

Spring 2017

Herbert Hoover Elementary / Charleston Complete Corridor Plan

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The Greatest Show on Earth

Interventions near Herbert Hoover Elementary School

Background

Herbert Hoover Elementary School

- Palo Alto, CA
- 400 students
- Charleston Road provides bicycle access



Problem

- **Accessibility issues** for bicycles and pedestrians along Charleston Road
- Vehicular **traffic congestion** during peak hours before and after school
- **Hot lava** is not known to be permitted in intersections under the Manual on Uniform Traffic Control Devices (MUTCD)



Purpose

- Improve accessibility for bicycles and pedestrians along Charleston Road
- Improve vehicular flows to mitigate vehicular traffic congestion during peak hours
- Provide safety features to prevent pedestrian-vehicle conflicts
- Suggest alternatives to hot lava in intersections

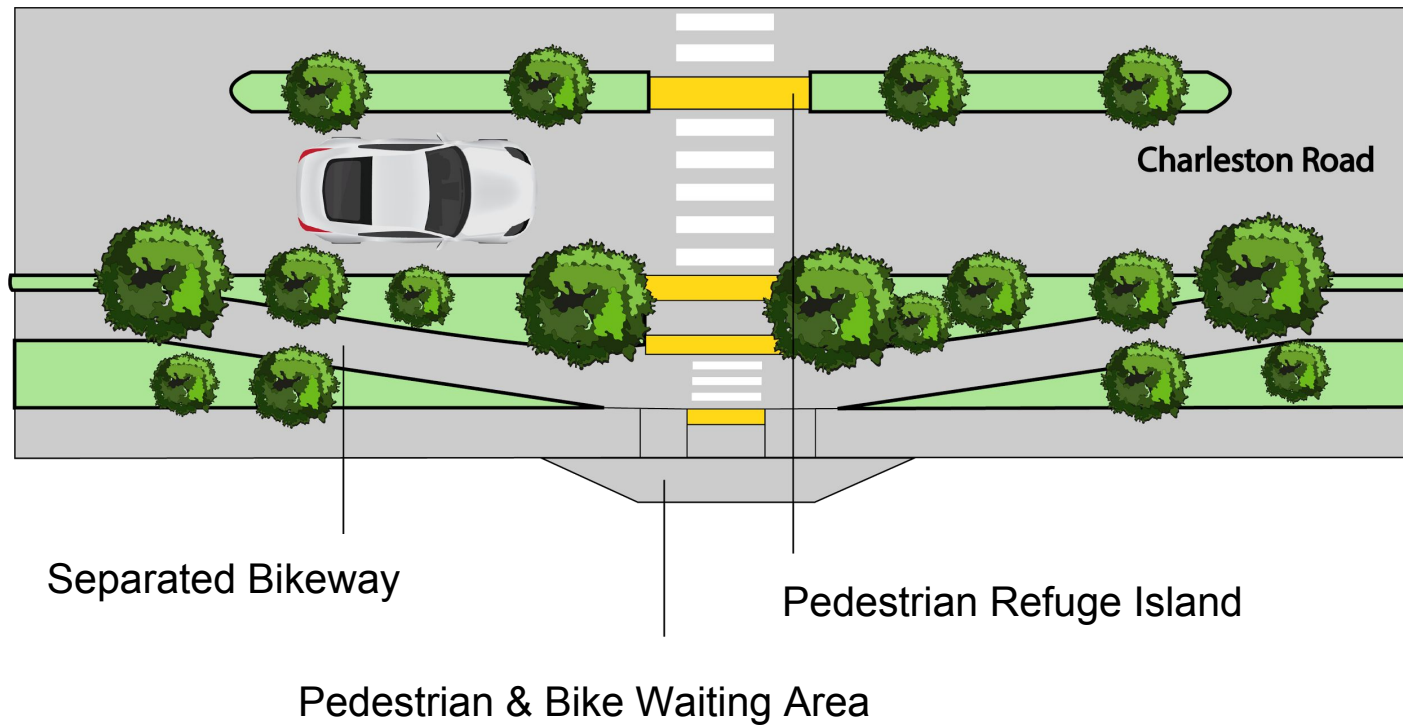
Proposed Interventions

1. Pedestrian Refuge Island + Crosswalk
2. Reverse direction of school service road
3. Minor improvements on Charleston Road
4. Narrow exit of school service road to one lane

1. Pedestrian Refuge Island + Crosswalk

- **Installation of pedestrian refuge island**
 - Provides pedestrians and cyclists with space for sanctuary within vehicular traffic
 - **Shortens crossing distance** for pedestrians and bicyclists
 - Adds physical buffer between opposite vehicular flows
- **Installation of mid-block crosswalk**
 - Provides pedestrians and cyclists with direct access to Herbert Hoover Elementary School
 - Use of crosswalk gives right of way for those exiting the service road

1. Pedestrian Refuge Island + Crosswalk

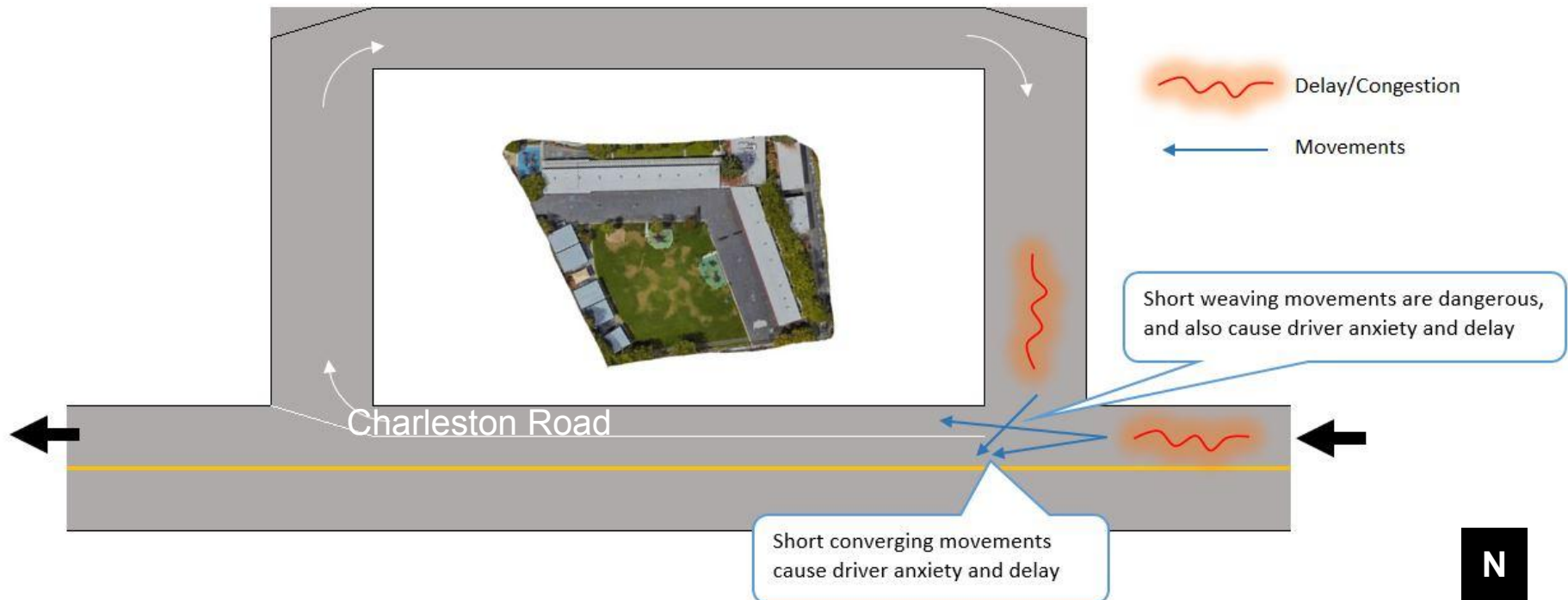


2. Reverse Direction of School Service Road

- **Moves vehicular delay off main roadway and onto service road**
- **Converging movements are safer**
 - No more weaving movements
 - Fewer conflicting left turns

2. Reverse Direction of School Service Road

Before



2. Reverse Direction of School Service Road

After

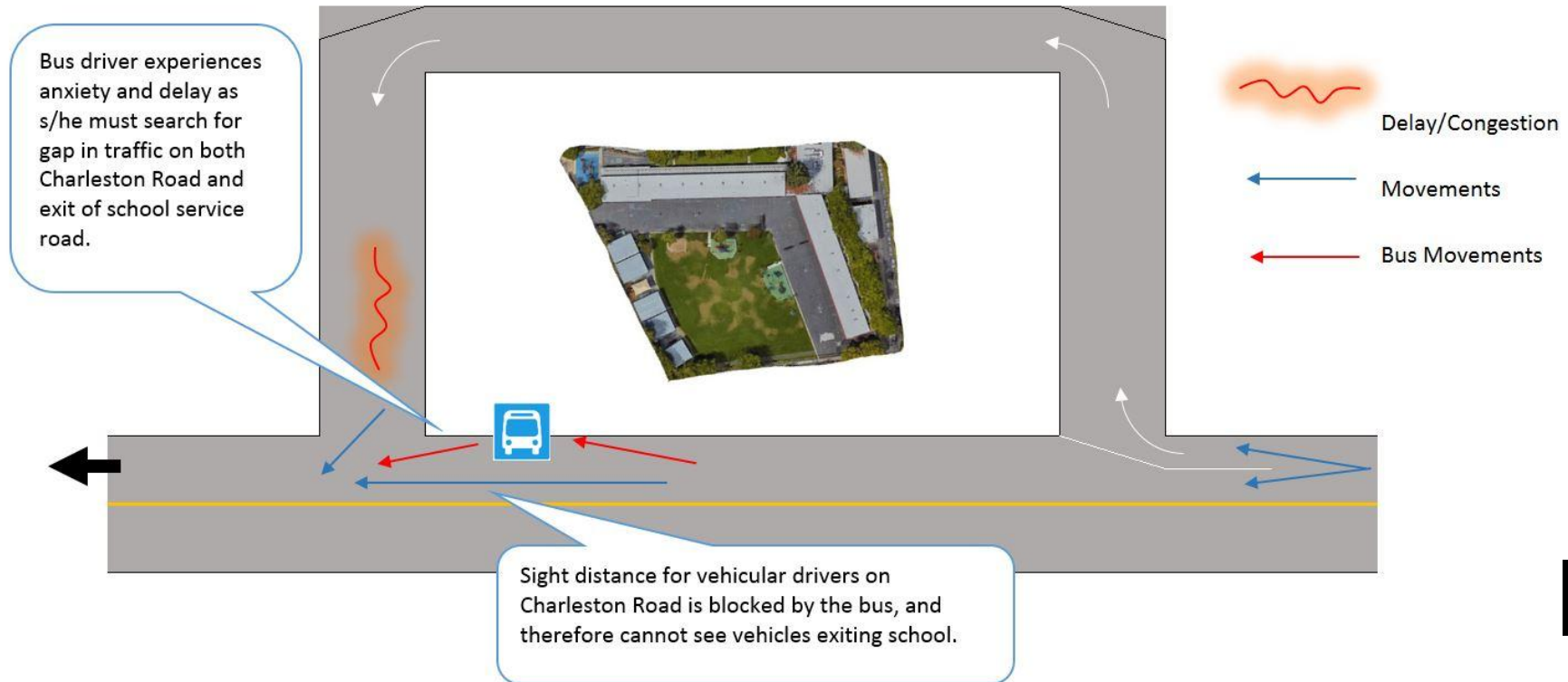


3. Improvements on Charleston Road

- **Moving bus stop farther northeast**
 - Provides space for bulb-out directly northeast of exit driveway of school service road
 - Allows bus to avoid waiting for gap in through traffic on Charleston Road and exiting vehicles from school

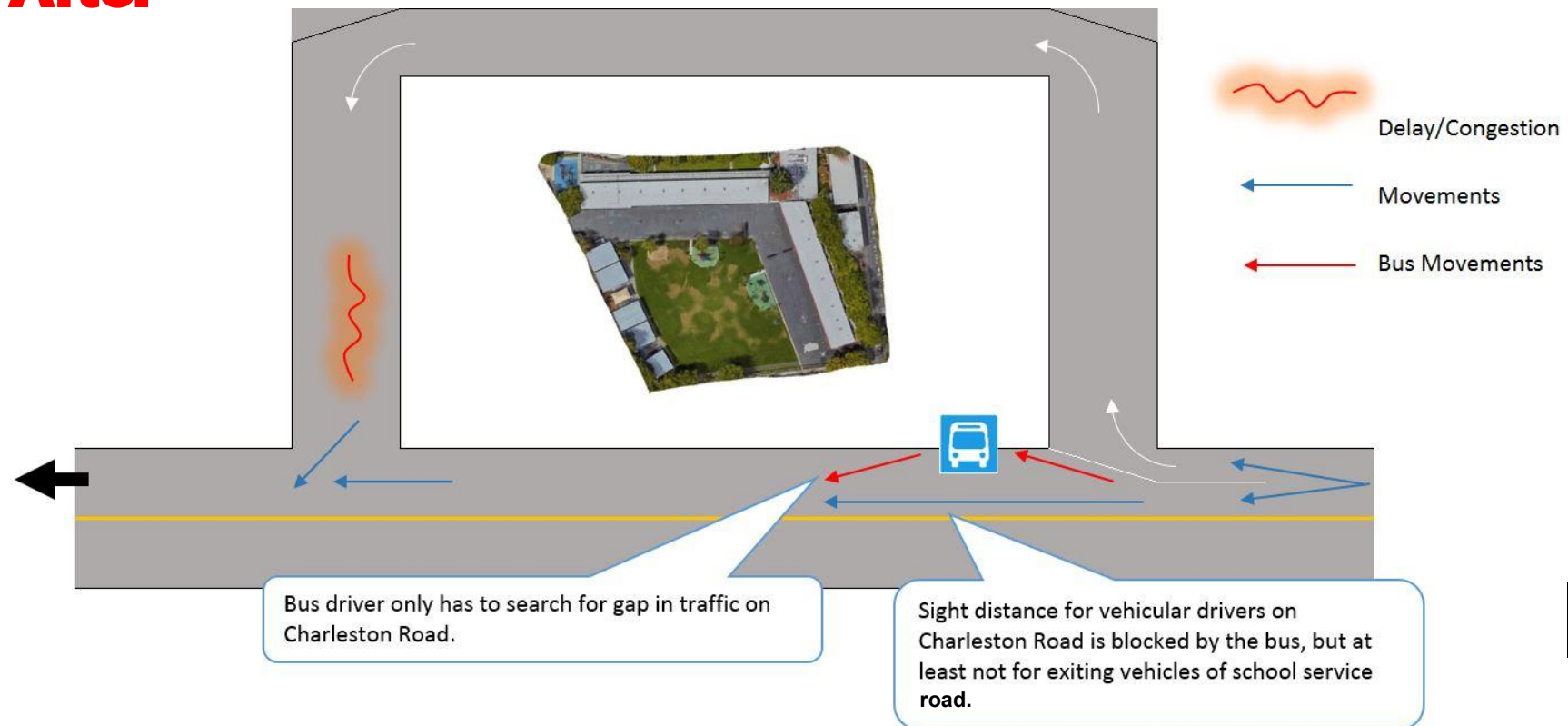
3. Minor Intersections on Charleston Road

Befo



3. Minor Intersections on Charleston Road

After



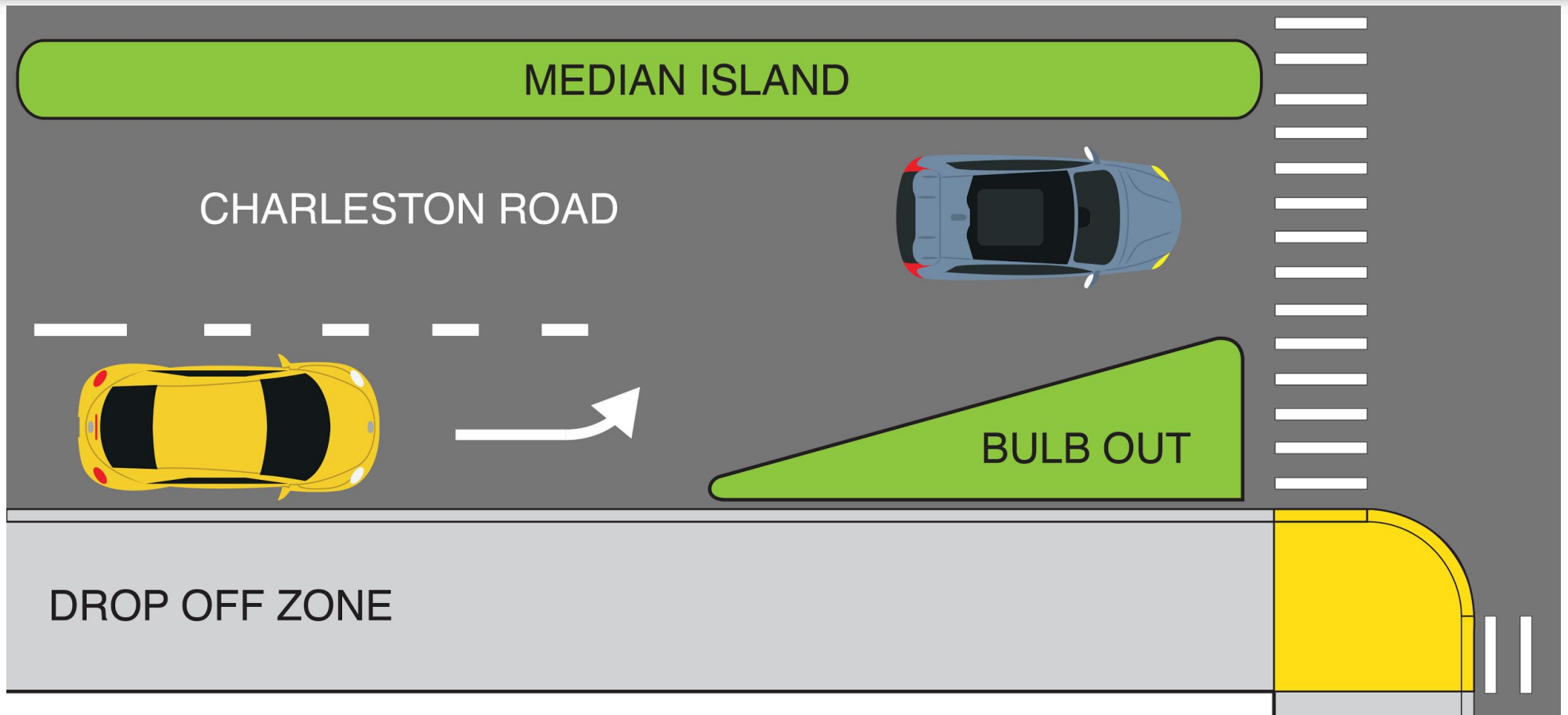
3. Minor Improvements on Charleston Road

- **Installation of drop-off lane along Charleston Road**
 - Provides vehicles with additional pick-up and drop-off access to school
 - Keeps higher-speed through-traffic away from sidewalk where the innocent children are

3. Minor Improvements on Charleston Road

- **Installation of bulb-out**
 - Shortens the distance that pedestrian and bicycle cross-traffic has to traverse
 - Reduces the number of lanes of vehicles that exiting vehicular traffic from the school has to find gap in
 - Slows vehicular traffic due to narrower traveled way

3. Minor Improvements on Charleston Road



4. Narrow exit of school service road

- **Narrowing exit driveway of Herbert Hoover Elementary school to one lane**
 - Reduces crossing distance for pedestrians and cyclists crossing driveway
 - Causes congestion on school service road, which slows down vehicular traffic and enhances safety for the innocent children
 - Reduces the number of lanes of exiting vehicles that through-traffic on Charleston Road must keep track of

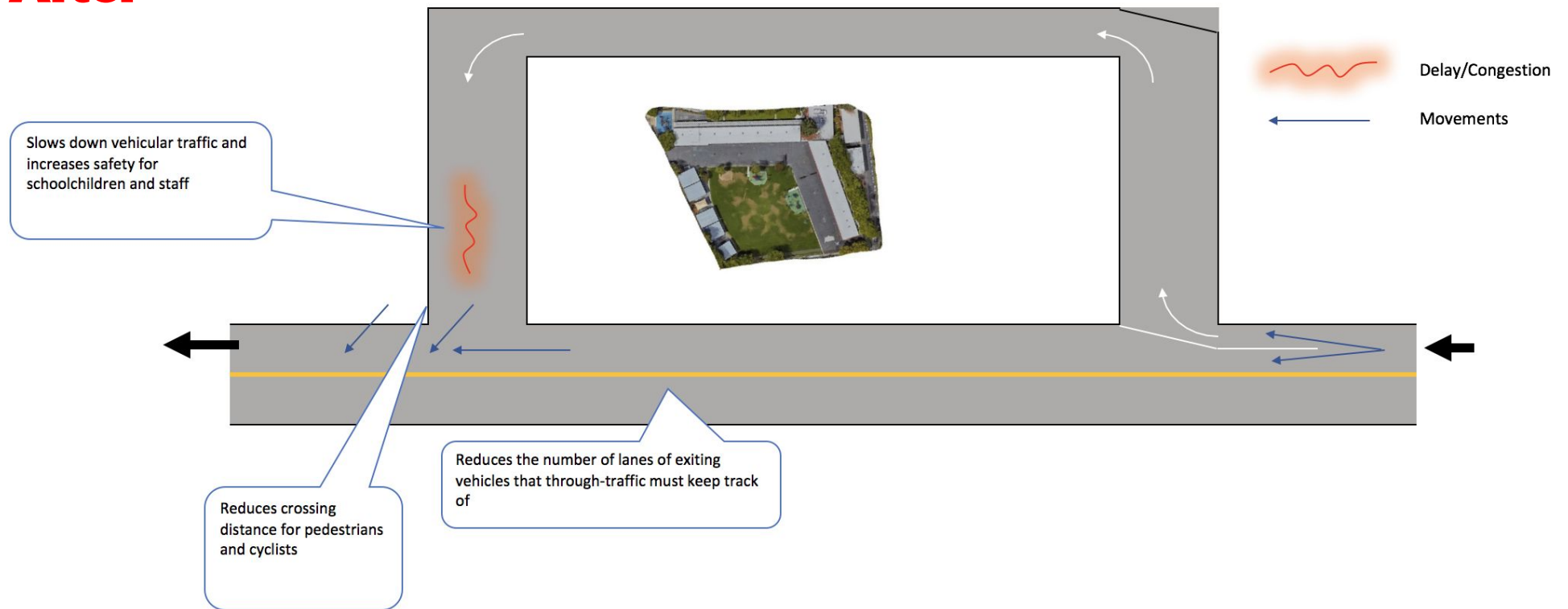
4. Narrow school service road

Before



4. Narrow school service road

After



Conclusions

- Improve accessibility for bicycles and pedestrians along Charleston Road ✓
- Improve vehicular flows to mitigate vehicular traffic congestion during peak hours ✓
- Provide safety features to prevent pedestrian-vehicle conflicts ✓
- Suggest alternatives to hot lava in intersections ✓

Mission Accomplished!



Thanks!

Seitu Col

Daniel Ha

Noah Stri

Justin Won



Herbert Hoover Elementary School:

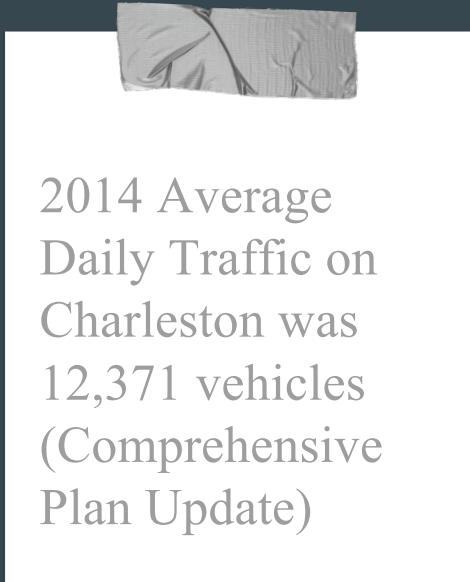
E. Charleston Road Complete Street



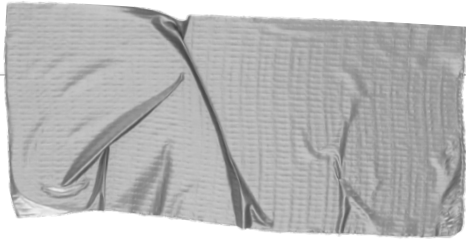
Study by Torina, Ian, Rob & Bryan

Existing Problem

- High volumes at drop-off times
- Conflict points at entrances
- No cohesive bike circulation
- Accommodations for active transportation are lacking
- Cars don't slow for school zone signs and striping



2014 Average
Daily Traffic on
Charleston was
12,371 vehicles
(Comprehensive
Plan Update)

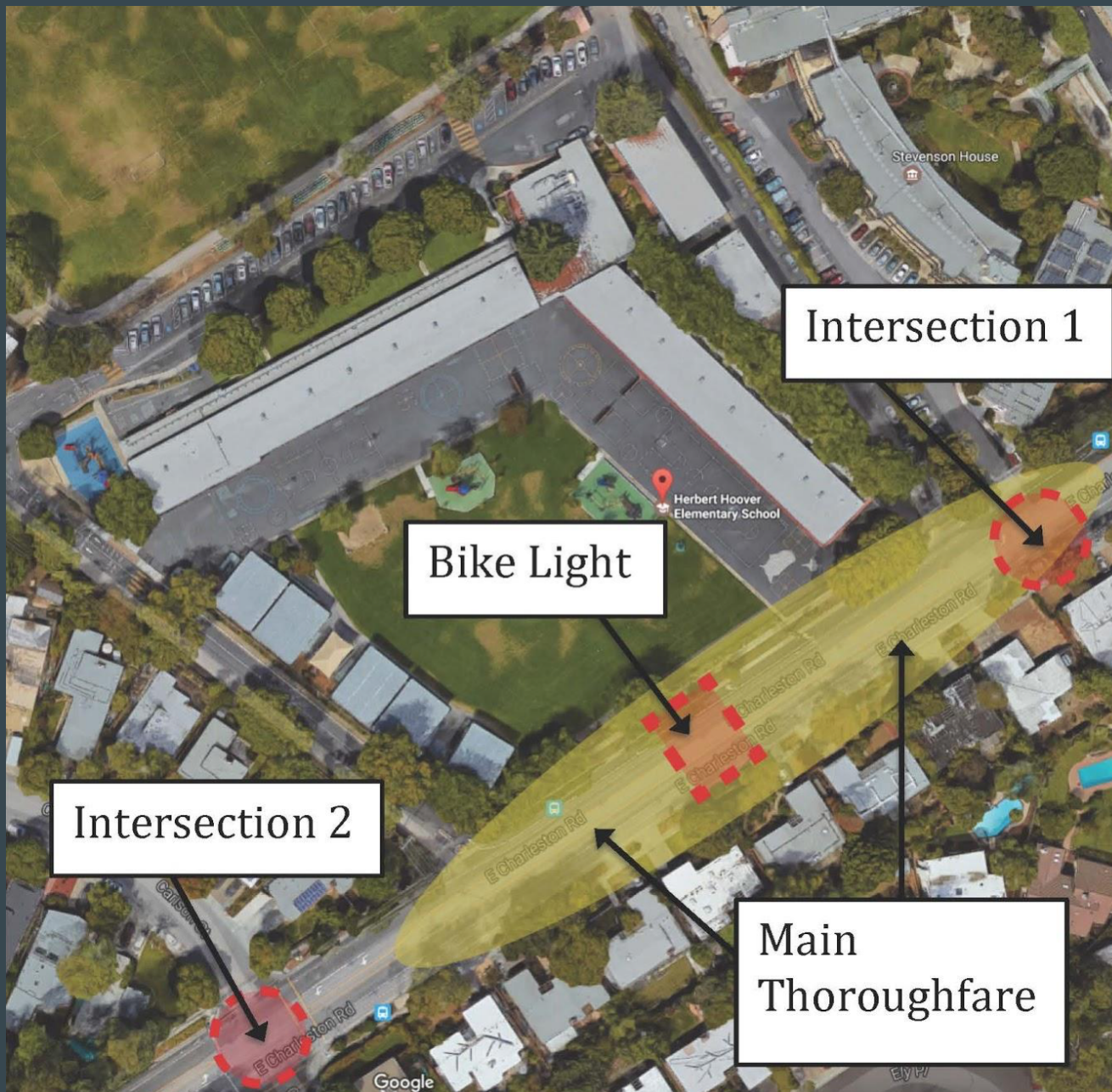


Possible Solution

**Make the street different,
unusual, unexpected**

- Raise and change texture of the street
- Provide minimum travel way for vehicles
- Give active transportation modes more space and protection
- Extend the school to include the street
- Encourage through traffic onto other routes



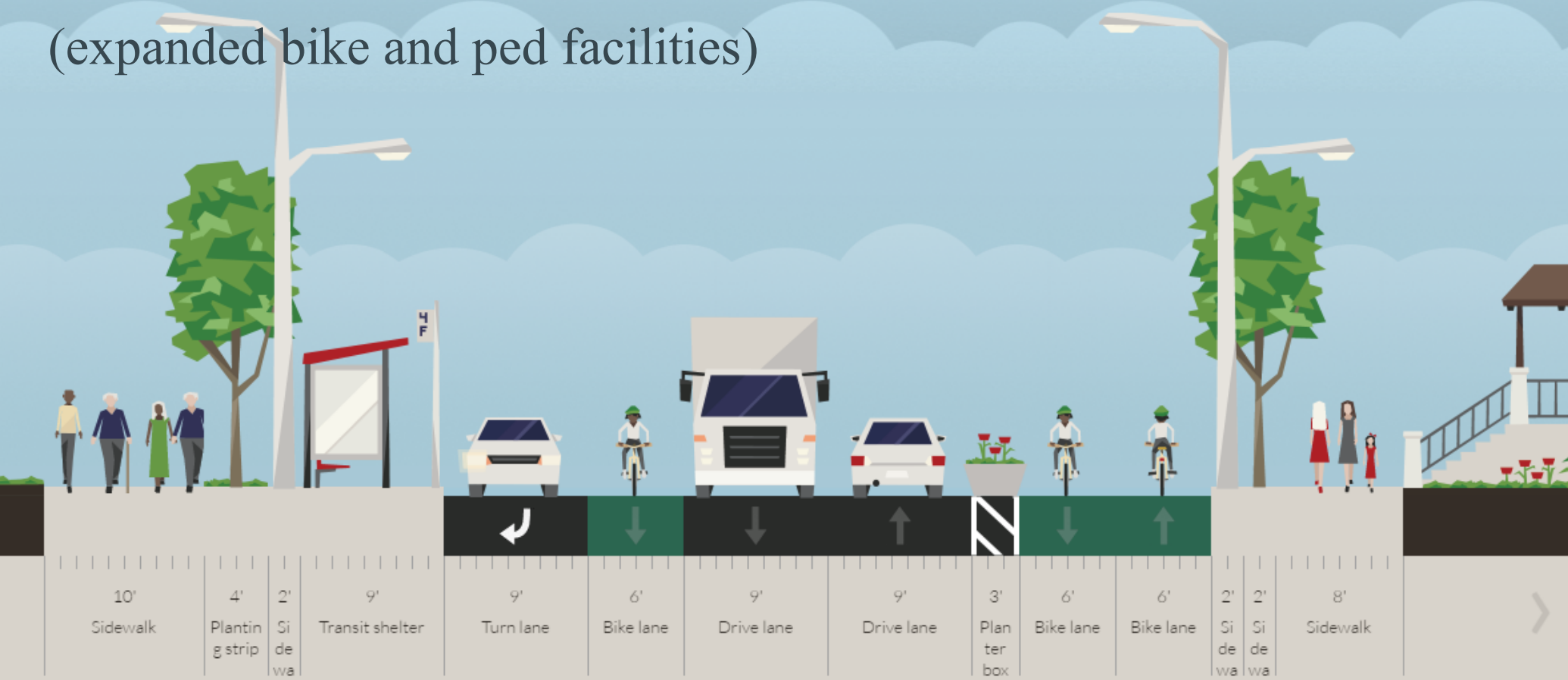


Proposed Improvement s

- Main Thoroughfare
- Intersection 1
- Intersection 2
- Bike Intersection

MAIN THOROUGHFARE Cross Section

(expanded bike and ped facilities)



INTERSECTION IMPROVEMENTS

Book-end each end of the “School Zone”
with **traffic signal**
and **roundabout**
as entry
treatment



Bike Light Intersection

Place a different textured and/or raised crosswalk with a timed bike light



Increase bicycle parking to encourage

Active Transportation

to reduce automobile demand
on the existing site circulation



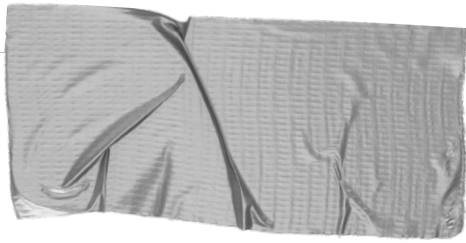
Children arriving at primary school in S'Hertogenbosch NL

Increase carpooling programs
and incentives to encourage
group rides

Smart Transportation

to reduce automobile demand
on the existing site circulation





Extra Pro: Property Values!

→ Property value in the surrounding area will likely increase due to the positive aesthetic seen through infrastructure improvements.



Palo Alto Bike Boulevard



Stanford Bike Lane



Palo Alto Bike Promotion



Nearby SF Protected Bike Lane



Citations

Queensland Government. (2017). *Bicycle road rules and safety*. Retrieved from

<https://www.qld.gov.au/transport/safety/rules/wheeled-devices/bicycle/>

Alta Planning + Design. (2014-2017). *Palo Alto Bicycle Boulevards and Feasibility Study*. Retrieved from

<http://altaplanning.com/projects/palo-alto-bicycle-boulevards-feasibility/>

SF-Bay. (2016). *Fresh Batch of Protected Bike Lanes on Horizon*. Retrieved from

<https://sfbay.ca/2016/09/12/fresh-batch-of-protected-bike-lanes-on-horizon/>

Peninsula Press. (2015). *Proposed Bicycle Boulevards advance after approval by city council vote*. Retrieved from

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<https://www.pinterest.com/pin/103231016434349438/>

Herbert Hoover Elementary Complete Corridor Site

Melanie Conti, Matthew Fluhmann, Kristen Anaya, and Caitlin Milich

About the Site

Location: Charleston Rd. and Waverly St.

Located on busy arterial street (Charleston Rd.)

Suburban homes, park, Stevenson House within immediate vicinity



Existing Traffic Conditions

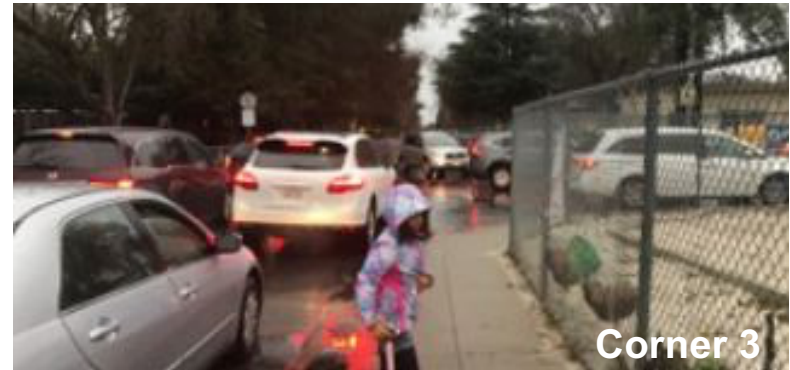
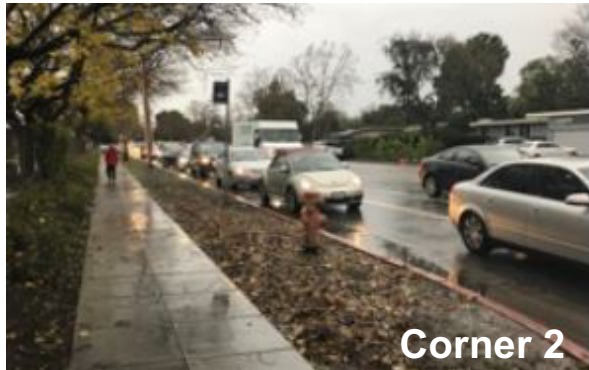
Traffic currently flows in a clockwise pattern around the school

School traffic turns off of Charleston Rd. onto Waverly St. (2 lanes)

Bottlenecks form past drop off area (lane merge) and at exit onto Charleston Rd.



Issues in Image

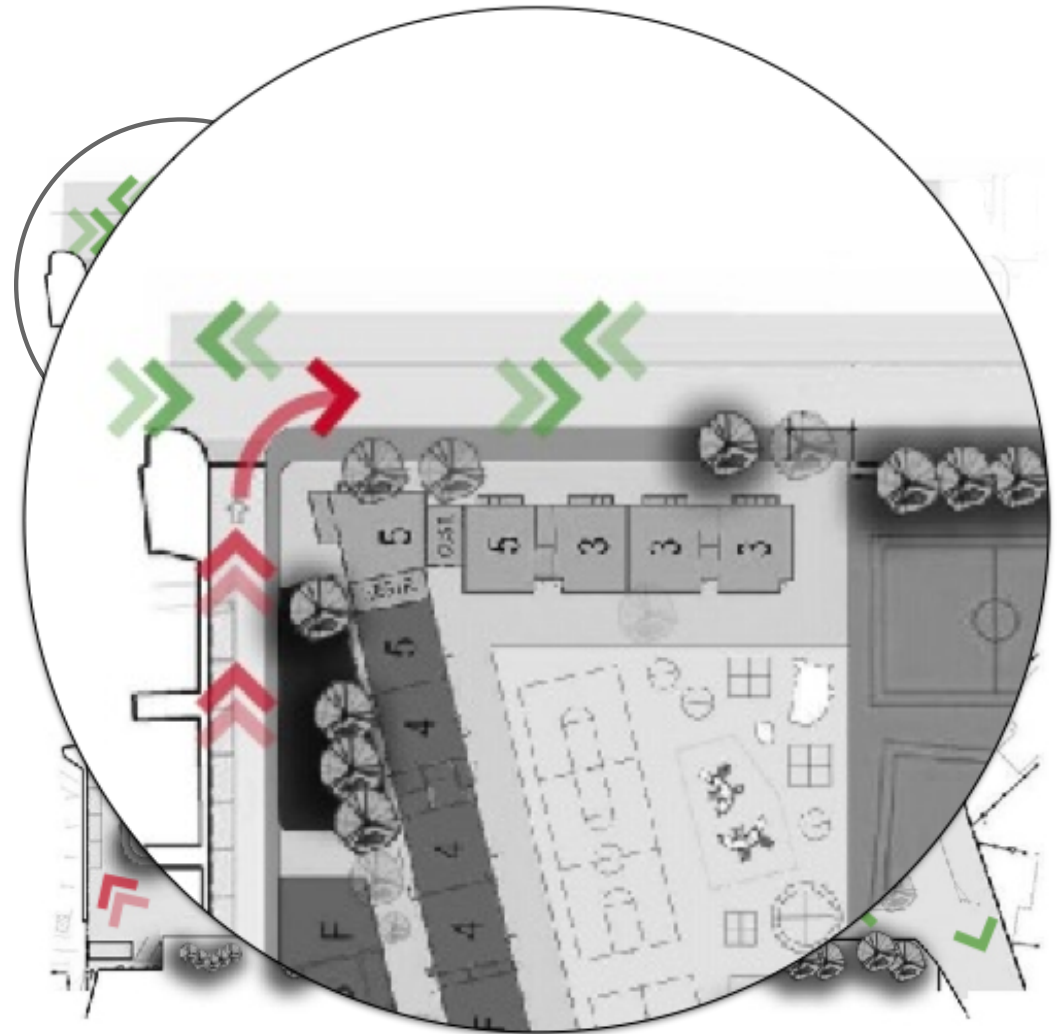


Existing Condition

CORNER 1:

The street narrows to one-lane causing a back-up

People have to bypass this intersection to get to the school entrance so it makes it harder for the people existing to turn out onto Charleston

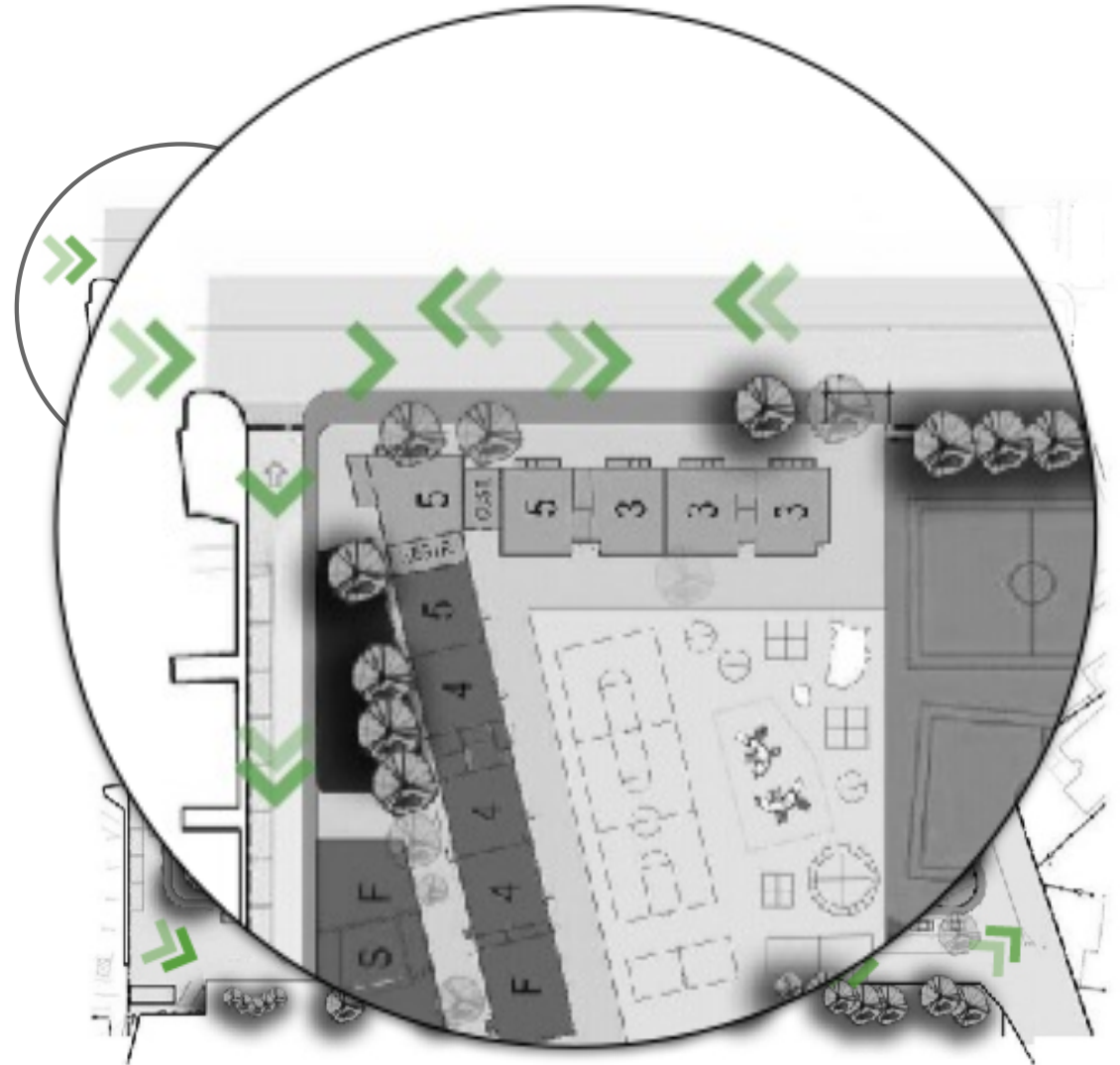


New Condition

CORNER 1:

This intersection now becomes the entrance into the school

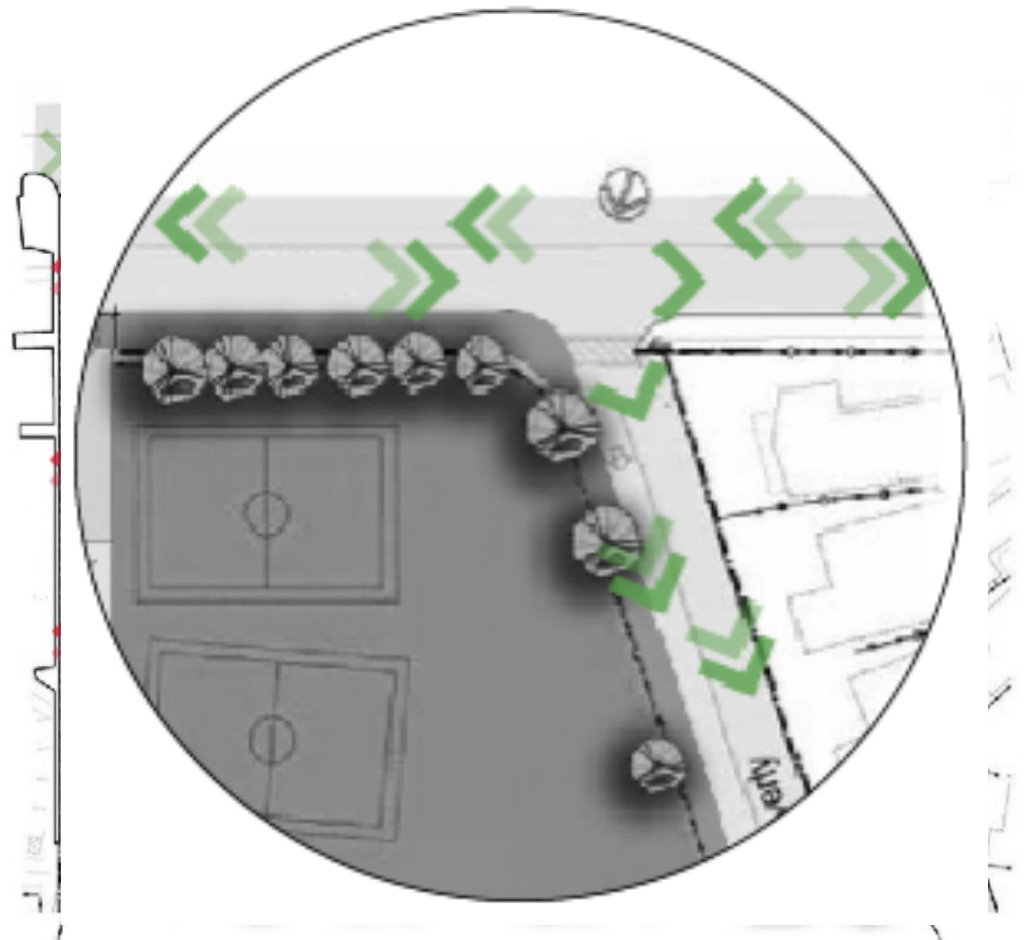
This lessens the traffic moving through the intersection past the school



Existing Condition

CORNER 2:

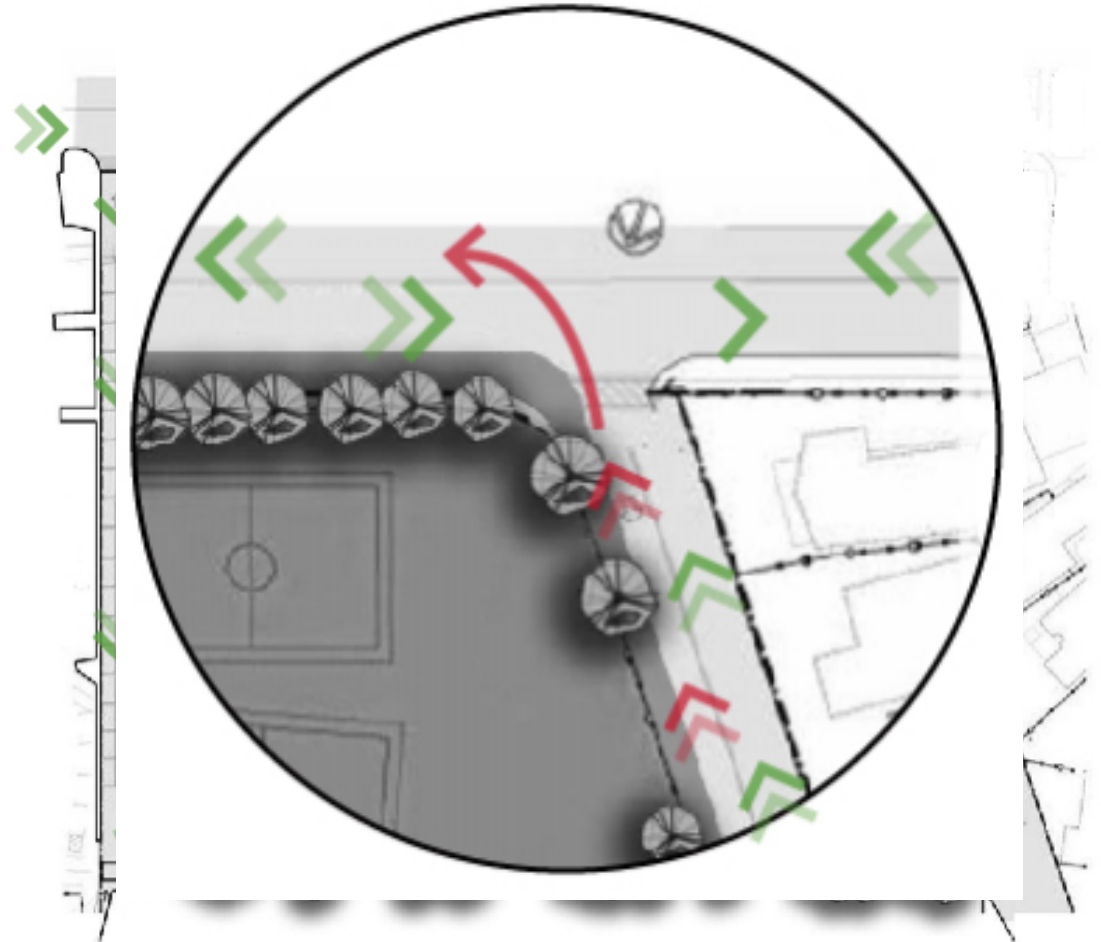
The is the current entrance to the school's drop-off area



New Condition

CORNER 2:

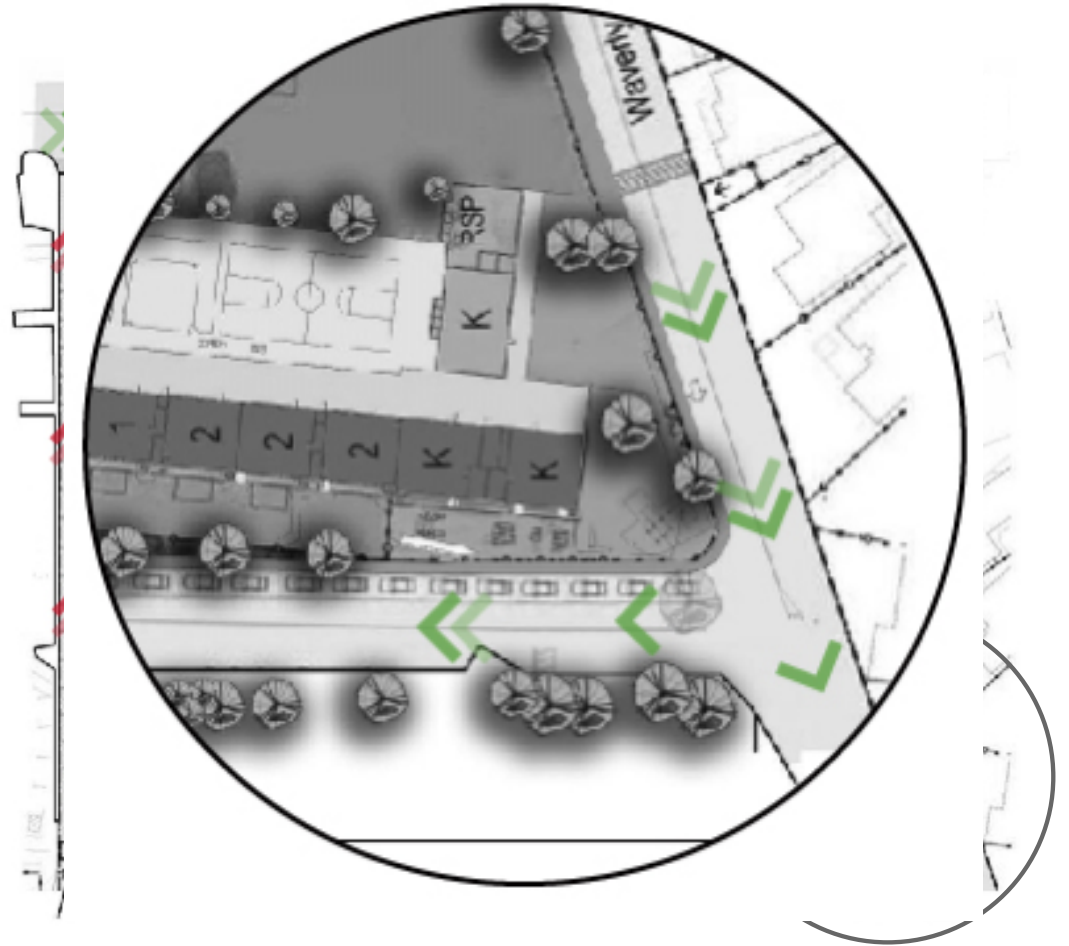
This intersection now becomes the exit from the school loading area. Rather than people merging down to one lane to leave, this plan uses a two lane road as an exit. People can also wait to make a left turn from the left lane without causing a back-up



Existing Condition

CORNER 3:

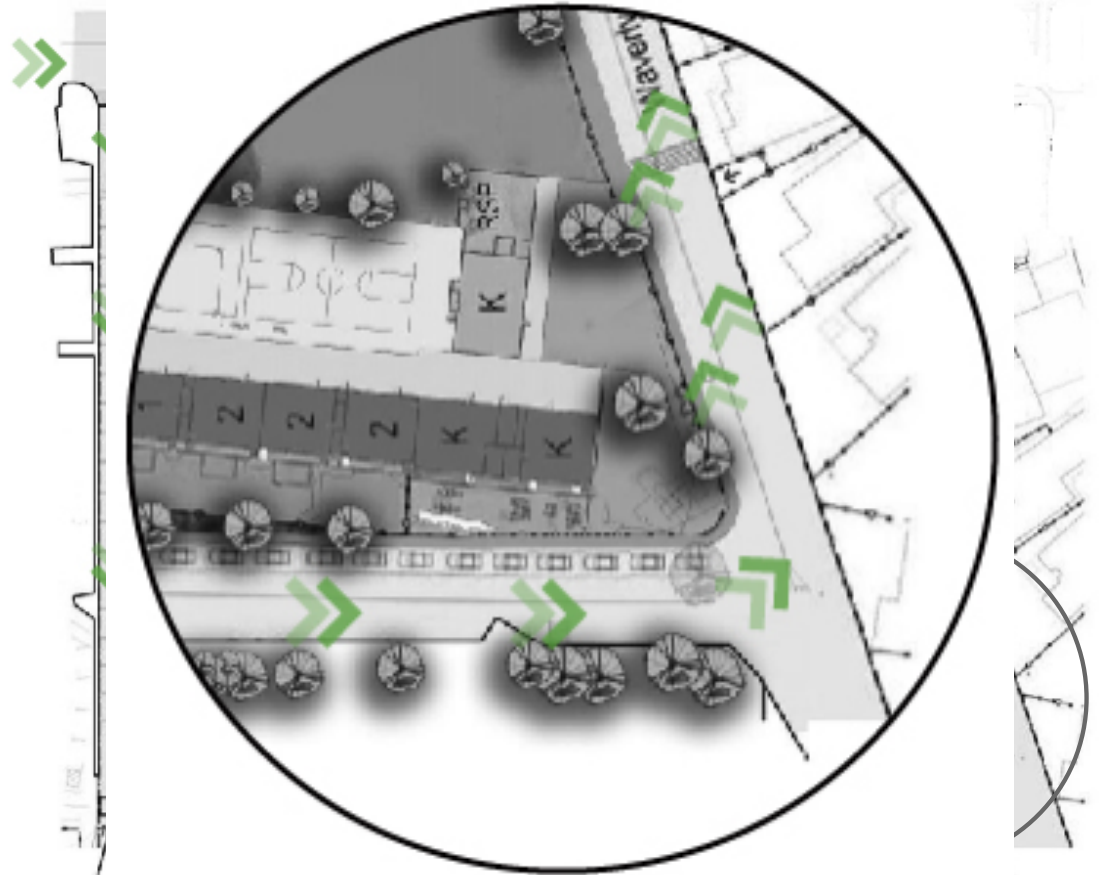
Cars turn right to enter the loading zone or continue straight.



New Condition

CORNER 3:

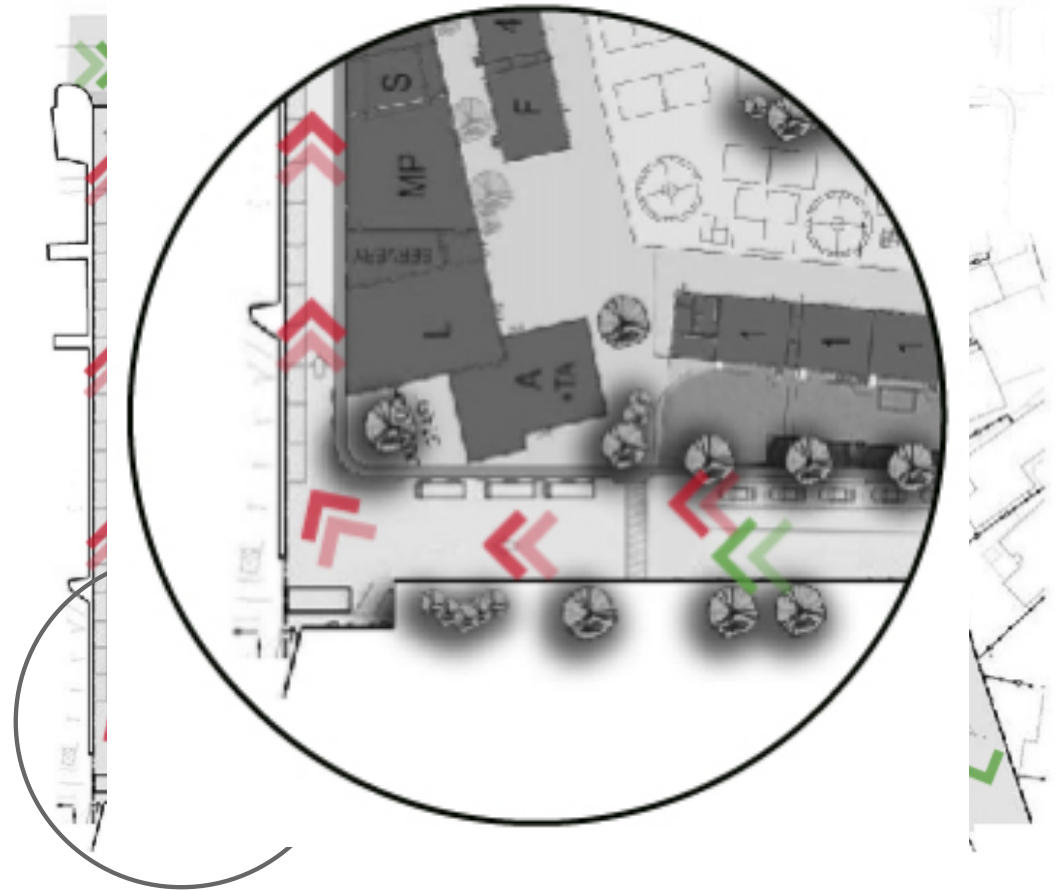
In this version, turning the corner to the exit, the road remains two lanes to keep traffic flowing.



Existing Condition

CORNER 4:

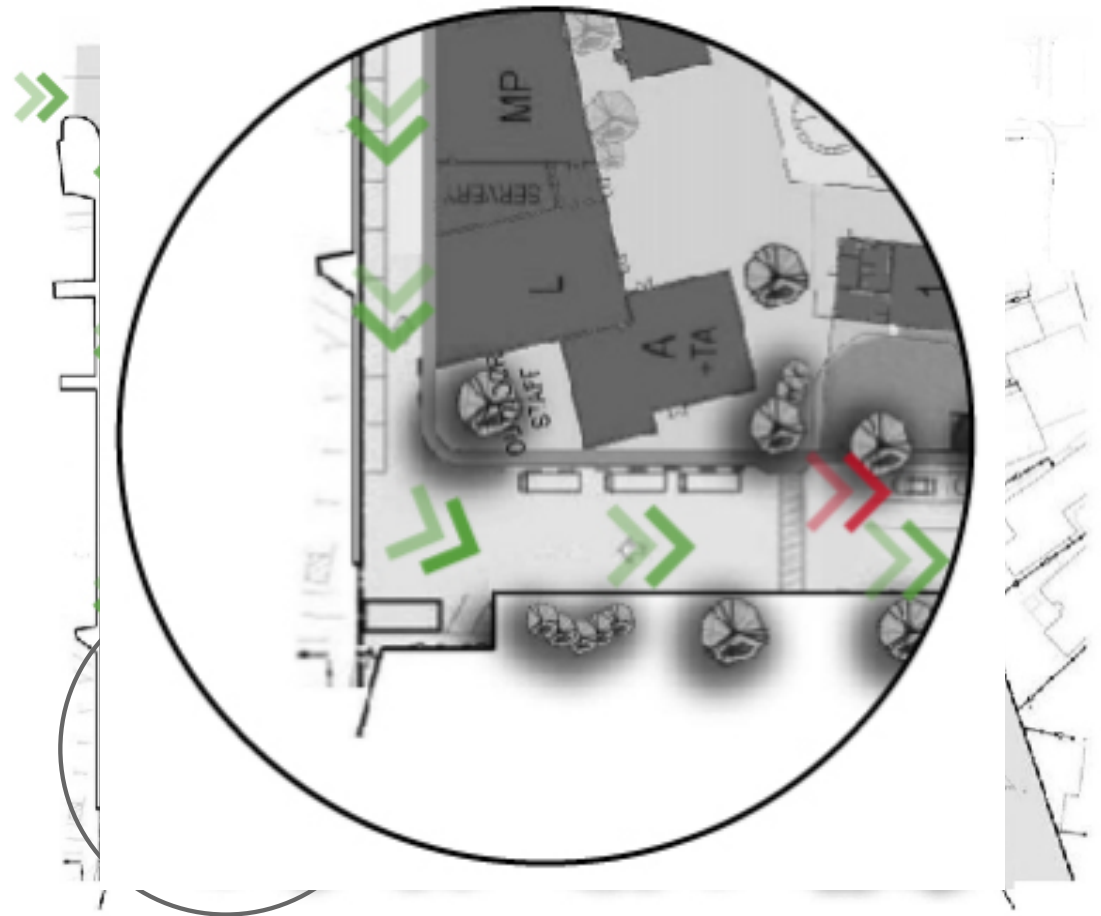
A lot of traffic backs-up at this intersection where the loading lane and the normal lane merge into one.



New Condition

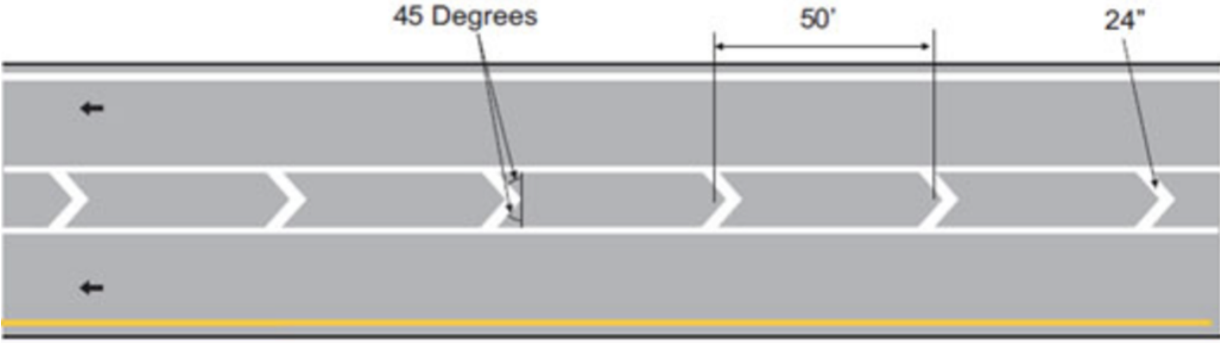
CORNER 4:

In this version one lane separates into two. The only slow moving traffic then occurs in the loading lane.



Ways to distinguish the loading/unloading

One Way Traffic: Separated By Median



Bike Crossing for Charleston

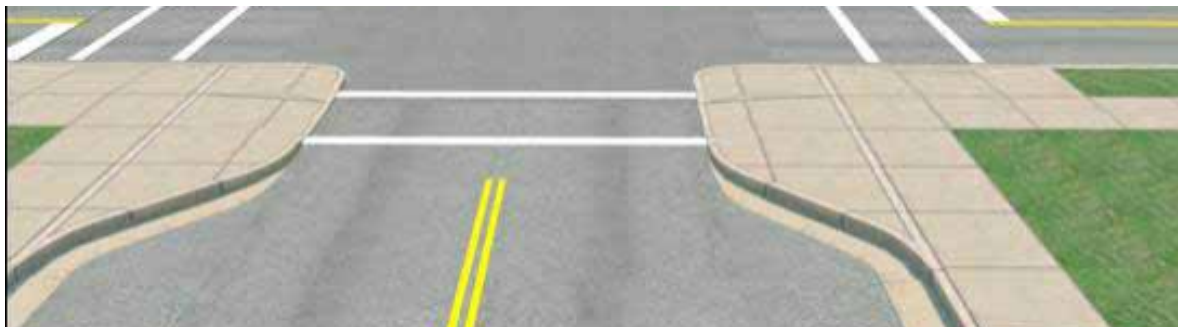


Pedestrian Treatments

Textured crossings

Signalized pedestrian crossings via increased signage and crossing guard at peak hours

Bulb-outs at the entrance and exits aim at increasing pedestrian safety



Implementation

Inform potentially affected residents and groups (parents, Stevenson House workers, etc.) of changes

Collaborate with them to improve project

Change signage, road markings to reflect new circulation pattern and enforce proper drop-off etiquette

Implement bulb-out to enhance new entrance into school loop (similar to proposed bulb out at Charleston Rd. and Waverly St.)



Charleston-Arastradero Corridor Plan

Jesse Carpentier, Dylan Coleman,
Kyle Finger, & Eric Martinez

Existing Conditions

- Right hand turn lane to enter Hoover
- Right hand turn lane into Hoover Entry Drive
- Entry Drive, Kinder Drop Off
- Kinder Drop off with three crossing guards
- **JLS Parking lot on Hoover: parents wait for cars to clear drop off**
- Right turn from Entry Drive to Drop Off Lanes
- Two lanes at Drop Off Area
- **Merge from 2 Drop Off Lanes to single lane Exit Drive**
- **Backup on Exit Drive**
- **Difficult right turn from Exit Drive to Charleston Drive**

Existing Conditions



Intersection #1



Intersection #2

JLS Parking Lot
Lane Merge



Intersection #3

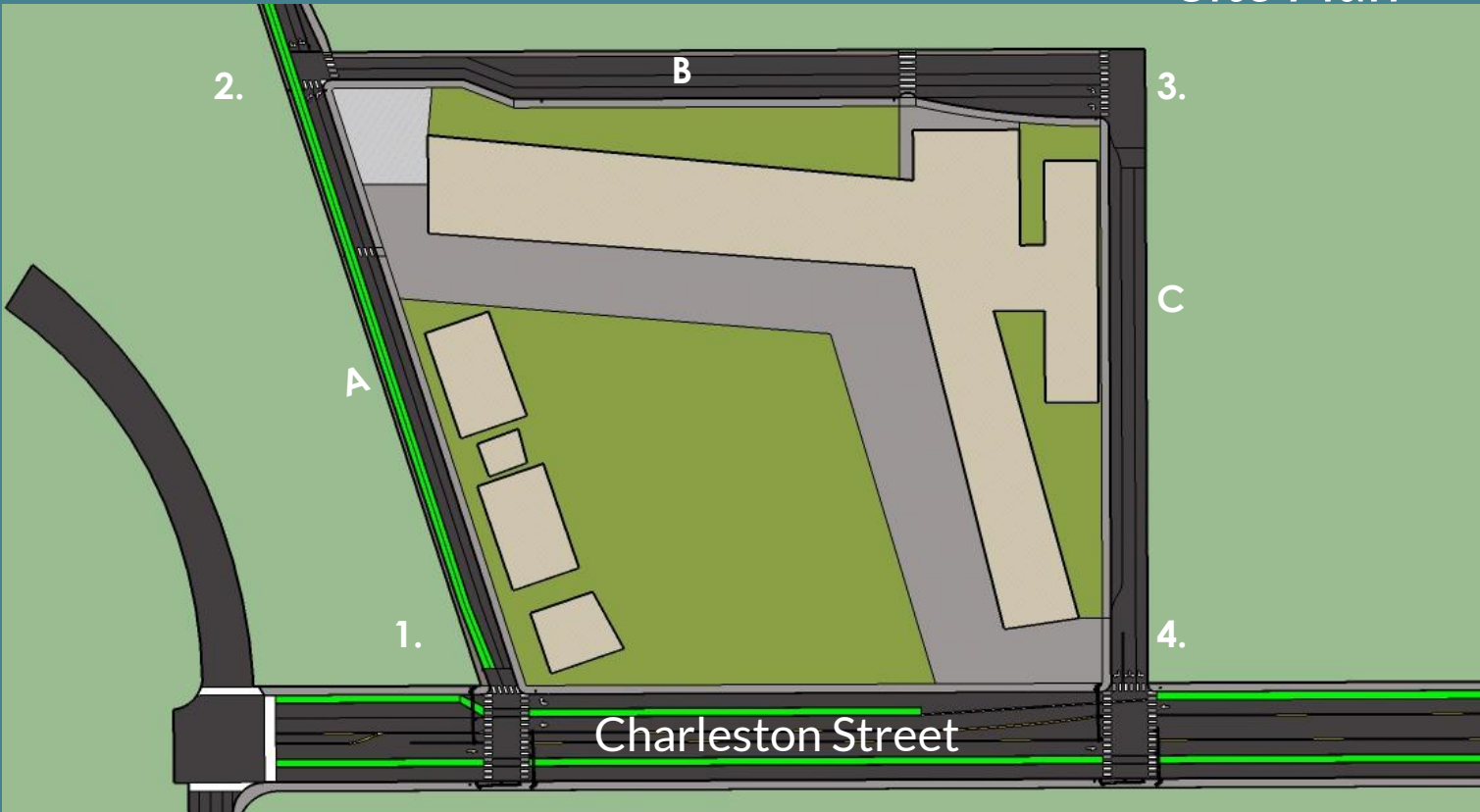


Intersection #4

School Exit
Backup Exit Dr.

Proposed Corridor Design

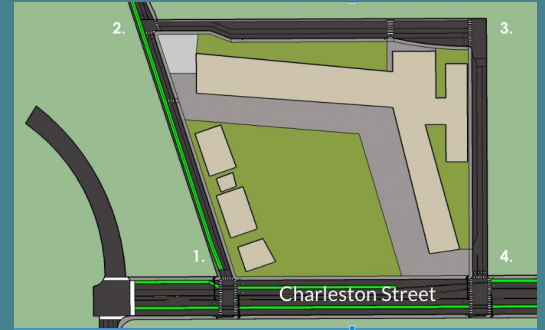
Site Plan



Proposed Corridor Design

Intersection #1

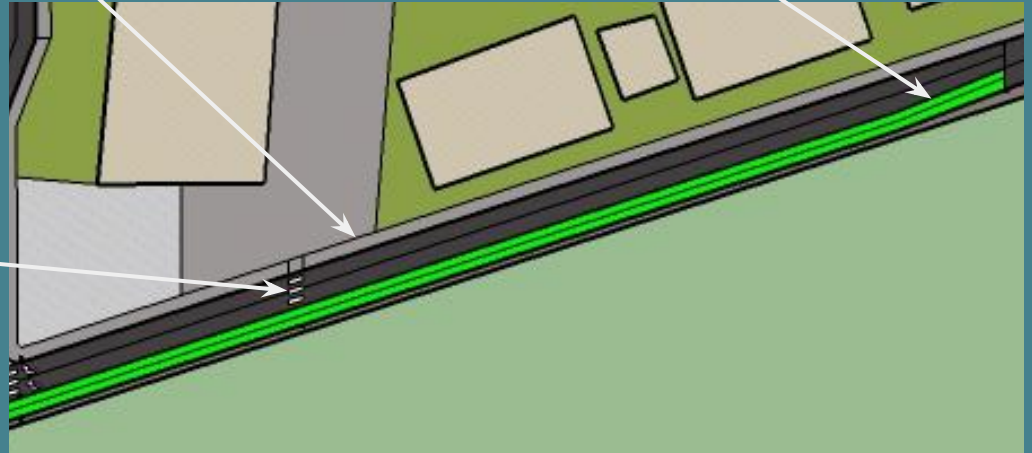
- Crosswalk and Traffic lights
- Protected left turns for automobiles and cyclists
- Left turn yield to oncoming traffic (e.g. south-bound on Santa Rosa x Monterey)



Source: FHWA

Proposed Corridor Desi

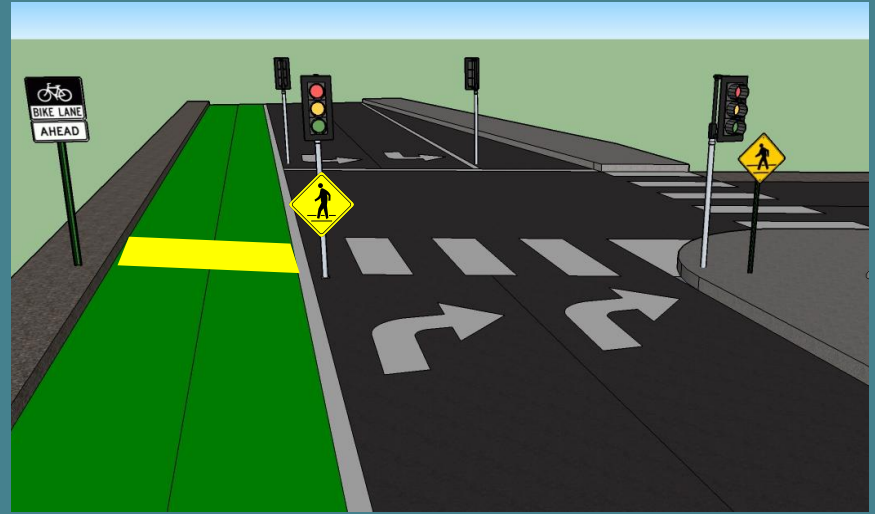
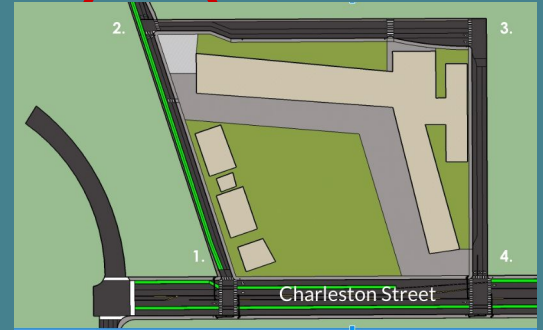
- Two-way bike lane to maintain flow and safety of cyclists
- Right lane is exclusively drop-off zone during peak hours
(comparable to an airport loading zone)
- Raised crosswalk



Proposed Corridor Design

Intersection #2

- Signal lights and crosswalk to maintain flow of vehicular traffic and pedestrian safety
- Both lanes become forced right-turn lanes
- Cyclists must yield to pedestrians crossing bike path



Proposed Corridor Design

Segment B

- Right lane is exclusively drop-off zone during peak hours
- Raised crosswalk
- Repaint 75% of the parking spaces as compact-only to compensate for parking spaces removed in Segment C



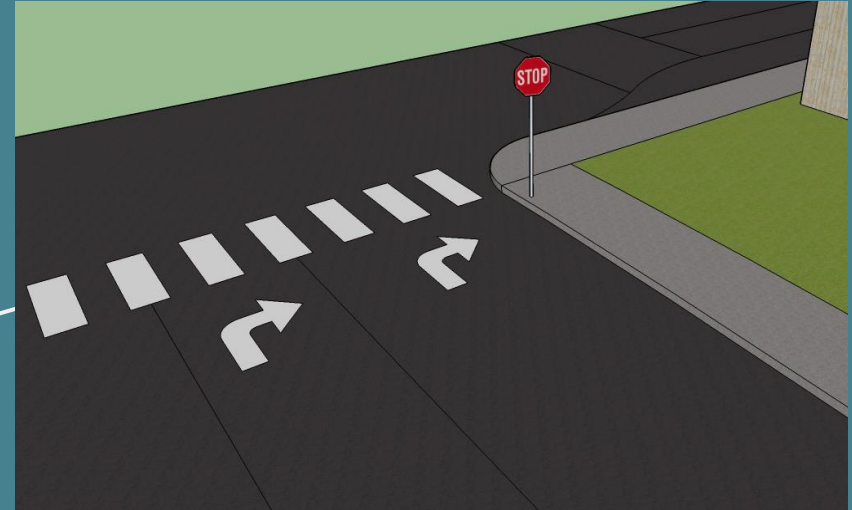
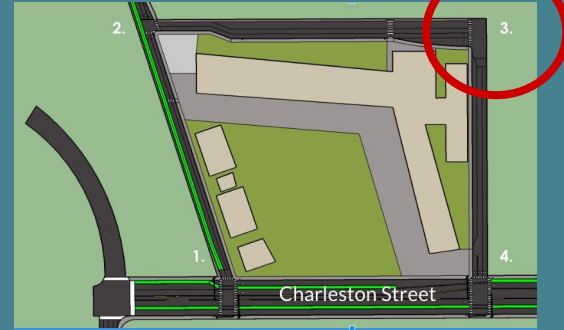
Existing Parking



Proposed Corridor Design

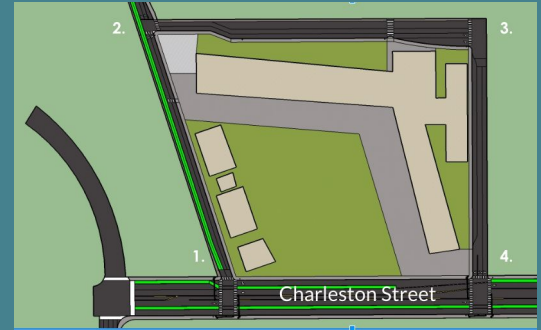
Intersection #3

- Stop sign and raised crosswalk to protect pedestrians
- Both lanes become forced right-turn lane

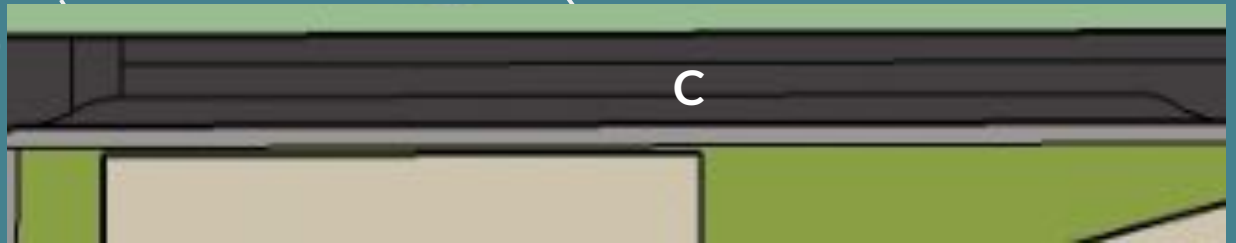


Proposed Corridor Design

Segment C



- Replace parking spaces with traffic lane*
- Two lanes of vehicular traffic instead of one to reduce congestion in segment C
- Loading zone continues
(remember, like an airport)

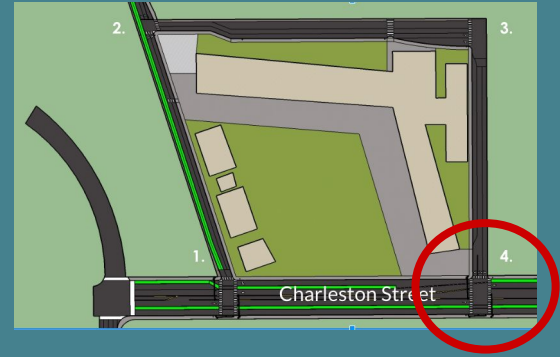


* Other parking lot will be repainted with both compact-only and large vehicle spaces to provide at least half of the removed parking spaces

Proposed Corridor Design

Intersection #4

- Traffic lights
- Crosswalks
- Protected left turn for vehicles exiting the school



Behavioral Strategies

- Education
- Enforcement
- Pedestrians
- Cyclists
- Drivers
- Time to adjust



City of Cuyahoga Falls