
- Existing traffic counts and speeds
- Funeral routing
- Pavement condition
- Storm water
- Pedestrian access and crossings
- Intersecting streets
- Bikeway network
- Safety for all users
- High school student access
- Safe Routes to School routes

19th St. & Ousdahl St. Improvements



Treatment Type: Intersection Crossing Improvements

Details: Signal improvements to provide bicycle & pedestrian designated crossing phase, pavement markings to delineate bike only lanes & crossings, Bicycle Signal with push button

Desired Outcome:

- Connecting 19th St. Shared Use Path/bike lanes and 19th St. & Iowa St. bike ped tunnel to 21st Street Bicycle Boulevard.
- Improve safety of crossing for non-motorized users.

Issues & Considerations:

- Concept of 19th St. & Ousdahl St. is a future project phase to add a low stress end/beginning of the bicycle boulevard to the grade separated crossing on Iowa.
- Alternate alignment from original location to provide a safe crossing at Iowa, 21st St. & Iowa St. would require major intersection improvements to provide a low stress crossing for non-motorized users.

Ousdahl St. - between 19th St. & 21st St.



Treatment Type: Speed Cushion

Details: City standard speed cushion

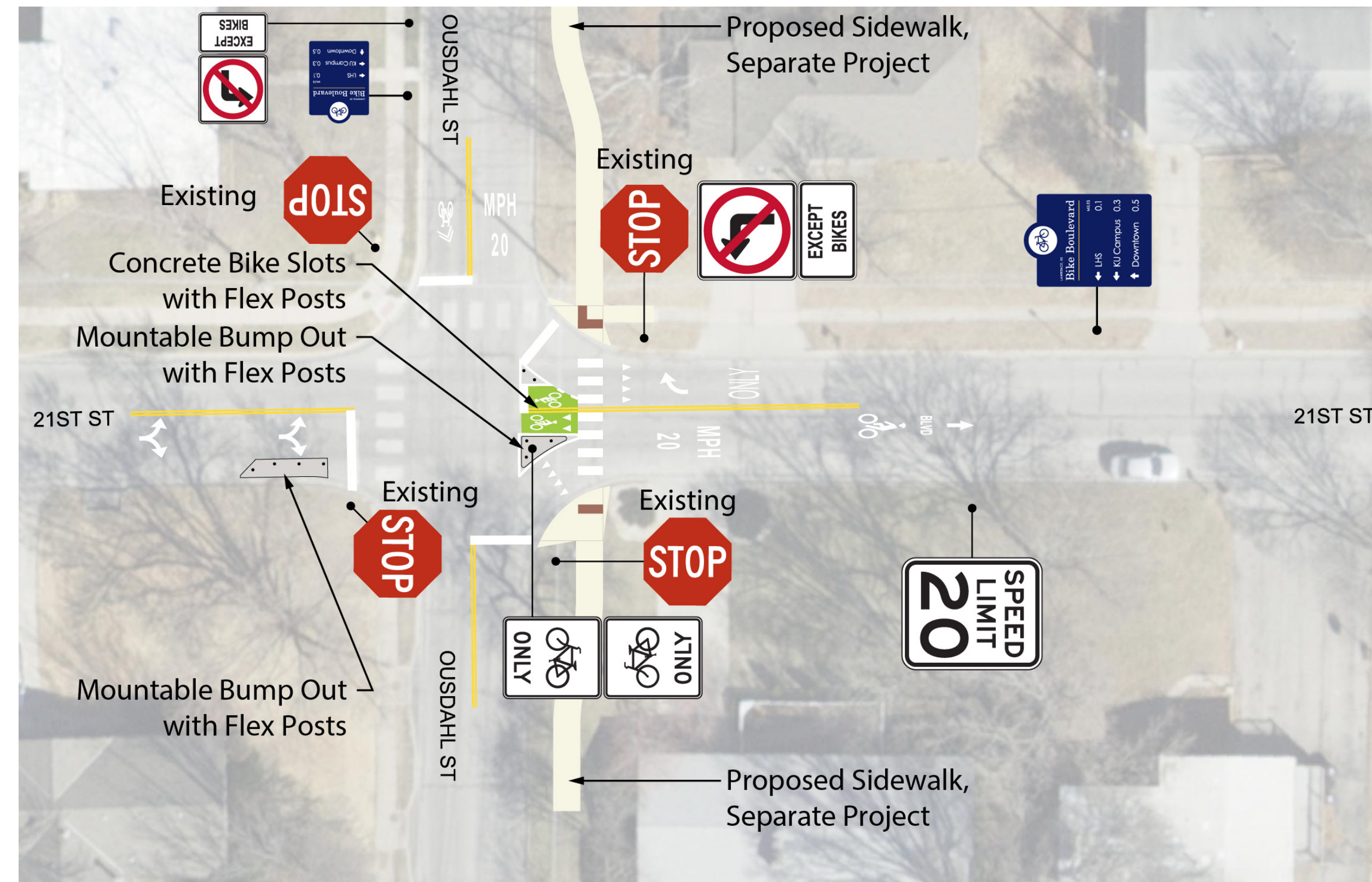
Desired Outcome:

- Speed reduction for motor vehicles to support drivers traveling the posted speed.
- Connects 21st St. Bicycle Boulevard to 19th St. Shared Use Path/Bike lanes

Issues & Considerations:

- Connection to 19th St/Iowa St Bicycle & Pedestrian tunnel for low stress Iowa crossing.
- Road already narrow due to on street parking on one side

21st St. & Ousdahl St. Improvements



Treatment Type: Diverter and Curb Bump out

Details: Intersection remains a 4 way stop, restricts vehicle movements on 21st St, provides mountable curb for emergency vehicle access

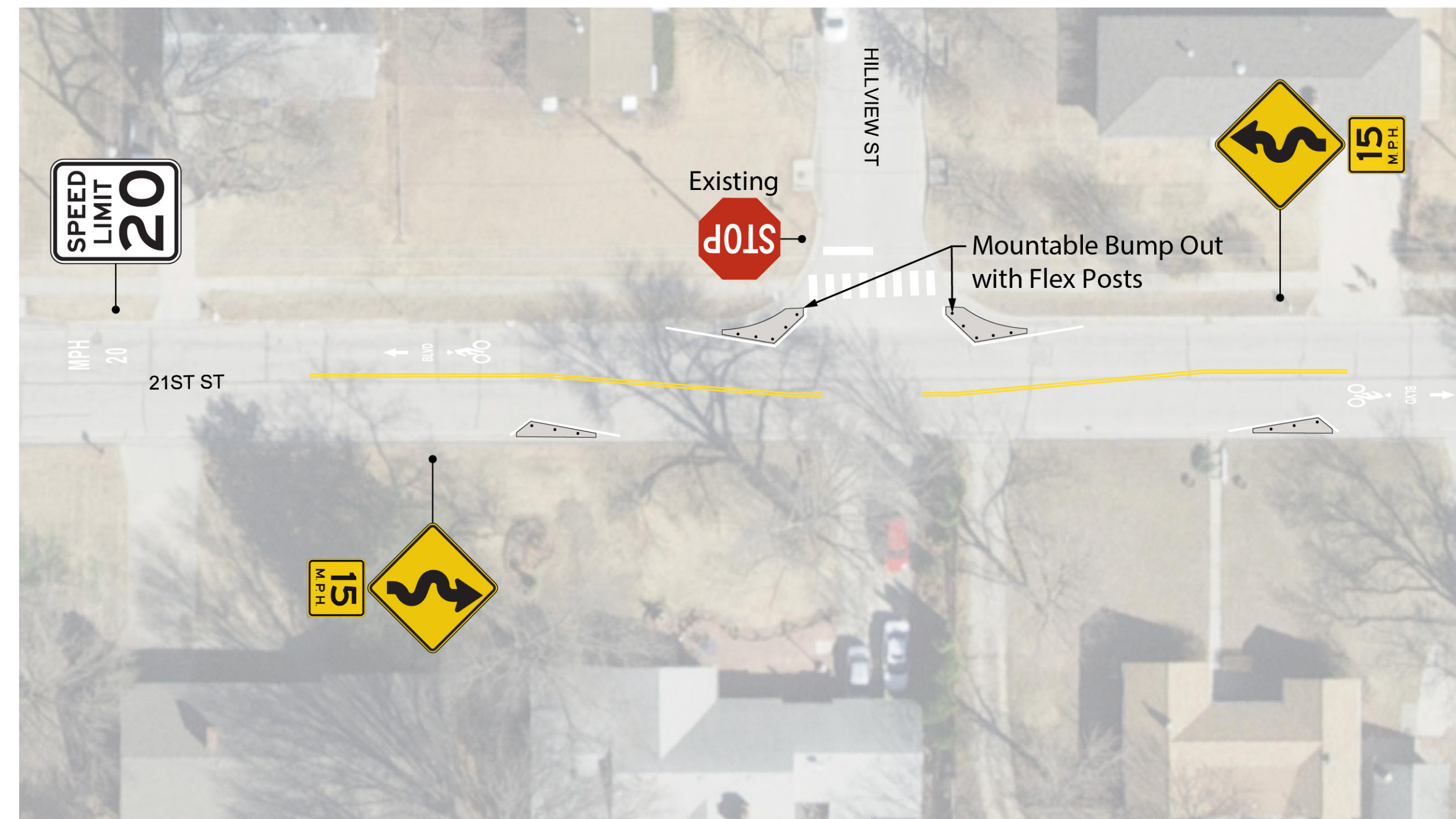
Desired Outcome:

- Reduction of cut thru traffic on 21st St
- Provide larger turning radius from 21st St. to Ousdahl St. for transit and fire/med vehicles

Issues & Considerations:

- Connecting the bikeway network north along Ousdahl St. to 19th St. to provide connectivity to new ped/bike tunnel under 19th St. & Iowa for access to the west.
- Future connection of the Bicycle Boulevard along 21st St. to Iowa St. requires intersection improvements at 21st St. & Iowa St.
- Maintaining emergency vehicle access
- Safe Route to School

21st St. & Hillview St.



Treatment Type: Chicane

Details: Mountable curb with flex posts for visibility, centerline pavement marking to define lanes

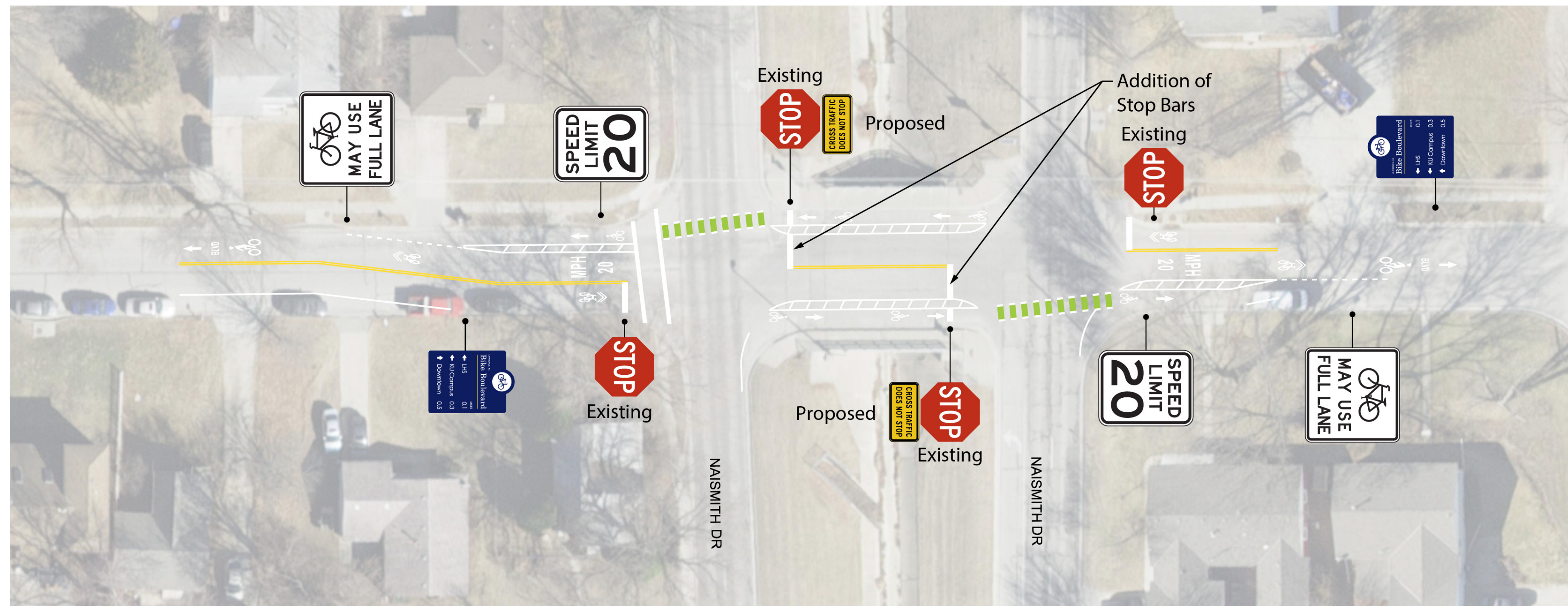
Desired Outcome:

- Speed reduction to 15 mph design speed

Issues & Considerations:

- Current Speeds are higher than desired speeds for a bicycle boulevard (25mph or less, 20mph preferred)

21st St. & Naismith St.



Treatment Type: Intersection Crossing Improvements

Details: Separated bike lanes, marked bicycle crossing spaces, signage/pavement markings to reinforce bicycle positioning in lane, speed limits signage and markings

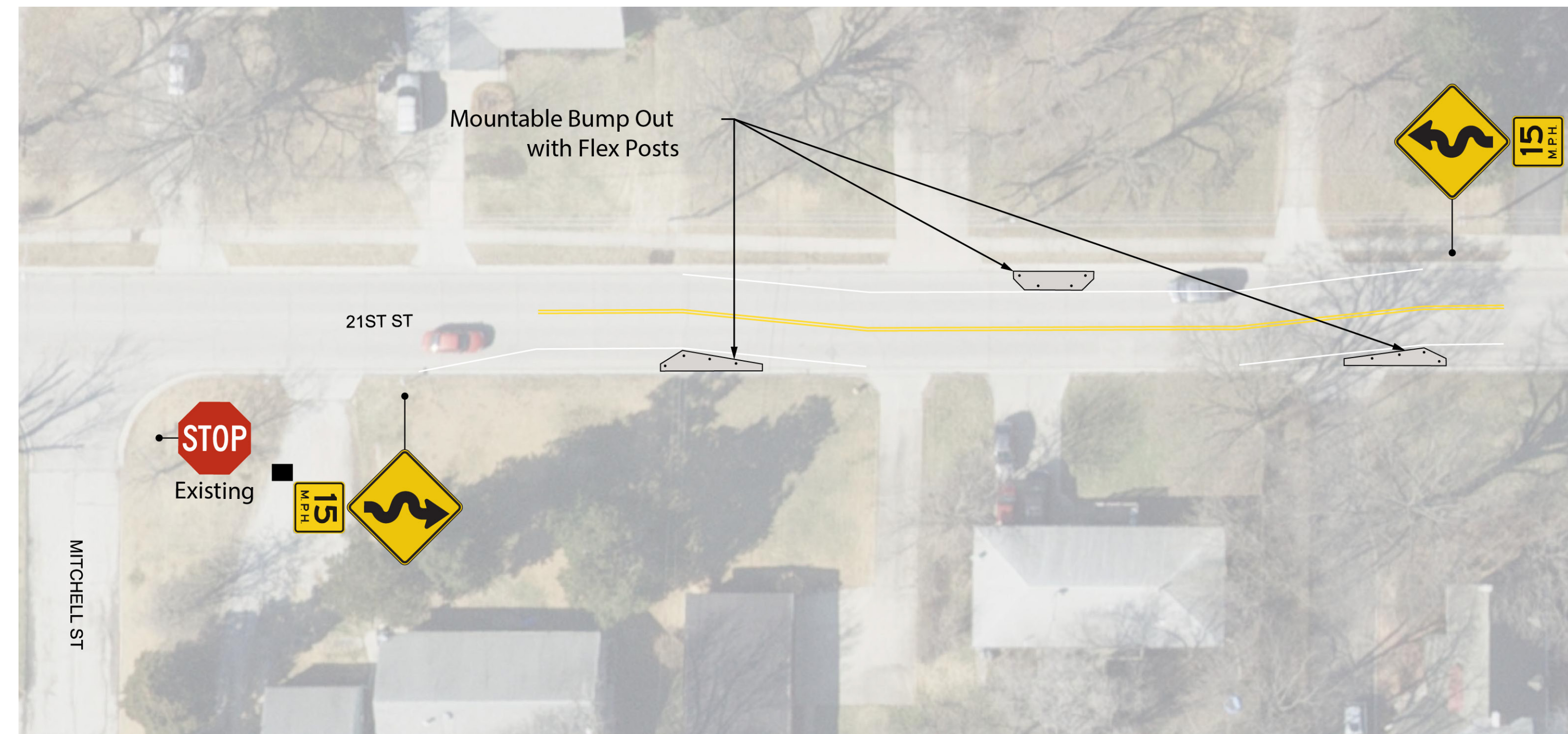
Desired Outcome:

- Improve crossings for bicyclists
- Interim design solution until Naismith Dr. is reconstructed
- Reinforced speed limits with pavement markings and signage

Issues & Considerations:

- Future reconstruction of Naismith with bikeway improvements will connect 21st St. Bicycle Boulevard to 19th St. and Naismith Valley Trail.
- Bicycle placement in roadway and visibility at crossing

21st St. & Mitchell St.



Treatment Type: Chicane

Details: Mountable curb with flex posts for visibility, centerline pavement marking to define lanes

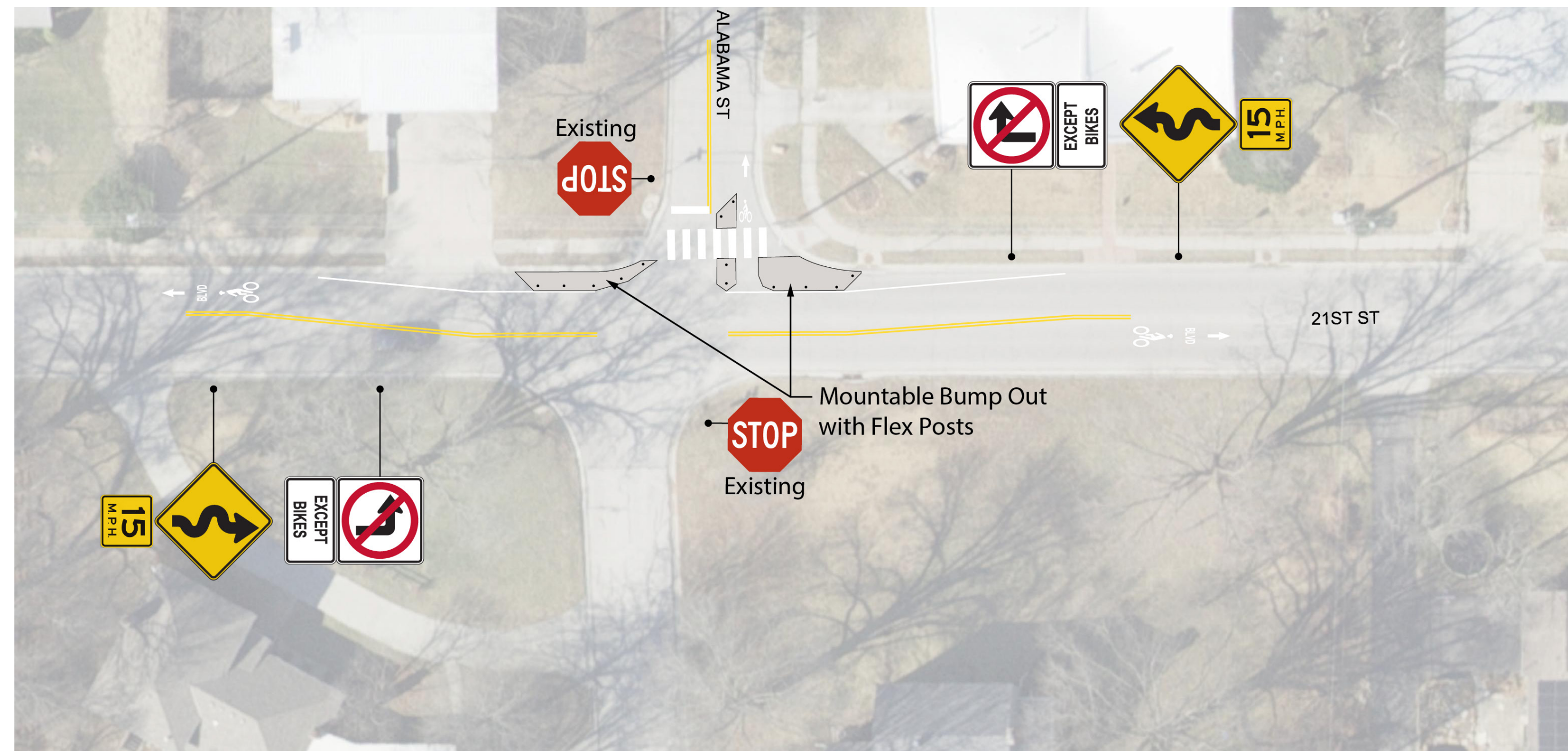
Desired Outcome:

- Speed reduction to 15 mph design speed

Issues & Considerations:

- Current Speeds are higher than desired speeds for a bicycle boulevard (25mph or less, 20mph preferred)

21st St. & Alabama St.



Treatment Type: Curb bump out and Diverter

Details: Restricts vehicle turning movements onto Alabama from 21st St, allows full bicycle turning movements, provides mountable curb for emergency access, narrows crossing distance for pedestrians and narrows travel lanes for vehicles, centerline pavement markings to define lanes

Desired Outcome:

- Address concerns of cut thru traffic on Alabama
- Reinforces speed reduction near intersections

Issues & Considerations:

- Due to left hand turn restrictions proposed for Louisiana, there were concerns about additional cut thru traffic on Alabama
- Current Speeds are higher than desired speeds for a bicycle boulevard (25mph or less, 20mph preferred)

21st St. between Carolina St. & Louisiana St.



Treatment Type: Chicane, travel lane narrowing and Speed Cushion

Details: Mountable curb with flex posts for visibility, centerline pavement marking to define lanes pavement striping to narrow travel lanes, speed cushion

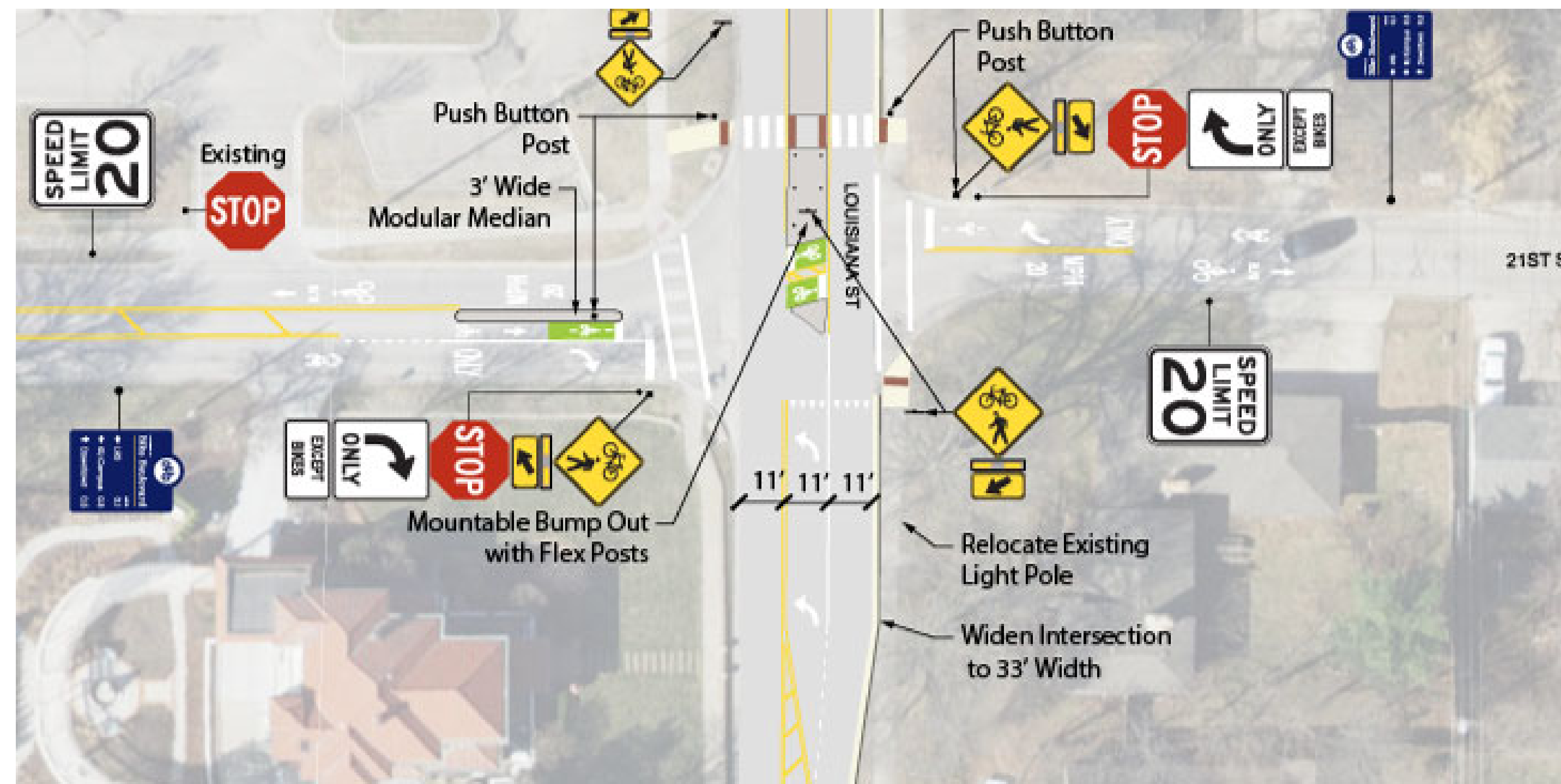
Desired Outcome:

- Speed reduction for motor vehicles to support drivers traveling the posted speed.

Issues & Considerations:

- Enhanced speed reductions of motor vehicles coming to the school eastbound or leaving the school westbound
- Pedestrian and vehicle traffic crossing Virginia to the sports fields
- Painted median that visually narrows the roadway to provide speed reductions due to no parking on both sides of 21st Street
- Current Speeds are higher than desired speeds for a bicycle boulevard (25mph or less, 20mph preferred)
- Vehicle restrictions were considered at Virginia St., but due to sports fields' access are not recommended

21st St. & Louisiana



Treatment Type: Intersection Crossing Improvements and Diverter

Details: Rectangular Rapid Flashing Beacon, pedestrian crossing moved south closer to intersection, street widening for addition of a northbound left turn lane onto 21st St, marked bicycle crossing spaces, signage/pavement markings to reinforce bicycle positioning in lane, vehicle left turns are restricted except northbound left turn onto 21st St.

Other improvements not shown on street diagram (changes made as a result of issues raised in the design process):

- Greever Terrance & Louisiana will have no left turns sign posted for limited during peak hours

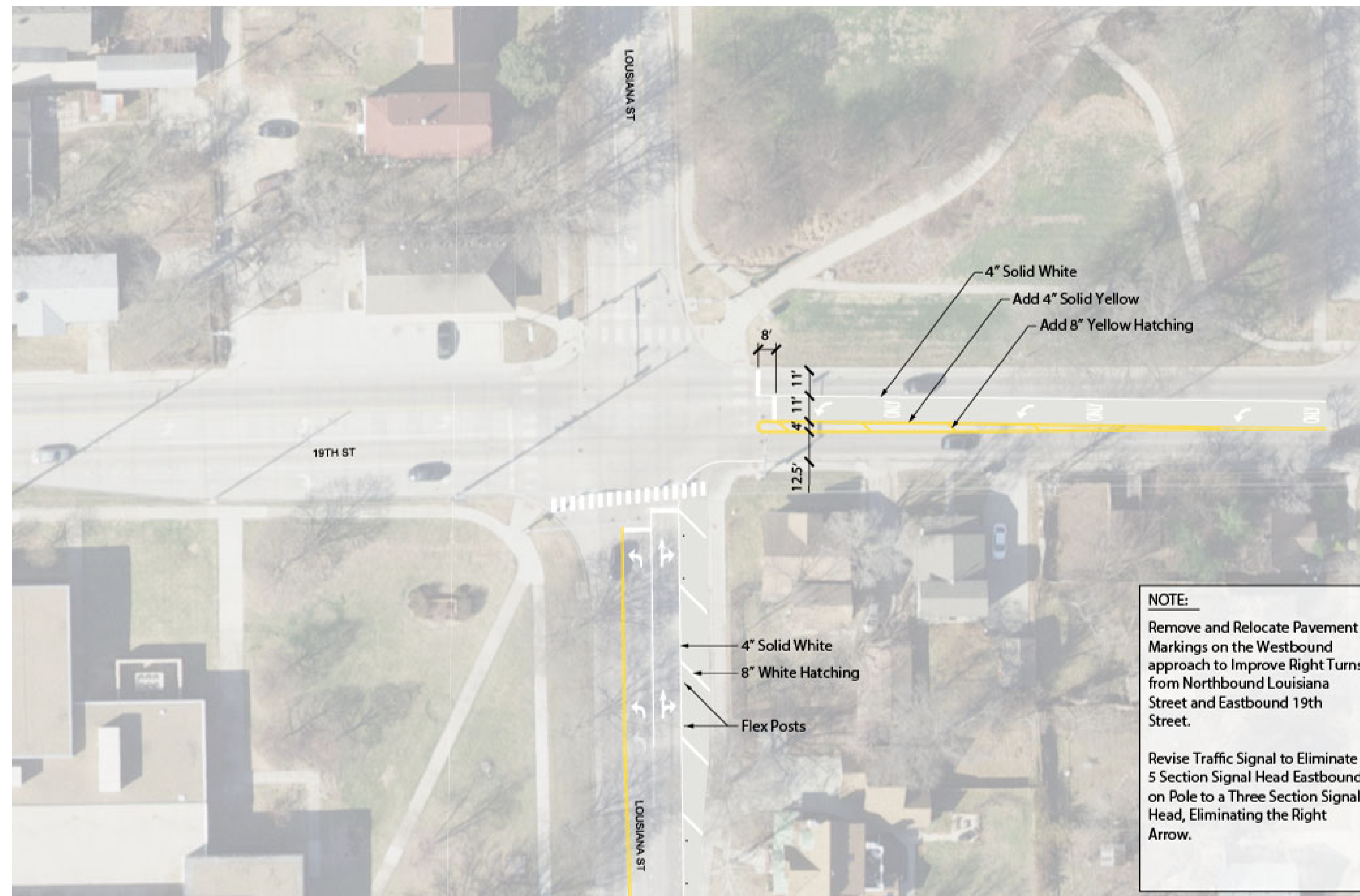
Desired Outcome:

- Rectangular Rapid Flashing Beacon to enhance safety of bicycle and pedestrian crossings
- Reduce frequency of motor vehicle crashes

Issues & Considerations:

- Access to Lawrence High School student parking lot
- 21st & Louisiana has a high crash frequency
- Maintaining emergency vehicle access
- Desire for a lower stress bicycle and pedestrian crossing

19th St. & Louisiana



Treatment Type: Lane Reconfiguration

Details:

Westbound lanes of 19th St. narrowed to allow painted median, northbound right turn lane eliminated and combined with through lane.

Desired Outcome:

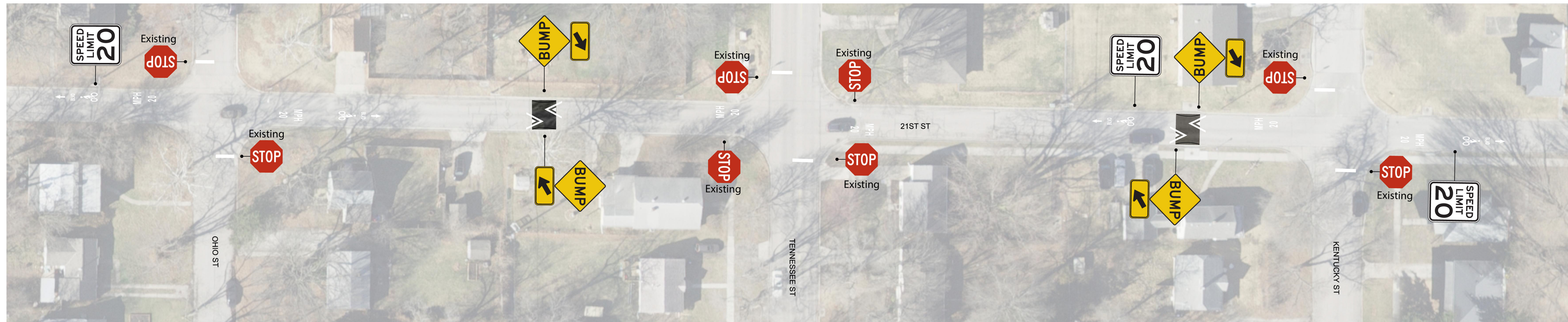
Improved turning radius for transit and emergency vehicles

Issues & Considerations:

- Transit currently operates on 21st St. east of Louisiana because the radius at 19th & Louisiana is too tight, bus operations would be more ideal on 19th St.
- Fire trucks cannot make the turn without using the through lane to complete the turning movement
- Completed several test runs through the intersection with a bus to determine the improvements necessary



21st St. from Louisiana to Massachusetts St.



Treatment Type: Speed Cushion

Details: City standard speed cushion

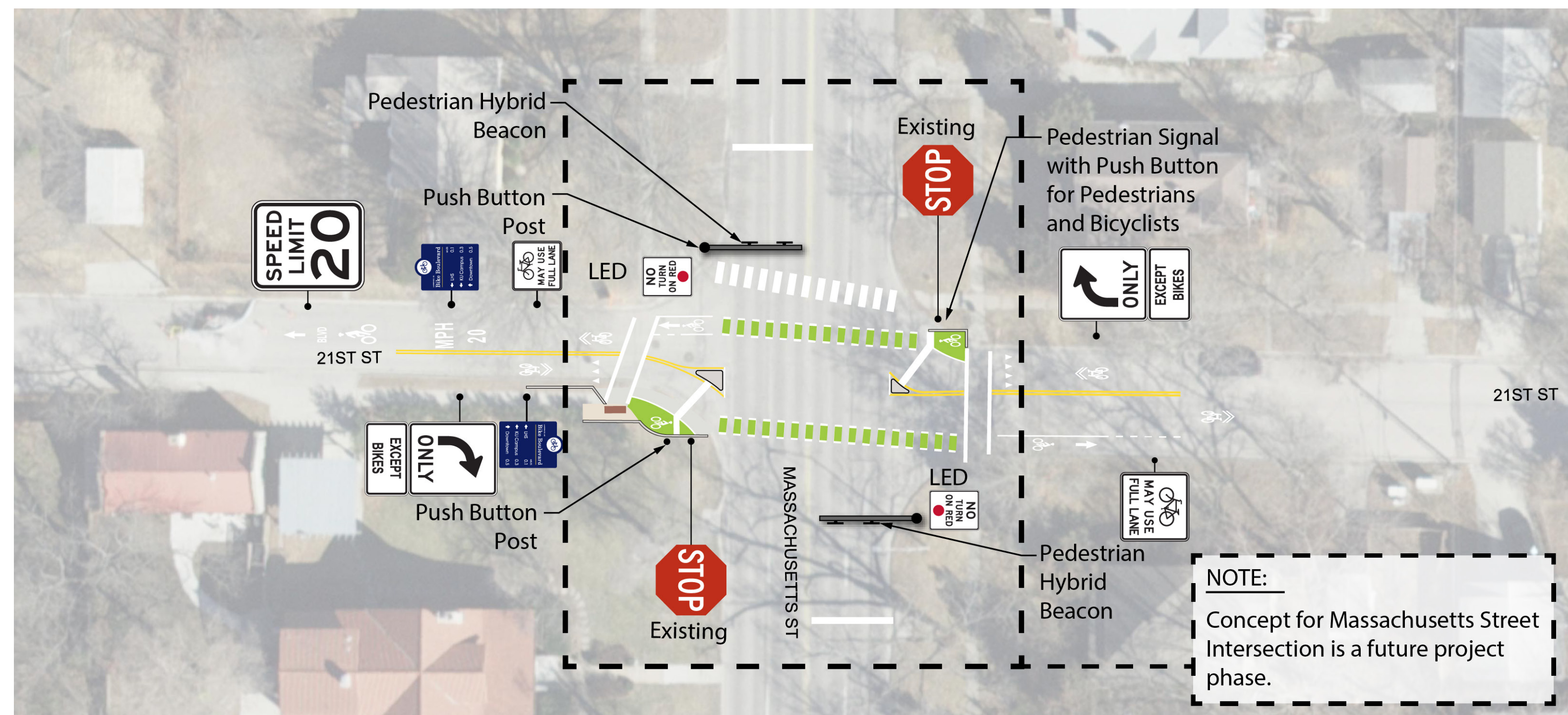
Desired Outcome:

- Speed reduction for motor vehicles to support drivers traveling the posted speed

Issues & Considerations:

- Current Speeds are higher than desired speeds for a bicycle boulevard (25mph or less, 20mph preferred)
- Roadway is narrower in this section of the corridor which limits the appropriateness of various speed reduction treatment options

21st St. & Massachusetts St.



Treatment Type: Intersection Crossing Improvements

Details: Pedestrian Hybrid Beacon and pavement markings, motor vehicle turning movements restricted from 21st St. to right turn only, marked bicycle crossing spaces, signage/pavement markings to reinforce bicycle positioning in lane

Desired Outcome:

- Improve safety of crossing for non-motorized users.
- Reduce motor vehicle conflicting movements for safety of offset intersection

Issues & Considerations:

- Concept of 21st & Mass is a future project phase to add a low stress crossing to bicycle boulevard and is planned for a future connecting bikeway along Mass
- Pedestrian Hybrid Beacon preferred over Rectangular Rapid Flashing Beacon due to 4 lanes of traffic, crossing distance, and visibility of beacon