Crash Analysis Studio

Grand Junction Session Transcript

Introductory Trailer

Chuck Marohn: I want to give you two scenarios. Scenario number one a plane crashes. Scenario number two, two cars collide. In scenario number one, we pull out all the stops – we bring in the NTSB, we try to figure out exactly what went wrong. Scenario number two – we send out the cops, we sweep up the mess, and we go on our way.

John Pattison: If we, collectively – everyone on this call and the broader Strong Towns movement – if we do this right, we're going to save thousands of lives.

Edward Erfurt: Mayors and local council members want to do the right thing. They have the ability to solve it. We're going to help provide those tools for them.

Session

Text: text

Tony Harris: Hi everyone. I know people are still filing in, but I think as long as I move slowly, we can go ahead and get started.

So happy Friday. Welcome to the Strong Towns Crash Analysis Studio. I'm glad that you're here with us. My name is Tony Harris and I am the action team coordinator with strong towns. And in a moment I will introduce you to the rest of our expert panel. But first, let's talk about why we're here. So the National National Safety Council, excuse me, estimates that over 44,000 people died in automobile crashes in the United States throughout 2023. We know that thousands more suffered traumatic injuries during these collisions. And despite the best efforts of public safety officials, these crashes are still happening and affecting all of our lives.

There's a prevalent misconception that car crashes are caused solely by mistakes that drivers make. Looking at your phone, changing the radio, drinking alcohol, speeding. When a crash occurs, the North American response is to send out law enforcement and insurance agencies to assign blame. We ask questions like, who made the mistake that caused this crash and who should we blame?

The reality is that crashes are caused by multiple factors, not just driver error error. When a traumatic crash occurs, we need to identify all the contributing factors and learn all we can from the experience so that we can reduce the number of deaths and traumatic injuries in our communities.

So what you're going to see now is a crash analysis studio session, drawing from the best practices of the medical profession. We've convened a panel to review a crash that happened in Grand Junction, Colorado.

A cyclist was traveling just outside of a crosswalk through an intersection when he was hit by a motorist who at the time of the collision had a green light.

So today I'll start by introducing you to our panel, then review the facts of the crash, and with our guests, we will assess the design factors that contributed to the collision.

I wanna emphasize our goal is not to assign blame, rather, our objective is to learn as much as possible about what happened and identify the many factors that contributed to this unfortunate event.

So I'm now going to introduce our expert panel for today. First, we have Conor Semler who draws on his experience in urban planning, traffic engineering, and technical research in Complete Streets design.

Conor is highly regarded for his ability to leverage transportation design to create livable and healthy communities. His focus is on improving conditions for walking and cycling through better evaluation and design.

Conor is a national leader in the planning and design of innovative bicycle facilities. He was involved in the development of both the National Association of City Transportation officials for ndo, urban Bikeway Design Guide, and the Federal Highway Administration's separated bike lane Planning and design guide.

Conor's experience is informed by his role in leading research and working closely alongside cities to continually evolve and innovate safer, more inviting bicycle facilities. So welcome Conor. Next we have Diana Rooney, who is a local advocate for multimodal and active transportation in Grand Junction.

She has served for four years on the city's urban Trails committee, including three years as chair and vice chair. Diana has been particularly involved with the city's annual active traffic counts effort and has advised on the recently adopted pedestrian and bicycle plan and transportation engineering design standards. Professionally, Diana is a licensed civil engineer engaged in urban development, street improvement projects and transportation projects.

Next we have Henry Brown, who is a mobility planner with the city of Grand Junction. He nominated this crash for our review and has helped gather information and resources for the session. He also opted to participate as a local expert. Today, Henry wants to make guests and residents safer while practicing sustainable travel around the city. Henry was drawn to Grand Junction because of its easy access to camping, hiking, and skiing. And he's also impressed by the local arts and cultural scene. Henry is passionate about data-driven insights data and has some professional background in product design as well.

And then finally we have Chuck Marohn, the president and founder of Strong Towns, a civil engineer and author of the book, *Confessions of a Recovering Engineer: Transportation for a Strong Town*. He developed the initial idea for the Crash Analysis Studio.

So now I'm going to walk us through the details of this crash in Grand Junction.

Just going to share my screen. Okay, great. So, let's start with what we know. We know that a cyclist Joseph E. was traveling north slightly outside of the East crosswalk that runs along North Avenue at its intersection with 29 Road. A motorist named Tricia was traveling westbound in the inner lane. As she approached 29 Road prior to the collision, she entered the intersection with a green light when she crashed into Joseph. And we know that the crash took place at 8:53 PM on October 8th, 2023. The crash report indicates that the location was dry, dark lighted, and that there was clear weather that night in Grand Junction.

Now we know Joseph was transported to the hospital with serious injuries after the collision occurred. The crash report tells us that he was not wearing a helmet which would likely put him at higher risk of traumatic injury. Now in the report we see that Tricia stated she believed she was traveling at 32 miles per hour while the estimated vehicle speed is listed as 28 miles per hour. Both of these speeds are below the posted speed limit.

The report also indicates that Joseph was not tested for alcohol or other substances.

So here we've included a map where you can see the crash location marked with a red pin near the center of the visual.

And next we've included a zoomed in visual of the intersection. So based on the diagram that's in the crash report, we know that Joseph was originally eastbound in the South crosswalk that spans 29 road. So we've depicted him in yellow here.

And then Joseph cut diagonally to go across North Avenue. So he changed direction and headed north. And then Tricia, who is depicted with Orange hit Joseph as she was coming into the intersection from that inner westbound through traffic lane. And so we outlined the approximate crash location in red here.

Now we know that the speed limit on North Avenue is 40 miles per hour. So this is 12 miles per hour higher than the estimated vehicle speed that's listed in the crash report. North Avenue is a straight road with a level grade, and we also know that Tricia's SUV was damaged enough to be towed away from the crash site.

So a little more on the overall conditions of the collision location.

North Avenue is a six lane roadway. At this intersection there are four through traffic lanes, two of them are westbound and two are eastbound. And at this location westbound traffic has access to both a dedicated left turn and a dedicated right turn lane. Now there are no bike lanes on North Avenue at this intersection though there is a small median in the center of the roadway.

And 29 Road does have bike lanes south of North Avenue.

The bike lane that is north of North Avenue disappears briefly and then it picks back up beyond Walgreens a little bit further up 29 road. And I will show a visual of that a little bit later on. The intersection is signaled and has white crosswalks striped on all four of its legs. And we know that the crossing on 29 Road is on recall and the North Avenue crossing is actuated.

So Henry also gathered some photos and footage of the crash location that I'm going to share briefly with you all. Now this first photo is a shot of the crash location from the southwest corner of the intersection. So you can see where Joseph would've been crossing north along North Avenue. And we've outlined the approximate crash location in red.

Now this next slide here is a closer up view of the traffic lanes that the motorist would've been moving through. So Tricia would've been in the through lane where this white car is just after the left turn lane here.

Now these two photos show the crash location and some of the intersection from its northeast corner. So this may have been taken from where Joseph was ultimately trying to cycle to.

And then this slide shows the full intersection from the Walgreens parking lot. So we wanted to include this to try to give a feel for the size of the location that we're looking at, right?

And then next we've included a shot to show what it might look and feel like to be approaching 29 road prior to crossing any part of the intersection. So I believe that this may have been the path Joseph was headed down. And then on this next slide here, we're illustrating what it looks like to cross 29 road, which again was the first part of Joseph's journey through this intersection.

And then this next shot shows what it might be like to anticipate crossing North Avenue. So I would estimate based on the diagram in the crash report that Joey might have shifted direction to begin crossing north either where this photo was taken or just nearby.

And then finally, we've included a still from nighttime video to illustrate what this area looks like in the dark, right? So this shows northbound traffic coming up 29 road with the collision location being just to the left here.

So Henry also helped us get measurements of the intersection where the crash happened. And on North Avenue from the perspective of a westbound motorist cyclist, you're gonna see a few different measurements and I wanna highlight some of these for us now. So on the westbound

side, which is to the right, you see there is a 10 foot wide left turn lane, two through traffic lanes that are each 12 feet wide and then a 13 and a half foot right turn lane.

Now on the eastbound side you have an outer lane that is 15 feet wide and an inner lane that's 11 and a half feet wide. So the total width of the road without sidewalks and without the green space on this side comes out to be 78 feet. And then when you add the sidewalks and that green space in that width jumps up to 102 feet.

Now on 29 roads south of the intersection, I wanna highlight the following. So on the northbound side, which is on the right hand side here, you're gonna see two left turn lanes, A through traffic lane and a right turn lane that are each 11 and a half feet wide. Now there is a bike lane that's sandwiched between the through traffic lane and the right turn lane. And that bike lane is five feet wide.

And then when you look over to the southbound side of 29 road, you're gonna see another bike lane that's five feet wide, an outer through traffic lane that's 11 and a half feet wide, and an inner through traffic lane that is 12 and a half feet wide. So this makes the total road width excluding sidewalks and side buffers to be 84 and a half feet. And then when you add those sidewalks and buffers in, the width jumps up to 109 feet.

And then I wanted to include a diagram north of North Avenue as well just to show that 29 road sort of temporarily takes on a different character, right? So northbound traffic, again on the right hand side comes into a single through lane that's 28 feet wide. And there is no bike lane on this segment here before you hit north of Walgreens though there is a four and a half foot median on the left hand side there.

Now southbound traffic has access to two through lanes. The outer is 16 feet wide and the inner is 12 and a half feet wide. Toward the center of the roadway, there's a 12 and a half foot wide buffer area and then an 11 and a half foot wide left turn lane for southbound traffic.

So this makes the total roadway width, excluding sidewalks to be 85 feet. And then when you add in sidewalks and the planter area on the right here, that width jumps up to about a hundred feet.

And then on this slide you can see that the bike lane does reappear a little bit further up 29 road and I outlined that in red. And that's just a little bit north as you're moving past Walgreens.

So we're looking at what I would call a suburban development pattern here with access to a mix of commercial and residential properties. North Avenue is a minor arterial with high priority for sidewalk retrofit and cycle infrastructure to the east and the west. North Avenue is represented on the high injury network and is listed as having proximity to seven schools, a regional park, the VA hospital, and Colorado Mesa University.

Now 29 Road is a principal arterial. And to my knowledge, there are plans to connect 29 from interstate 70 to US 50 at a new interchange within eight years and 29 road ranks as high priority for sidewalk retrofit and cycle infrastructure to the south. It also serves as an elevated crossing of Interstate 70 business route. And it's the first railroad and river crossing east of Downtown 29 Road is also listed as having proximity to four schools and a planned regional park.

So when we look at this surrounding area map, you can see some of the schools that I mentioned like Nestle Elementary and then Book Cliffe Middle. And of course there are multiple retail establishments along North Avenue. And then if you see just south of the intersection, this green 70, that is where Interstate 70 business route runs.

So Henry and his colleague Eric Mocko, who is a transportation engineer with the city, gathered some speed data for us to look at as well. So they collected information over several days. And

what I did was I honed in to look at speeds of east and westbound traffic on North Avenue between 8:00 PM and 10:00 PM on Sunday March 3rd.

So what we found was 484 of the 1034 cars tracked were traveling at or beyond 40 miles per hour. So that means 46% of drivers were at or over the speed limit. And then we found that 81 cars or 7% of cars tracked were traveling at 50 miles per hour or faster. And then we calculated that 85% of drivers were traveling at or below the 45 to 49 mile per hour range.

So I'm going to stop sharing my screen now. Okay. And I would like to turn to our panel and I think maybe we can start with Conor.

Conor, could you tell us, you know, what you think might have contributed to this crash just based on the information we've looked at today and, and what you've seen prior to this session. And I, I wanna invite you to feel free to share your screen and use Google Maps if there's anything you'd like to point out in particular.

Conor Semler: Sure. Thanks Tony. Yeah, looking at the information that you shared prior to now, and just as we're getting into the conversation, like others probably, I'm first most struck by the land use pattern in this area as well as the, the street design.

Chuck is famously coined the phrase stroad for streets that look exactly like this.

And, and the problems are, are consistent with many, many streets. Like, like it, I've never been to North Avenue, but I've been to a hundred streets that that feel very similar.

And just, I, I can share my screen just while I, while I talk through some of these observations. So the, the place, the place that we're looking at is an auto-oriented area, but people who visit and, and access destinations and opportunities in this area are primarily traveling by vehicle. I think that I, I assume reasonably that includes most people in decision making capacities in this

area. City engineers, planners, consultants, politicians, likely only ever experience North Avenue through the windshield of a car. And they, it is hard for people to imagine what it would be like to experience this place as a person who walks or bikes, let alone someone who walks or bikes it every single day.

That that that experience that our, our victim in this crash experience through, through his life is, is foreign, a foreign concept to the people who are in the decision making capacity.

But Joseph's not alone, right? The, there are a high density of land uses in this area, even even in a sprawling sense. There's a lot of stuff here. There's stores, there's homes, there's restaurants, and two bus routes serve the corridor with bus free buses coming twice an hour all day long, picking up and dropping people off.

And there are in fact hundreds of households in this vicinity that don't have access to a vehicle. This is data that's available through the census that shows showed me that five to 10% of all households in this neighborhood don't have access to a vehicle. So there are many, many people who don't have the option to, to drive to get to their destinations. And that experience just isn't reflected by people who make decisions. And you can see that as we dig deeper into the, into the realities here, and I'm sharing this as a preface because when, when questions come up about street design in this area, people making decisions are, are in, are informed fundamentally by their experience as drivers engineering standards that they are held to like level of service standards.

That the intersection are thinking only about delay of people in cars as developments like the Walmart come in, they're being asked to study what it means for traffic in the area. They're not being asked to what to study, what it means for people that have to get their employees who have to get there by bus or who have to bike or walk there.

And the result is a street that is just simply not designed for people to bike the while, while this was probably obvious for a long time, I think the consensus among the engineering and planning profession now is that a safe facility on a street like this, the only option is a separated facility for people biking and walking. There's the, there is no such safe facility of an on-road bike lane. Even the one that you show on 29 really doesn't provide for the safety that people people need.

So, so the, the Joseph, the, the cyclist, I, I started on the wrong side, apologies, approaching the enter approaching the intersection from this direction, travel along the sidewalk.

He's not even considering riding in the street, right? He's riding in the sidewalk because that's where it's reasonable to do so as, as he gets to the intersection, there's no way for him to get to the left turn lane to make a left turn like a, like someone in the car would. So he is choosing to make what we call a two stage left, two stage left turn. So traveling first across this leg of the intersection, repositioning and then traveling this way across the other side of the intersection.

One thing to notice as I'm flipping around, you do see people out here on bikes, right? There's someone here, there's someone, someone down here. It's not uncommon to experience people biking and again, they're not reflected in the decision makers.

So the, the last thing I want to point out, at least in, in my opening observation is thinking about how much time it would take for Joseph to get through this intersection, which I, he may do every day. He may do multiple times a day, getting to work, getting home from work or, or whatever Aaron can maybe running the analysis from the police report indicate that Joseph was in this position here approximately while there was a red light for traffic on North Avenue. So he knew that he had a chance now to get across the street, traffic was stopped on the busy street that he needs to cross. And if he didn't cross, then judging off of the single time patterns, he was going to have to wait over a minute, maybe 70, 71 seconds is what I calculated for the next opportunity across the street.

And that's only if he maneuvered his bike up here to push the button to get across the major road.

So he took a chance to try to make it across rather than wait that additional 70 seconds. And it's easy for people who reflecting on the, on the crash to say, well the safer thing would be to wait, why didn't you wait?

We know that as pedestrian and bike delay increases beyond 30 seconds, the likelihood of crossing against a signal starts to grow, grow significantly.

71 seconds is approaching a level of service of failure for by traffic engineering standards, even for people in cars, people who are sitting in the safety of their car, listening to the radio, protected from the elements for people that aren't in a car, 70 seconds is an incredibly long time to wait. And we just know that people won't do it. And so what's called for here is designing with that acknowledgement.

We, we, we do this all the time for people driving. We don't install traffic devices that we know people won't adhere to. For example, we wouldn't put in a midblock unsignaled crosswalk on this street because we wouldn't expect that people would, would stop and yield to pedestrians even if that were the law. And the same sort of thinking needs to go for people who aren't in cars, people who walk and bike, what are they likely to, how I'd like to behave given the conditions we provide them. And in this condition, an intersection with no provision for bikes with long delay and inconvenient access to a push button to get to, to get across the street. We will, we know that the person is likely to over time make choices that put them at risk. And we need to, we need to consider that every time we think about adding capacity for traffic, what's the impact going to be on people's behavior who aren't in cars.

So I'll, I'll pause here, just sort of trying to paint the picture of the dynamic between the people who are making decisions for design and the impacts people who actually use the facilities.

Tony Harris: Thank you Conor. Yeah, I really appreciate how you laid out the experience of decision makers like through a windshield and then also thinking about the experiences of people that are, you know, biking or walking through this area potentially on a regular basis, right? And the, the potential for risky behavior, right? Or what we might perceive as risky behavior. Great, thank you. Henry, would you like to go next?

Henry Brown: Sure, thank you. First of all, I would like to give a shout out to the first responders in this crash because I think they arrived in record time and we're able to transport Joseph to the medical care that that was required. They were also very helpful in acquiring some of the information that's been used so far in this report as well as our engineering staff who was really helpful as well.

First I'll, I'll also build a little bit on what Conor said. So he mentioned like the transit access at this intersection and, and actually it's one of the highest frequency areas for our transit system, which runs on our headways. There happen to be four routes that make movements around this intersection, which means that we've got eight buses traveling per hour through this area with with stops within a one to two block radius. And so that makes it one of the best served areas in our entire city for transit. And, and as you pointed out in the street view picture and in my experience traveling up here to take some of the photos that we've seen as well as visiting meetings in the area is that it's very typical to see vulnerable road users in the area.

Whether those are people trying to catch the bus, trying to get to their jobs in the area or trying to get home to some of the lower income housing that's nearby here as well as students accessing the schools that we saw.

One piece, I think Tony, if it would be possible for you to pull up, I think it was the cyclist point of view in the intersection, I think we saw a picture that included a queuing vehicle trying to turn left southbound onto 29 road. And in my review of the video of the the crash, it was clear that there was also a vehicle.

Yeah. So where that car is shown, the white car there in the turn lane in the the crash situation, there was also a large SUV sort of in that position, but actually even more forward and, and sort of committing to the turn in a sense by pulling into the crosswalk.

So I think that that situation from my assumption and and my experience in the intersection here might have possibly even been blocking the view of the oncoming vehicle for Joseph. And so in that situation he might not have even been aware that he was trying to beat someone through the intersection, but rather thinking that it was just something that might have been, you know, a feasible movement in the case of trying to avoid that extra waiting time. So that's another I think, piece of the decision making that goes in there.

But from a, the intersection point of view beyond the hi utilization of this corridor from non-car users is also just thinking about the context of North Avenue as you mentioned, it has a lot of business and there's many business accesses including to the Walgreens on the northeast side of this intersection. There's also really frequent signalization. I think we're looking at half mile displacement of traffic signals along North Avenue. And so despite the high speed limit of, of 40 miles per hour and, and the, the high rate of speed that we see from some of the road users, although most are within sort of that anticipated 85th percentile type of view, the signals really cause a situation where despite the high speed limit, people aren't traveling the length of the corridor very quickly.

And so I know that we've seen some studies from a traffic engineering perspective where less frequent signalization or shorter phases can actually do more than high speed limits for the throughput and vehicular capacity. And so I think that there could definitely be opportunities

here to improve a situation for motorists by making them be able to, to transverse the, the corridor quickly while also helping lower the rate of people who are speeding dangerously on the corridor. And, and I sort of include 40 miles per hour in that speeding dangerously even though they are operating their vehicles legally.

The other piece here, which Conor you alluded to is that the cyclist Joseph was sort of behaving as if he were a pedestrian in the situation of the crash choosing to, you know, he wasn't fully in the crosswalk but acting near the crosswalks and making that two stage left turn that you mentioned.

I think that, you know, I myself am probably more in the camp of the vehicular type cyclist and so in this situation I would've been in the left turn lane to turn north onto 29 road and in that case it would've been very easy to see, you know, the vehicle that was obscured from his point of view and it would've been a legal movement had there not been that oncoming traffic for me to make that turn in one movement. And so I think that the fact that there's no receiving bike lane on 29 road North and we've got that wide sort of generous right turn curb radius because of the bike lane or what would have been the bike lane all contribute to the level of discomfort of cyclists not wanting to be the, the in the vehicular mindset that I think could have ended up, you know, precluding these injuries in this crash if that had been a, a comfortable decision for Joseph.

Tony Harris: Yeah, thank you for, for laying that out. That helps me to understand a little bit better why maybe Joseph made the decisions that he did in moving through that intersection. Thank you. Anything else Henry? Or should we move on to Diana?

Henry Brown: One other thought and, and stop me if I'm sort of getting ahead here.

I, I think about the size of this intersection and the footprint and we've started to see some examples here in North America of protected intersections. And I think that this, you know,

within the existing footprint of the intersection, this could definitely be a situation where a continuation of that wide trail that that's already been built on the south side of North Avenue to really encourage a safe two stage left turn versus kind of a fluid one stage into the next. Like we saw here in this crash, the infrastructure I think could really help encourage safe behavior and, and it's already been proven in North America and I think we could definitely figure out a way to fit it into this intersection footprint.

Tony Harris: Definitely. I think that makes sense to me. Diana, can we hear from you?

Diana Rooney: Sure. And Henry, you gave me a perfect lead into the thoughts that I had.

I, the thing that strikes me the most about this situation is CDOT improved this roadway in 2023. They milled and overlaid the road and the city of Grand Junction and the committee I was on pushed very strongly to include a bike lane on North Ave. It's obviously a high stress roadway, so maybe not the roadway you would select if you had, you know, maybe, maybe you don't want to do it, but if you have to do it 'cause you need to get to your business or to shopping or because you live right around the corner, it's available to you.

But what I noticed that you can see and what Henry mentioned is improvements that were permitted to be done recently were off off-side sidewalks, which were detached from North Ave and obviously Mr. Joseph was working, was using those, those improvements that were made on the north and south, or sorry, the east west orientation, like he was riding his bike on those sidewalks, which made a safer facility for him, but that didn't stop him from getting hurt.

And so my first impression, you know, I do think the city of Grand Junction and its planners and engineers, a lot of them are cyclists and do commute through town and they're, they're actively thinking about these improvements, but the intersection of state and local governments often prevents a, you know, presents a conflict here, but you know, some of the improvements that have. So I guess my point is that some of the improvements that have been recently made

while they have maybe lowered the level of stress on this roadway have not actually prevented injury from occurring from cyclists or pedestrians in this corridor.

So how can we do better how, you know, what has been improved is not enough.

Tony Harris: Yeah, thank you for articulating that. That's helpful for my understanding of this area and thinking about kind of local and, and state intersections too. Anything else, Diana?

Diana Rooney: I'd also wonder from the perspectives of that night shot how lighting could have influenced this, you know, it sounds like from what Henry had shared that there was a vehicle that maybe was obstructing, north Ave is very long and flat and straight. And so while maybe the last 50 or a hundred feet of that approach, the driver maybe, you know, the cyclist was not able to see her, see the driver coming up, what was going on six seconds before the impact. Because there's no median, there's no barriers. You should be able to see somebody coming down that road further than the, the one truck.

And so was the intersection lighting actually illuminating pedestrians and cyclists in that intersection? Or was it really lighting everything from the top down and creating blind spots for both the driver and the cyclist?

Tony Harris: Right, right. Thank you. Okay, Chuck, can we hear from you?

Chuck Marohn: Absolutely. Thanks Tony. You know, as I was listening to everybody, I was thinking this is the 15th one of these crash studios that we've done. And generally when I've been involved and we've looked at a site, there have been obvious like design problems there have been obvious, you know, I think of the one where like the, the traffic signals were kind of mismatched and temporary and had been there for a long time and shouldn't have been, you know, that, that there, there were kind of like obvious design flaws. I I'm going to step back and

say I, I think from an engineering standpoint, in terms of building a stroad, building an environment like this, there really isn't a design shortcoming here.

I mean like everything has been done by the book, everything's been done. Like according to what the design best practices would be.

I'm not seeing, like, there's nothing that jumps out at me. The, the, the traffic signals are all, I mean each lane has their own signal. The lighting, I I, I agree with Diana, there might, there might be some issues there, but generally like the lighting is put in according to best practices, it it, it seems like you actually have spacing between the roadway and the sidewalks.

You know, you've got the turn lanes in it, it everything here. If you were an engineer and you were worried about moving vehicles and you were designing this kind of stroad-esque environment, you would say like, we checked every box, like we met everything. Yet the outcomes that you're getting are not what you are expecting or not what you are desiring. And I feel like there's a, there's a need here to kind of step back and say, what, what have we got wrong here? What are we not seeing with the, with the results that we, because the results are not matching what we anticipate. What do we have wrong? And I, we talk about modeling the crash studio on the medical practice.

I think the, the big thing that we see doctors do is actually questioning often their own practices. Like we're, we're doing this and we're getting sub optimum outcomes. What about this is wrong? And when I look at this, I mean the, the very first thing that jumps out at me is that the speed, we're not getting the speeds that we are expecting to get. I mean, if we think that this should be a 40 mile an hour corridor, we're not getting 40 mile an hour speeds, we're getting 85th percentile, speed is higher than that. Why do we really want 40 mile an hour speeds or not? Because I, I think the other question is, you know, if, if we're trying to get 40 mile an hour speeds, why did we pick 40 miles an hour?

40 miles an hour is way, way, way too fast for a corridor where you anticipate having people on bike, people on foota. And, and we can look here just on Google, I mean Google's a snapshot in time. You go up and down this corridor and there's people on bikes all over, there's people walking mid-block. There's all kinds of things that you pick up. This is an intersection where even like a base design would have to assume that there's gonna be humans outside of a vehicle here. Why did we choose a 40 mile an hour design speed? So we chose a design speed that is way higher than what the conditions suggest would be safe for people. And then we actually designed it where we're now witnessing speeds that are even higher than that from an 85 percentile speed. So what, what, what were our underlying assumptions and how are those not matching reality?

I feel like there's a little bit of a, the analogy I wrote down here was like, it, it, it feels like what we've done here is we've created like a, a wood chipper where you gotta stick your hand in it to get the, the wood through or like a bandsaw where you're required to make the cut to put your finger like two inches from the blade. Can it be done? Yes. If someone is paying full attention and like all a hundred percent engaged, could they do that for a long period of time without cutting off their finger?

Yes. Will they eventually cut off their finger? Yes, they will because they're human. And so when we look at something like a wood chipper or a bandsaw, we design it in a sense with like the human flaws in mind. We recognize that someone using a machine like this is sometimes going to slip or make a mistake or do something different. And what we do is we design these machines to like lower the stakes in those kind of environments. Here I think we recognize that humans are gonna make mistakes, right? But what we've done is we've not lowered the stakes at all. We've in fact, I think designed very high stakes environment so that even a modest kind of understandable human error that someone might make has the, has the very strong likelihood of being, you know, being fatal or being traumatic in terms of the outcome.

This is, as Conor said, like the classic stroad situation.

It’s, from a design standpoint, we've decided here that we're going to try to move vehicles very quickly. So everything in this corridor is designed for through traffic and to move cars very quickly. You've got multiple lanes I saw earlier some traffic flow amounts and I mean this is, I'm sure that what is going on here is we're anticipating higher flows in the future.

Maybe you've got the interstate just over from this, you're not gonna get a lot of people who are going through the community coming off here and, and using this for traffic flow purposes. But nonetheless, you know, there's a, a kind of maybe anticipation of flow, but you, you don't have super high volumes here.

You also don't have high speeds. And so even though you've engineered for in a sense, high volumes and high speeds, you, you can't achieve high speeds because you've got the traffic signals. You also have a lot of intersections and a lot of turns. So you don't want high speeds yet you've got speeds that, you know, based on all that complexity are, are, are in a sense fatal. They're, they're, they're too high to be safe. So you put all this money into building a road, but no one gets to move very fast. You put all this money into, in a sense creating development along here and inducing growth and private investment.

But you have some of the lowest returning private investments that you can make.

Conor showed the overall site and this place is just full of parking lots. I mean, I would say two thirds of land area is unproductive land area. I mean it's just bare ground asphalt.

And you can see from the kind of residential development that you're getting here, which is on the, the lower end of the, the investment scale. This is not a desirable neighborhood to live in.

It's also, you know, from a a commercial standpoint, because everything is so spread out, it's a very low returning, low productive environment. So you have this conundrum where you are in

a sense trying to do two things at once, doing them both poorly. You're trying to move vehicles very quickly. You're trying to create an investment, you're getting suboptimal of both. And then you as an afterthought consider how do we accommodate people coming through this corridor? How do we put kind of the, the minimum or the modest amount of human investment for the humans that we have in a sense planned to be in this space.

So you get along the, the the, the the, the main street coming through here, you don't have any bike lanes on the perpendicular street. You have these kind of throwaway bike lanes. None of them are protected, none of them are safe. Henry said he would be in the left lane turn lane. You're a braver man than I, Henry, I don't know as I would do that with 40 mile an hour traffic, you know, literally like a couple feet away from me, that would be pretty scary. I think if I wanted my kids to bike through here, I would say act like a human on foot, stick to the sidewalks, walk your bike across the street, do that kind of thing.

So we know people are there, we know that they're there. We actually take the step to kind of modestly plan for them, but we plan for them in kind of a theoretical way. We're planning for not the humans we have, but the humans we wish we had, right? We're, we're planning for people who never make mistakes, are perfectly happy to stand for a minute and a half in the sun waiting while there's no cars or maybe a few cars going, not using their own human discretion, not acting the way humans normally act.

And so I, I look at this thing and I, I think from the standard engineering approach, it's hard to identify a design flaw. It really is because we've, we've followed all the books, we followed all the manuals and that's where I think the challenge with this particular crash is to actually take a step back even further and ask ourselves where is that base understanding that we have flawed? And I think if I put my finger on where the base understanding of that is flawed is that we planned for fatal speeds of motor vehicles and we've planned for humans to be in the same space in a way that they are not protected.

A way that they are kind of open and exposed and in a way that they're expected to make decisions that go against human nature. And when you combine those two things together, you are in a sense accepting a certain rate of attrition, a certain rate of human, you know, fatalities and, and, and traumatic injuries because you've just created an environment where you've gotta stick your hand in the wood chipper over and over and over again. And at some point you're gonna get your fingers cut off.

That's all I got Tony.

Tony Harris: Great. Thank you Chuck. Yeah, that wood chipper language is really helpful for me in thinking about how people might navigate through here on a regular basis.

Anything else on factors or should we move toward recommendations? Okay,

Henry Brown: I, I'd like to hop in just with one additional piece. I think from a systematic view, a lot of what Chuck said really resonates with me. One maybe box that's soon hopefully to be ticked but is not fully ticked, I would say from an engineering standpoint is zooming out a little bit here is just the connectivity and, and continuity of the facilities. So we saw in the street view or in my photos, pretty nice path to the south of North Avenue. It has pedestrian lighting, it's separated from the roadway or buffered from, from moving traffic. As soon as you cross 29 road, that facility becomes connected to the roadway completely adjacent to that 40 mile an hour traffic and doesn't even make it to the next crossing of, of, of North Avenue, let alone towards some of the higher density and, and more accessible housing in Clifton and, and further northeast of here.

And so thinking about Joseph's experience, if he were heading towards sort of the, the northeast that might've been why he was even making this turn in the first place. And, and the city and county and state are, are partnering on doing a lot of completion work along North

Avenue, which I think is great, but thinking about the existing conditions they don't extend very far beyond the intersection here.

Tony Harris: Right. That's really helpful. Additional information. Thank you. Okay, well if we are feeling satisfied with factors, I'm gonna take us back to, to Conor to think about recommendations to consider for improving safety in this area.

Conor Semler: Yeah, thank you. I really appreciate all the comments from the rest of the panelists. I think we're all sort of coming around to the same orbit and you know, Chuck, your, your opening, it was exactly my reaction when I first got invited to think about this crash is that there's not a lot of obvious failings of the intersection design.

My mindset went for went first to the way the signal operates. That's because you can't see that we look at a Google Earth and I think Henry and the team for providing a lot more information about that.

Henry made, I think the three most important points that I was thinking of in that is that we, we should look for opportunities to reduce the signal timing and the cycle length across these corridors in general.

One of the, I talked about this with you Chuck when we, when we had our chat a little bit ago, but I want to say this as often as possible. One of the mathematical glitches that we fall into is we can get the most capacity, meaning we can put the most vehicles through an intersection per hour, which is how our models calculate it by having the longest cycle lengths because you, you eliminate the time that it has lost out of 300 3600 seconds in an hour. If you have fewer of those in all red time, you get more cars through the intersection. But the reality is people don't experience intersections that way. They experience them once during the day or twice during the day.

And what we wanna do is reduce that delay and what the best way to reduce delay is to keep the cycle length short. And that is, that leads to the second point of Henry's, which was it's not the speed limit that is dictating how long it takes people to get through this intersection. We can reduce speeds way down and no one will mind if we can have the, the signals coordinated and keep our timing short. They're going to get from point A to point B in the same time or less while we can improve safety and access for people who aren't in cars.

And then the third of Henry's points, sorry to just steal all your thunder, Henry, is the protected intersection idea. And you know, this is just an emerging design in the United States. It's well proven abroad and it came together in the moment. I like this because you can sort of react on the fly, but while Chuck was talking about the, the wood chipper, I was, I was drawn for the first time in a long time to an intersection I stood at in Netherlands. I know you're used to thinking of the Netherlands as this place that is never gonna look like what it looks like here, but just a reminder of where we are. Are you seeing my screen?

Tony Harris: Yes. Yeah, I see your screen. I see the map pulled up.

Conor Semler: Okay, great, great. So they actually have giant intersections in the, in the Netherlands too. And there's an intersection in Delft that I think of all the time, which as you can see has a ton of lanes.

There are obviously things about this intersection that wouldn't work in Grand Junction exactly, but in terms of principles and design approach, what they do is fully separate the, the biking and walking movements from the intersection. Diana made the really good point that the, the separated sidewalk, which is being serving as a bike facility in this case provides for that low stress and safety away from the intersection. But it doesn't, it just, it just turns in right into the middle of the intersection at the point where all the conflict occurs. And this protected intersection concept is designed to make those movements, make those conflicts happen apart

from every, all the other stress that drivers are dealing with as they get through a busy intersection like 29 and north.

And so, you know, I even can't get there because of this. I even have a photo that I took, this is standing at one of these corners, you know, it is a huge intersection that you, all you see is intersection in this whole panorama that I took. But navigating it as a person on bike or a person on foot is, is much more manageable than the places that we look at in on these, on these roads.

And the last thing I'll say that I, I wish I was smart enough to be able to articulate exactly, but the way that they manage the signals for non vehicle users in these intersections is so much more intelligent. It requires a lot more logic than we're typical to used to using, but they don't just give you one opportunity to cross an intersection to a, a leg of traffic at this intersection. Any chance where there's not conflicting vehicles, there's a chance to get, get through the intersection part of the way and then part of the way further, and again, overall what the goal is, is reducing the amount of time that we're asking people to wait to get through this intersection while biking or walking while also managing a high ball lane of vehicles.

So my pitch is, I think bringing in these protected intersection concepts to increase with increasing frequency in our, in our planning and our design, recognizing that people are goning to use the intersection different than they would a smaller, more compact over intersection.

Tony Harris: Yeah, understood. Thanks for the visual there. That was really helpful for interpreting what you were, what you were referencing. Great. Diana, would you like to go next?

Diana Rooney: Sure. Kind of just like Chuck said, you know, from an engineering standpoint, if I took out a, one of the big manuals on how to design an intersection, this is a picture perfect intersection. You even got buffered sidewalks that didn't help improve its safety.

I do like the idea of some sort of vision zero or reflection on that speed limit. You know, north Avenue is a state highway, it existed a lot longer than the community around it has. And so I do would wonder if anyone's ever stopped and thought a little bit about that, you know, I would imagine as a state highway they're thinking about volume and getting a certain amount of volume through that road, but is that the highest priority at the moment? Or given that there's an interstate just a few, not even a mile south of here and that could take that volume, is there a benefit in reducing speeds on this, turning it back into a urban level street and not just a highway, at least for the section through town?

I, I would wonder if there's, you know, often as civil engineers we're outside of our area of expertise in looking at lighting standards and quite often lights are, are really good at highlighting cars, but I would wonder if there was backlighting events or if there's a way to better improve lighting standards at night for highlighting the pedestrians, splashing that light on the person themselves and not just the floor of the roadway could have helped prevent an issue like this. And sometimes the glare from an intersection obscures the vision of that driver being as they're coming up into it. Like the, the glare itself could have con you know, been an issue.

So opportunity to look at lighting standards on this intersection and you know, I I like the idea that Conor presented of some sort of better protected intersection that could have helped channelize, you know, could have made that a lot more comfortable a movement for this gentleman and, and yeah, unfortunately I don't have anything to add. You know, I do think re reducing speeds would, is a, is an obvious opportunity to help prevent things like this.

Tony Harris: Yeah, absolutely. Thank you. Henry, would you like to go next?

Henry Brown: Sure, yeah, I think one of the things that that resonates for me is the idea of the multi-stage crossing or just providing better opportunities for crossing. We do have a lot of

protected left turn phases and, and I don't have the awareness specifically if this intersection uses those, but I assume that it does just based on the other practices and maybe Conor can, can chime in there, but in, in some of those circumstances, for example, if let's say folks are turning, they have a left hand movement from North Avenue onto 29 road simultaneously northbound and southbound, nobody's crossing that or no vehicles are, are might signaled to cross that southern leg of crossing North Avenue.

And so that could be an opportunity if there were a protected median, you know, I think it has to be a little larger than, than what exists already and potentially bump out a little further into the intersection to really serve that purpose functionally. But that could be a sort of refuge island for pedestrians are cyclists to stage for continuing to cross. And, and what that does is that can really help with the cycle timings because you don't need to give the full walk clearance to get someone across the entire street, just across half of the street in some cases. And it gives them a head start, a pedestrian's, a head start to cut into that 70 or so seconds.

Tony, I think you were mentioning that somebody would be expected to wait on that southeast corner if they were trying to cross North Avenue.

And so it helps I think from the compliance standpoint where people are maybe more likely to wait if the, the time is a little shorter. And then I think it helps overall with the, the cycle timing as well, keeping things flying, which again continues to be I think the priority for a lot of the, the design engineers. And so creating a situation where that's a more comfortable opportunity for people. Also similar to what you were showing from that panorama photo means that as someone waiting at that southeast corner, I only have to look one direction, I only have to look left to see, you know, who might be coming from that direction to potentially conflict with my movement.

And then once I'm halfway across the street, then I can look right and, and see who might be coming from that direction. And so I think it makes it a much more accessible situation just

from a comfort, you know, we, we have high aspirations to try to increase the, the modal share that biking and pedestrian biking and walking have in our community. And little things like that can make a big difference just in making feel, making people feel more comfortable sending their kid out on their own to get to school, for example. Or, you know, cycling home after dark.

Tony Harris: Absolutely. Thank you, Henry. Chuck, anything from you?

Chuck Marohn: I really appreciate Conor's DR intersection and the panoramic photo. I think it kind of brings into sharp relief the the question that we've got here because to me there's, there's gotta be a, a philosophical decision and I think this is actually not an engineering decision, but is actually like a council level decision. It's a, it's a, it's an elected, it's a public policy decision. Are we trying to make this a street or are we trying to make this a road? Is our design priority here to create private investment to have people build in this, to have, you know, transactions and housing and, and commercial and all this stuff.

Is that the goal or is the goal here that this is a important traffic corridor and we need to move cars very quickly because we can't do both? We can't do both effectively. You have to do one or the other.

If, if we give engineers and planners and, and an entire technical staff policy direction on that, like, hey, this is, this is gonna be a street, we wanna get more commercial development here, we wanna get more investment here, we want to grow our tax base, create jobs, get more housing, that's an awesome outcome. But if that's the outcome, then we have to get really, really serious about reducing speeds. And I don't mean sending police out there, I don't mean setting up a a, a a, you know, lower speed limit. I actually mean going out and physically reducing speeds. You, you need to build a protected bike lane in there.

You need to take that outside lane and you need to put up a, a, a wall the same way you would in a temporary construction zone. And you need to have that like as a separate place for people to bike.

In doing that, you need to narrow up the lanes and actually slow down traffic as you're coming into this intersection, you need to really tighten things up, like actually bring the curb out and make it physically hard to drive fast. Because when you enter the intersection in a complex street where people are gonna be crossing on bike, on foot, cars, merging all this stuff. You need speeds to be really, really slow for that kind of complexity to take place. You, you'd get rid of these turn lanes, you'd get rid of the, you know, the, the direct to turn all that.

I think when we look at that, that photo that Conor showed you said, I I i, there's a lot going on here. It's, it's really interesting because there's a lot going on to simplify decision making, right? So when the vehicles are turning left, going left across traffic is the most, I most dangerous thing you can do. But when the people are turning left, the bike walk can go straight with zero fear, right? That it's like you could make a mistake and there's not gonna be any car coming at you. We can do things like that here in a lower scale way. If we really tighten up the intersection, lower, lower speeds and use the, the kind of signal and that timing to create less of an emphasis on throughput and more of an emphasis just on kind of the, the, the, the crossing of this intersection, making that something that is very low risk to do, because the speeds are gonna be really, really low.

And I'll say this a little bit different than Conor said it on a street, if you're gonna have a signal, the kind of default is more red than green, you're actually stopping people a lot because you're making that intersection really safe.

If, if we decide from a policy standpoint, nope. The most important thing here is that this is a, this is a road we need to move traffic. Traffic is the most important thing here. Let me be clear. I'm okay with that. Like, I think that's an okay design outcome. But the thing is, is like everything

else we do here has to be consistent with that. So you gotta stop building stuff for people to go to here. You gotta close these intersections, not build anymore, right in right out accesses people stopping and turning and all that kind of stuff.

You need to get people away from this. You need to, I mean, I would even rip out the sidewalks maybe I, I think we'd have to look at this a little bit more clearly, but certainly you would need alternate routes for people who live in areas adjacent to this to get to the places they go without coming anywhere near this wood chipper, right? Like, we wanna just keep them away from it and make it so that they can get to where they want to go without having coming anywhere near this. Because what we've said is that traffic is gonna flow here at fatal speeds. And so if you've got the wood chipper, you gotta keep your hand away from it.

If you've got fatal speeds, we need to have alternate routes for people to get to where they're going without coming anywhere near this. In that scenario, the signal timing actually goes the opposite of what Conor's suggesting, where you actually kinda lean into the long signal because we want traffic to flow along this road. And you don't, you want to de-emphasize crossing, we actually don't want people crossing this because it's gonna be really, really, really dangerous. I suspect that's not what they're gonna wanna do. I suspect you wanna lean into the street part of this.

The problem is that the way it's funded through the state, the state wants to lean into the road part of this. And so you have this kind of policy conundrum that your engineers and your designers and everybody else has tried to compromise and work out. And the result of that compromise is that you've created something really, really dangerous. Really, really expensive and financially not very productive. And so as a policy thing, we have to resolve that, that problem first before we throw more money at this.

Tony, I I I, I think short term, there's some things we can do with cones and bollards and, and signal timing, but ultimately this is a big policy decision where, where we need, we need the, the, the aircraft carrier in a sense to decide which direction it's going and then start turning it.

Tony Harris: Yeah. Understood. Understood. Any other thoughts or reactions on recommendations?

Henry Brown: I just would like to emphasize what Diana shared before that I-70 B is, you know, about a half mile south of here. And interestingly, so us six, if, if I go a few, maybe a mile or so east of this intersection, US six joins up with I-70 B. And then on the other side of town, us six joins up with I-70 B again. And so in a sense, this, this us six North Avenue here is kind of acting as the, the, let's say boulevard through town to I-70 Bs being the loop road in a sense. And so I think that Chuck's question of what direction do we wanna move in for the North Avenue itself is a super important question, but it can also be applied to many of the other corridors in our city.

As you said, you know, one, one stroad is not so different from any other stroad in a lot of situations. And so that decision making I think should happen comprehensively and extend beyond the context of this single intersection recognizing here that we potentially do have an opportunity for an easier decision given that there is a road that's already pretty good at being a road not too far from here.

Chuck Marohn: It's your boulevard with, you know, taco Bell, first National pawn shop, big O Tires. I mean, I'm not putting these things down because communities need these things, but you know, you, you've made this massive investment here in a boulevard and you're not getting very much for it. And so whatever sacrifice to safety you're making for economic development is not paying off for you. Right? It's not like this is not leading to some great return for you. And so, yeah, I mean if you want Taco Bell, let's get Taco Bell. If you want the pawn shop, let's get

the pawn shop. But we can do that in an environment where we spend a lot less money and make it a lot safer.

If you don't really want those things or don't really value those things and you really value the benefit of moving vehicles quickly, you know, you're not sacrificing much by having those be in a different place.

So that, that's the, that's the, I I think the trade off that we've made with this design is we've actually chosen to spend a lot of money to get very little and to create something very unsafe. And that's kind of like the worst of all three variables we could maximize. We've, we've almost minimized all three things we could minimize.

Tony Harris: Right, right. Yeah. The trade off language I think is really important for, for laying that out in a way that's easy to understand.

Anything else on recommendations Go ahead

Diana Rooney: To, to follow up on what you're proposing, Chuck? I I really like those ideas. You know, as a driver, north Ave is often my destination. While we may be looking at a small section of it that doesn't have a lot of destinations for myself, the hardware store is just east of here. I live west of here and I visit a lot of businesses up and down North Ave at the same time as a cyclist, it's impossible to cross this entire US six from the entire length of it and through Grand Junction. So this is just one small sliver of challenge throughout town.

I do wonder if you were to road diet this down to a single lane and move us six's designation to I 70 business to the South, which does action function much better as a high volume road, if you were to, you know, better allocate this space for economic development and for being able to make it a pleasant corridor for everybody to use, you know, as a driver, it's not that great an experience either. It's narrow and uncomfortable in its own right. You know, as a cyclist it's

definitely more, more uncomfortable and more high stress no matter whether you're crossing or traversing along with the traffic. So I like those ideas of re from a, from a, a higher level standpoint, from a, a decision making standpoint, reevaluating your priorities in the community and figuring out where those priorities should be lying.

Tony Harris: Yeah, well stated, there's something about a, a space that feels unsafe as a cyclist and a pedestrian, and then also frustrating as a motorist that I feel like I'm hearing as a theme here, right? And that's not necessarily the type of place I would wanna find myself in or I would feel uncomfortable making decisions under stress or high stakes there at least.

Great. Anything further or should I move us into closing out our session?

Okay, well I'm going to share my screen one more time and I just want to offer some acknowledgements as we close out today. So I want to say thank you first and foremost to our panelists who have joined us. So Henry, Diana, Chuck Conor, thank you for being here with us today and walking us through this analysis. I also want to offer a special thanks to Eric who assisted with the speed data and gathering resources alongside Henry. I know that was kind of a big lift, so we really appreciate your help. Thank you to the police department and other city staff and community members that have also helped out. And I would like to say thank you to our sponsor for this event and anonymous donor and thank you to Strong Town Staff as well.

You can find a recording of this session and all of our crash analysis studio sessions by going to strong towns.org/crash-studio. And our next virtual studio session will take place on April 26th. You'll be able to find more information about that on our website soon and on our site, you can also find links to our free academy course for establishing a crash analysis studio in your own community. And if you're interested in having strong town staff, visit your community to co-host an in-person studio. You can fill out an inquiry form through our site as well.

So on behalf of my colleagues and the assembled panel, thank you for watching this session of the Crash Analysis Studio. Keep doing what you can to build a strong town. Take care.