

Elephants in the Road



How Climate Chaos, the Safety Crisis, and the Rise of Autonomous Vehicles Will Shape the Future of Humboldt County's Transportation System, and What We Need to Do About It



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EXECUTIVE SUMMARY

Three major phenomena are shaping the future of the transportation system in Humboldt County and nationwide: climate chaos, autonomous vehicles, and the road safety crisis (particularly for non-vehicular road users). These phenomena will only grow in importance and influence in the decades to come. Yet today, as transportation officials at every level continue to repair and maintain our existing transportation system and draft plans for the future, these phenomena are often relegated to the status of minor considerations, or are ignored completely. This approach, if continued, will leave local communities constantly in a reactive or defensive mode, responding to the whims of large profit-seeking corporations and distant governments in Silicon Valley, Wall Street, Sacramento and Washington, DC, and to the vicissitudes of mother nature, always a step or two behind the curve. In order to take control of the future of our transportation system—the life-blood of our society and economy—local communities need to plan proactively, starting now, and quickly embody their priorities in pavement and paint. This paper lays out the extensive evidence supporting the need for immediate action to address these three phenomena, and suggests data-driven strategies and actions to adopt in Humboldt County. Those strategies and implementing actions are summarized in the tables below.

Strategy 1: Reallocate the Right of Way		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none">○ Acknowledging benefits of mode shift in plans○ Reallocating limited vehicular right of way for bike lanes	<ul style="list-style-type: none">○ Rapid implementation of complete bike, pedestrian and transit networks in all communities○ Use all available funding sources○ Transit-only lanes in Eureka and McKinleyville○ Sidewalk improvements in Arcata and McKinleyville	<ul style="list-style-type: none">○ Shift focus away from separate bike and pedestrian infrastructure and toward reallocation of paved right of way○ Abandon congestion management as a policy goal

Strategy 2: Realign Incentives with the Public Good

<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Limited reform of car parking requirements ○ Some requirements for bicycle parking ○ Ad hoc employee and tenant incentives ○ Official policies promoting infill development ○ Small amount of metered parking ○ Efforts to improve transit routes 	<ul style="list-style-type: none"> ○ Comprehensive and systematic program of employee and tenant incentives ○ Transition curb space toward active transportation, loading and commerce ○ Dramatically increase availability and quality of bicycle parking 	<ul style="list-style-type: none"> ○ Make transit fare-free ○ Increase frequency of transit ○ Redesign transit routes ○ Integrate all transit systems & improve service quality ○ Add transit hubs with convenient first/last mile mobility options ○ Charge market rates for parking ○ Eliminate minimum parking requirements and establish maximums ○ Switch from Euclidean zoning (separated uses) to form-based, mixed-use zoning

Strategy 3: Slow Down		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Some traffic calming projects 	<ul style="list-style-type: none"> ○ Adopt and implement a comprehensive, context-dependent policy of slowing vehicular travel speeds 	<ul style="list-style-type: none"> ○ Abandon travel speed and congestion relief as management goals

Strategy 4: Put Technology to Work for Everyone		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Pilot e-bike rebate program ○ Vehicle activated speed signs ○ First steps of transit fleet electrification 	<ul style="list-style-type: none"> ○ Write robust plans to ensure that vehicle-to-vehicle, vehicle-to-infrastructure, and automation technologies support transit, walking and biking ○ Create a permanent and fully funded e-bike rebate ○ Fully fund transit electrification 	<ul style="list-style-type: none"> ○ Reform signalized intersections to prioritize pedestrians, bicyclists and buses

Strategy 5: Proactive, Equity-Focused Policymaking

<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Limited inclusion of equity in planning documents ○ Some sea level rise planning ○ Mobility on demand planning 	<ul style="list-style-type: none"> ○ Adopt robust equity policies ○ Allow disadvantaged and vulnerable communities to lead planning processes ○ Adopt comprehensive and realistic sea level rise and wildfire plans ○ Consolidate development 	<ul style="list-style-type: none"> ○ Take equity seriously ○ Discontinue old sprawling development style ○ Adopt universal design rather than minimum legal accessibility standards

1. THREE CRITICAL PHENOMENA FOR TRANSPORTATION

Three phenomena loom large over the present and future of the global transportation system: a climate in chaos, a crisis of traffic safety, and rapidly increasing automation. While we cannot afford to downplay or ignore many other phenomena which intersect with the transportation system—perhaps most notably local and regional air pollution—we make the case here that these three phenomena are nevertheless the forces which will dominate the shape of our future system. All three are extremely well documented, and subject matter experts almost universally agree that they will play primary roles in shaping the transportation system of tomorrow. They represent both fundamental challenges and enormous opportunities. And yet, in most transportation plans and projects being conceived and implemented today, they are secondary considerations at best. In this report, we make the case that communities in Humboldt County would be far better served if local officials addressed these phenomena directly, effectively and soon, putting them at the center of all local transportation planning decisions.

The transportation system contains within it both causes and effects of climate chaos, the safety crisis, and the automation revolution. If we continue with business as usual, we will continue both contributing to, and increasingly reacting to, these three phenomena. And we will lose our best chance to influence our future transportation system for the better. Eventually, decisions made in places like Silicon Valley, Wall Street, Sacramento and Washington, DC will limit our options for addressing these phenomena, and the North Coast will have little choice but to get on board or get out of the way—in every sense of the term. But that’s not the only option.

Residents and governments of Humboldt County have spent much of their recent history reacting and adapting to decisions made in far-away places. And it’s undeniable that we’ll have to do a lot of reacting and adapting to these phenomena as well. We can’t change global trends on our own. But what we can do, if we start now, is choose *how* we’re going to adapt, and in doing so take a certain amount of control over how these forces and trends will play out in our communities in the future.

In this section of the report, we provide a summary of important background information on each of the three phenomena and document their importance to the transportation system. In the second section, we explore how the most productive actions that can be taken to address these phenomena are, fortunately, inter-compatible—and many of these actions, in fact, solve multiple inter-related problems at once. We also describe how Humboldt County can implement important measures to address these three phenomena head on, and in doing so create a future transportation system that meets our needs and improves our quality of life.

1.1 TRANSPORTATION & CLIMATE

Anthropogenic climate change is widely recognized as a global crisis likely to cause “severe, pervasive and irreversible impacts for people and ecosystems” if not adequately mitigated.¹ In California, annual average daily temperatures are predicted to increase by 5.6-8.8°F, depending on the extent and timing of action taken to reduce greenhouse gas emissions. The impacts of this rapid warming are numerous and diverse. Those impacts include a potential doubling of the area burned by wildfire each year in the state, a two-thirds reduction of the annual snowpack, an increase in frequency of both extreme droughts and mega-floods, and inundation of coastal homes and other infrastructure totaling almost \$18 billion by the end of the century. The total economic cost of failing to tackle the climate crisis is estimated to reach tens or hundreds of billions of dollars annually for California by mid-century, with economically disadvantaged communities bearing the brunt of the impacts.²

Although the extent of each climate impact will vary across the state’s diverse geography, the North Coast will experience all of them, and generally to a similar degree as the rest of the state. Some impacts will be felt most in inland areas, others on the coast. Notably, the rate of sea level rise in the Humboldt Bay region is the highest in the state.³



Water washes over Jackson Ranch Road during a 2014 King Tide, a preview of one local effect of future sea level rise. Photo credit: Ted Halstead via Humboldt Baykeeper.

Transportation is a leading source of the greenhouse gas emissions fueling the climate crisis. The transportation sector contributes approximately 16% of all anthropogenic greenhouse gas emissions globally.⁴ Transportation accounts for 36% of emissions in the United States⁵ and 40% in California,⁶ making it the largest source of greenhouse gas emissions at both the national and state level. In Humboldt County, transportation accounts for an absolute majority of emissions, at 54%.⁷

The transportation system will be significantly impacted by the climate crisis it is helping to cause. Highway flooding is projected to triple by the end of the century in California, the risk of closure and damage to roadways from wildfire will increase substantially, and increased temperatures are projected to increase the cost of road maintenance and repair by up to 9%. In addition, supporting infrastructure such as electric transmission lines, pipelines and refineries as well as the freight transport system are vulnerable to climate impacts.⁸

Humboldt County’s transportation system is highly vulnerable to all of these climate-related risks. Our isolated location makes us particularly vulnerable to floods, wildfires, and landslides

from intense rainfall closing roads, and taking down electric transmission lines. We are also uniquely vulnerable to sea level rise. Much of the transportation infrastructure surrounding Humboldt Bay is particularly at risk, most notably Highways 101 and 255.⁹ Without significant action toward both global mitigation and local adaptation, these critical linkages and many others will likely be regularly flooded or permanently inundated and unusable well before the year 2100.

There is a moral imperative to address the causes of the climate crisis embedded in our transportation system. There is a pragmatic and economic imperative to address the effects the climate crisis is already having and will have in the future on our transportation system. There are also growing political and legal imperatives. It is not a question of if, but when, future state, federal, and international laws and regulations will require ever stronger climate mitigation and adaptation measures. By acting now, Humboldt County's local governments and communities will have much greater power to determine the shape of their own mitigation and adaptation measures.



Wildfire warning on a rural road in the Western United States. Photo Credit: Haydn Blackey/Wikimedia Commons.

1.2 THE CRISIS OF TRAFFIC VIOLENCE

Vehicular collisions, also known as road injuries or traffic violence, is the 8th leading cause of death worldwide, killing about 1.4 million people each year. Driving is the only cause of death in the top ten which is not a disease, communicable or non-communicable.¹⁰ In the United States, traffic violence kills about 39,000 people each year, making it the 13th leading cause of death.¹¹

As US driving rates and population have both increased dramatically over the last century, increased safety regulations and innovations have decreased the number of deaths per capita and per mile traveled. Even the absolute number of deaths has dropped significantly since reaching a peak in the 1970s.¹²

However, the risk of death from traffic violence is not distributed evenly throughout the US population. While it is the 13th leading cause of death overall, it is the 5th leading cause of death for children aged 1-4, the 3rd leading cause of death for children aged 5-14, and the number one cause of death among people aged 15-24.¹³ Motor vehicle deaths are also more than twice as frequent among Native Americans than for the population overall, and more than twice as frequent for men as for women.¹⁴ Pedestrians with a disability, particularly children and people with visual impairments, are at much higher risk of collisions.¹⁵



A pedestrian-unfriendly streetscape on 4th Street in Eureka. Photo credit: CRTP.

Furthermore, even as overall traffic deaths have decreased, pedestrian deaths have increased in recent years. The number of people killed by vehicles while walking in the United States has increased by 35% in the last decade, even as the number of people killed while occupying a vehicle has declined by 6.1%. Seniors, people of color—particularly

Native Americans—and people in low-income communities are all substantially more likely to be killed by vehicles while walking.¹⁶

Similarly, the number of people killed while riding bicycles in the US has risen by 30% in the last decade.¹⁷ The frequency of bicyclist deaths is much higher for older adults, and lower for Asian Americans and Pacific Islanders.¹⁸ There are no available data on potential differential rates of bicyclist fatalities by income in the United States.

In 2018, the most recent year for which data are available, 6,283 people were killed by traffic violence while walking in the United and 806 were killed while on a bicycle.¹⁹ In other words,

about 20 people are killed in traffic violence every day while walking or bicycling in this country.

In addition to the human cost, this traffic violence carries a massive economic cost. Injuries and deaths of pedestrians and bicyclists have been estimated to incur societal costs of over \$86 billion annually in the United States.²⁰

Among all states, California has the 39th highest overall traffic fatality rate when ranked by population, and the 33rd highest when ranked by miles traveled.²¹ Yet our state has the 5th highest rate of fatalities for people riding bikes,²² and is ranked as the 16th most dangerous for pedestrians.²³

In 2017, the most recent year for which data are available, 957 people were reported injured or killed in traffic violence in Humboldt County, of which 75 were people walking and 48 were people on bikes. That was enough to rank the county at only 27th among California counties for its overall rate of traffic injuries and deaths, but 3rd for pedestrian injuries and deaths and 8th for bicycle injuries and deaths.²⁴ In recent years, the county and its major cities have consistently ranked among the most dangerous in the state for people walking and biking.



Pedestrians struggle to cross a wide multi-lane road. Photo credit: Smart Growth America

Media coverage of pedestrian and bicyclist injuries and deaths in the United States has a strong tendency to blame the victim and almost always fails to connect individual incidents to the broader crisis,²⁵ despite the fact that the World Health Organization classifies road deaths as “preventable” and an “epidemic.”²⁶ This bias in media coverage obscures the underlying causes of the crisis and tends to shift public opinion in favor of drivers.²⁷ Nevertheless, the causes of the crisis are well known to experts: streets that are designed for vehicular speed and not for non-vehicular safety, and an increasing number of sport-utility vehicles (SUVs) and pick-up trucks, which are much more lethal in collisions.²⁸

In much the same way as climate chaos, the traffic safety crisis for vulnerable road users presents a clear moral imperative for transformation of the transportation system. There is an economic imperative to address the billions of dollars that today’s traffic collisions cost our society. And there is also a growing political imperative for change, as advocates, the media, and the public learn more about the heavy toll this traffic violence takes on communities—and the fact that low-income communities, people of color, and older adults are dying at disproportionate rates. And again, just as with climate chaos, proactive local steps to make streets safer for people walking, biking, and using other mobility devices will help local

governments in Humboldt County stay ahead of future mandates which will likely come from state and federal legislatures.

1.3 THE AUTONOMOUS VEHICLE REVOLUTION

The most prevalent taxonomy of vehicular autonomy is developed and maintained by the Society of Automotive Engineers and categorizes vehicles as follows²⁹:

- Level 0: Operated by a human driver with no autonomous elements
- Level 1: Operated by a human driver with autonomous assistance systems (e.g., collision warnings, adaptive cruise control)
- Level 2: Operated primarily by an autonomous driving system with human driver fallback; human driver required for unexpected object and event response
- Level 3: Operated by an autonomous driving system with human driver fallback; autonomous system responds to unexpected objects and events, human driver required for unexpected system failures
- Level 4: Operated entirely by an autonomous driving system as long as it is operated within its “operational design domain” (e.g., a certain mapped area or specified conditions)
- Level 5: Operated entirely by an autonomous driving system, regardless of location or conditions

Much has been made of the fact that, despite numerous predictions to the contrary, “self-driving cars” are not yet widely available to consumers or deployed in American communities. Nevertheless, the SAE taxonomy clearly demonstrates that autonomous vehicles (AVs) of various sorts are already a reality. Level 1 vehicles have been commonly sold to consumers for years, and even vehicles with Level 2 capabilities are widely available. Level 3 and even Level 4



An autonomous vehicle being tested on the street in San Francisco. Photo credit: Dllu/Wikimedia Commons.

vehicles are also already on the streets in many locations, although they are not widely available to consumers and typically operate within extremely limited operational design domains. New Level 3 and 4 applications—from passenger shuttles to long-haul trucks—are being piloted all over the world and are rapidly moving toward widespread deployment.³⁰

In 2014, California adopted a regulatory framework for testing Level 3-5 AVs—that is, those

primarily or entirely operated without a human driver. By early 2020, the state had issued licenses for testing such vehicles on public roadways to 65 companies, including many of the world's biggest car manufacturers and technology companies.³¹ In other words, even though Level 3 and above AVs are not widely available for sale to consumers, they are already operating extensively in California. The extent of those operations can be illustrated by the fact that there have been more than 250 reported collisions involving vehicles in the testing program since it began in 2014, with multiple collisions reported every month since the start of 2018.³² As one team of researchers put it in 2018: "Current questions about AVs do not now revolve around whether such technologies should or should not be implemented; they are already with us."³³

Most analysts do not predict that the majority of personal vehicles will be entirely "self-driving" within a short period of time. Instead, they predict that while most vehicles of all types will be equipped with increasingly autonomous driving systems, Level 3 and 4 vehicles will become ubiquitous in certain sectors long before they take over the entire transportation system.³⁴ The question of whether or not Level 5 vehicles will ever be achieved is still a matter of some debate.^{35,36}

In recent years, experts have produced divergent but uniformly dramatic predictions for the future of AVs. Generally, these predictions fall into one of two different categories, often referred to as the utopian and dystopian models.^{37,38,39} Reviews of the academic literature indicate that both futures—or some combination of them—are plausible,⁴⁰ and that actual outcomes could be highly sensitive to decisions and policies made in the public sector.⁴¹

In the utopian prediction, AVs lead to a dramatic decline in personal vehicle ownership, and people rely on fleets of electric AVs to move them (and their goods) around. The AV fleets can be programmed to maximize routing efficiency and prioritize safety, so total vehicle miles traveled (VMT) drop precipitously, as does the collision rate. Because the fleet vehicles virtually never need to park (except to charge), a largely proportion of the vast amount of urban space currently devoted to parking can be put to more socially, economically, or environmentally productive uses. The utopian future for AVs is efficient, safe, and environmentally benign.



A Level 4 autonomous shuttle bus parked at a hospital in Europe. Photo credit: Donald Trung Quoc Don/Wikimedia Commons.

In the dystopian prediction, personal vehicle ownership levels stay high, and people merely buy AVs to replace their traditional vehicles. The cost and inconvenience of driving drops

dramatically, as people can safely work, sleep, drink alcohol, and more while moving from place to place, and people consequently drive a lot more. Sprawl increases as more people move to suburban and exurban homes, because a long commute is no longer considered so unpleasant. Long-distance freight transportation increases as the biggest cost of shipping—drivers—disappears entirely. The dystopian future for AVs is full of congestion, environmental destruction, and social dislocation.

While much about the future of AVs is unclear, the trend of increasingly autonomous driving systems is undeniable. Compared to climate chaos and the crisis of traffic violence, this autonomous vehicle revolution may be earlier in its evolution and its impacts harder to predict. But there is no doubt that it will exert a strong influence on the future of the transportation system. In fact, legal and political systems at the state and federal level are already adapting to it, generally with laws and regulations driven by the dictates of industry rather than the desires of local communities.^{42,43}

Because the outcomes are less well understood, the imperatives for transportation system change presented by the AV revolution are less clear than for climate chaos and the safety crisis. However, upon careful considerations, these imperatives are no less urgent, precisely because of the role that AVs can or will play in each of the other phenomena. There are moral, practical and economic imperatives to address the AV revolution because of its potential to exacerbate or ameliorate both climate chaos (through its influence on vehicle miles traveled, emissions and development patterns) and the safety crisis (through its influence on traffic patterns, vehicle design, street design, and legal and regulatory standards). For local communities like those on the North Coast, there is also a clear legal and political imperative to proactively change transportation systems in order to exert our priorities locally before a lax state or federal regulatory regime allows the big auto and tech companies to force their own priorities onto us.

2. STRATEGIES FOR A SUCCESSFUL FUTURE TRANSPORTATION SYSTEM

As we have seen, there are strong reasons for local communities to proactively address the phenomena that will be—and in many cases already are—shaping transportation systems both locally and globally. The causes and effects of climate chaos, the traffic safety crisis and the autonomous vehicle revolution are myriad. These are complex, overlapping, yet clearly distinct phenomena. They each pose many challenging questions for decision makers in the transportation sphere, and there is no single answer. However, there are a number of well-documented measures that local communities can take to both fulfill their responsibility to address the most pressing problems presented by these phenomena and position themselves to respond to future developments and ensure the best chances for positive outcomes. Even those measures which address only one of the three phenomena are generally compatible with planning and action for the others, when well considered. The few potential areas of conflict are relatively minor and manageable. In this section, we identify and introduce the kinds of steps local communities should be taking now in light of the looming threats and opportunities presented by climate chaos, the crisis of traffic violence, and the AV revolution.

2.1 REALLOCATE THE RIGHT OF WAY

The modern convention of devoting almost the entire public right of way of streets and roads to automobiles is a legacy of social, economic, and technological upheavals of the early twentieth century—and a concerted, sustained public relations and lobbying effort by the car industry. Prior to the turn of the twentieth century, all people generally had equal rights to roads and streets, whether they were walking, using some other means of conveyance, or in fact doing anything as long as they didn't threaten or obstruct other users of the right of way.⁴⁴ Even in the years since cars took over our streets, vehicular dominance of the right of way has often and increasingly been challenged in response to the many negative consequences of the prevailing order.⁴⁵

Chief among those negative consequences, of course, are traffic violence and climate chaos. Others include local air and water pollution, noise pollution, and social isolation. The rise of automated driving presents the newest challenge to the conception of streets as the rightful domain of cars by raising fundamental philosophical and practical questions. For example, if a human being doesn't control a vehicle on the street, does the machine itself still have a right to the road? If so, how does that right measure up to the rights of other road users like pedestrians and bicyclists?



I Street in Eureka demonstrates the priorities of a previous era of street builders, with excessive right of way devoted exclusively to vehicles. Photo credit: CRTP.

In contrast to driving, walking, biking and other forms of active transportation have many individual, societal and environmental benefits and few negative consequences. Walking has many health benefits and is recognized for its potential to dramatically improve public health.⁴⁶ Biking has a similarly positive influence on individual and public health.⁴⁷ Indirectly, public transit has similar benefits as walking and biking. Most transit riders walk to and from transit, resulting in greater overall physical activity than non-riders, and accruing all the personal and public health benefits of walking.⁴⁸

Furthermore, all forms of active transportation are inherently less risky to other road users than driving. Few if any people are injured or killed by someone else walking into them. Most people killed while biking are killed in motor vehicle collisions.⁴⁹ The number of pedestrians killed in collisions with bicycles in the United States is so low that the rate is officially estimated to be zero,⁵⁰ and the number of pedestrians injured by bikes is decreasing even as the rate of bicycling increases.⁵¹ Public transit is not only many times safer than driving for vehicle occupants, but is also significantly safer for pedestrians and bicyclists per passenger mile.^{52,53}

From the perspective of climate chaos, active transportation and transit have similar advantages over personal vehicles. While life-cycle emission assessments are notoriously difficult to perform, biking has been estimated to generate more than 90% lower greenhouse gas emissions than driving per passenger mile, and buses to generate more than 60% lower emissions per passenger mile.⁵⁴ Greenhouse gas emissions from walking are so low that reliable estimates are not available.

Active transportation also has a significant advantage in adjusting to climate impacts. Walking and biking infrastructure is much less expensive to build, repair and maintain per mile than vehicular infrastructure—for example, the median cost per mile to build a paved multi-use trail is about 13% of the minimum cost to build an undivided 2-lane road⁵⁵—not only costing less to construct initially, but also making adaptation to changing conditions more feasible.

Most of the advantages of active transportation and transit for public health, safety, and the environment will persist regardless of the level of automation of future vehicles. These modes are also much more space-efficient than individual vehicles.⁵⁶

Therefore, when planning the future allocation of street space, there is a compelling case for allocating much more space to walking, biking, and transit, and much less for individual vehicles. Today's street design decisions can direct the AVs of the future toward a productive rather than destructive role in our communities.⁵⁷

Right of way allocation decisions have real consequences for the future of the transportation system. Researchers have long recognized that adding vehicular lane-miles results in more driving, through a phenomenon called “induced demand” or “induced travel.”⁵⁸ Estimates of the extent of this effect have varied widely, but some recent statistical analyses suggest that there is a 1:1 relationship between added vehicular capacity and additional driving. In other words, induced travel results in congestion and traffic speed reverting to former levels within a relatively short period of time.⁵⁹ Furthermore, the inverse effect (sometimes called “reduced demand” or “traffic evaporation”) is also well documented: reductions in vehicular capacity result in a decrease in driving.⁶⁰ Thus, to the extent that right of way allocation decisions increase or decrease the number of vehicular lane miles in the transportation system, they will also increase or decrease the amount of driving. Allocating more right of way to non-vehicular modes is therefore a highly effective strategy for reducing greenhouse gas emissions as well as



A protected bike lane.

other health-harming emissions from transportation, and will by definition have a strong influence on the travel behavior of future AVs as well.

Induced demand for other modes is less well studied. However, it has been demonstrated that investments in public transit reduce traffic congestion and improve air quality,⁶¹ and cities with better bicycle infrastructure see higher rates of biking.^{62,63} One important element of mode choice and likely induced demand for both biking⁶⁴ and transit⁶⁵ is network completeness and design—factors that are less necessary to consider for automobiles in modern car-centric American communities. Induced travel by foot is not well studied, but is probably influenced by similar factors as bicycle travel.

Thus, replacing right of way designated for cars and trucks with right of way designated and designed for pedestrians, bicyclists and transit is likely to result in transportation mode shifts. This shift to greater levels of walking and biking has important implications for the crisis of traffic violence: There is a very strong and consistent inverse correlation between the number of people who walk or bike in a given area and the risk of being hit by a motor vehicle (the “safety in numbers” effect).⁶⁶ If reallocating right of way reduces vehicular lane width or road width, it is also likely to reduce the severity of crashes that do occur, as a result of the well-documented relationships between lane width⁶⁷ and road width⁶⁸ and driving speed.



A shared street or "woonerf." Photo credit: Eric Fischer/Wikimedia Commons.

Reprioritizing rights of way in our local communities will simultaneously address climate chaos and the traffic safety crisis, and help prepare for increasing safe vehicular automation. Humboldt County is large and mostly rural, so there will always be an important role for individual vehicles which allow for greater range, flexibility and per-passenger load capacity than active transportation or transit. However, the majority of county residents (approximately 70% according to 2018 Census tract estimates) live in relatively dense communities near Humboldt Bay, where there are many opportunities for reprioritizing the right of way. This means transforming some on-street parking and vehicle travel lanes into a combination of wider sidewalks, protected bike lanes, and bus-only lanes, as well as pedestrian- and bike-friendly landscaping, street furniture and parklets. It may also mean converting some streets to

pedestrian-only areas or “shared streets”—which allow vehicles but prioritize pedestrian movement.⁶⁹

2.1.1 WHAT WE'RE ALREADY DOING

Most local government agencies in Humboldt County have adopted General Plans and other documents which officially recognize many of the benefits of active transportation and transit and call for improved infrastructure to support these modes. Additionally, the adopted Regional Transportation Plan for Humboldt County discusses the benefits at some length and calls for “complete streets” and a “balanced transportation system.”⁷⁰

Most of the bicycle, pedestrian and transit projects proposed, planned and constructed by local agencies involve adding new adjacent or separated facilities, rather than reprioritizing the already developed right-of-way. However, to the extent that the current system is out of balance by virtue of devoting too much space to private automobiles, and rebalancing requires reallocating some of that space to pedestrians, bicyclists, and public transit, the Regional Transportation Plan can be seen as calling for reprioritization of the right of way. Indeed, some of the projects in the Plan, and some other projects completed by local agencies in recent years, have reallocated some vehicular street space—generally for new bike lanes.



Bike and pedestrian lanes on asphalt.
Photo credit: Kenneth C.
Zirkel/Wikimedia Commons.

2.1.2 WHAT WE NEED TO START DOING

Local government agencies in Humboldt County need to perform comprehensive assessments of the pedestrian, bicycle and transit networks in each community, identifying both gaps and inadequate infrastructure. Research suggests that complete and effective networks are necessary to encourage residents to choose these modes.^{71,72} Piecemeal

development of network elements (a bike lane here, a sidewalk there) has been the standard approach for many years in most jurisdictions, but this approach is slow, expensive, and unlikely to maximize mode shift effects. Therefore, rapid implementation of complete networks has become the gold standard for bicycle infrastructure improvements.⁷³

Humboldt County’s communities need to embrace rapid implementation and extend it to pedestrian infrastructure and transit systems as well as bicycles, planning and implementing complete network build-outs in the immediate future. Network design must ensure easy access and use by people with disabilities.⁷⁴ Rapid implementation typically uses less permanent materials which allow easier modification and is therefore less expensive than

piecemeal development, but it will require more one-time funding than is traditionally available for active transportation and transit projects locally. Therefore, it will require a shift in traditional funding practices. Notably, local agencies will have to rely less on competitive state grant funding from the Active Transportation Program, and will instead have to dedicate



A transit-only lane. Photo credit: Tdorante10/Wikimedia Commons.

significant funding from other programs traditionally used to support vehicular infrastructure projects. On the state highway system, Caltrans will likely need to dedicate funding from the State Highway Operation and Protection Program (SHOPP) and the State Transportation Improvement Program (STIP). Local agencies will have to dedicate more unconstrained local and state revenues to these projects, including all Local Transportation Funds.

Local agencies should consider the extremely important role of rapid network implementation in improving public safety when judging the applicability of funding sources focused on safety, including Measure Z.

Network buildout should follow accepted best practices for pedestrian, bicycle and transit infrastructure established by the National Association of City Transportation Officials (NACTO).⁷⁵ Two specific network improvements in Humboldt County communities are important enough to merit specific mention:

- Establish transit-only lanes on Highway 101 in Eureka (4th Street, 5th Street and Broadway) and possibly on Central Avenue in McKinleyville. There are currently no dedicated transit lanes in the county. Most areas of the county have sparse traffic, and the lack of dedicated transit lanes has no effect on route scheduling or on-time performance. However, the above-referenced streets are critical transit linkages and often experience heavy vehicular traffic and delays, particularly on Broadway.
- Widen sidewalks, remove obstacles, and fill in gaps in Arcata and McKinleyville. Of the county's major population centers, Eureka has a generally adequate sidewalk network. However, sidewalks in Arcata are generally very narrow and full of obstructions, preventing easy pedestrian passage and often completely blocking passage for people using wheelchairs, strollers and other devices. McKinleyville's sidewalk network suffers from many of the same problems, as well as large areas which lack sidewalks entirely. Sidewalks should have a minimum 6 feet of clear path to function effectively.⁷⁶ Generally, designing the pedestrian system to ensure access for people with disabilities ("universal design") also ensures a high-functioning system for the public at large.⁷⁷



A narrow, obstructed sidewalk in Arcata. Photo credit: CRTP.

2.1.3 WHAT WE NEED TO CHANGE

In recent years, the bulk of local efforts to improve bicycle and pedestrian infrastructure in Humboldt County have focused on improving local and regional trail systems. These efforts have resulted in enormous improvements to bicycle and pedestrian networks. However, these improvements have come at significant financial cost, some localized environmental impacts, and have taken many years—even decades—to accomplish.

While local agencies must not abandon the regional trail system, they need to place greater future emphasis on the reallocation of space in existing paved rights of way. Such reallocations have multiple benefits, most notably: they are far less expensive than projects which require constructing entirely new infrastructure,⁷⁸ they are less environmentally damaging, and by reducing vehicular capacity while increasing pedestrian, bicycle or transit capacity they have the potential to significantly increase the mode shift impact.

This shift in focus from building separate active transportation infrastructure to reallocating the paved right of way will require a concurrent shift in vehicular traffic management priorities. Specifically, local agencies will have to abandon the use of vehicular level of service (LOS) as a management tool and vehicular throughput and speed as management goals. All vehicular capacity-increasing projects, which have the effect of inducing additional vehicular travel, need to be removed from the SHOPP, the STIP, and the Regional Transportation Plan. In addition to a major cultural shift, this will require amending most local General Plans and the county's Regional Transportation Plan.⁷⁹

Strategy 1: Reallocate the Right of Way

<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Acknowledging benefits of mode shift in plans ○ Reallocating limited vehicular right of way for bike lanes 	<ul style="list-style-type: none"> ○ Rapid implementation of complete bike, pedestrian and transit networks in all communities ○ Use all available funding sources ○ Transit-only lanes in Eureka and McKinleyville ○ Sidewalk improvements in Arcata and McKinleyville 	<ul style="list-style-type: none"> ○ Shift focus away from separate bike and pedestrian infrastructure and toward reallocation of paved right of way ○ Abandon congestion management as a policy goal

2.2 ALIGN INCENTIVES WITH THE PUBLIC GOOD

As discussed at length above, shifting travel away from individual vehicles and toward walking, biking and transit is one of the keys to begin addressing climate chaos, the crisis of traffic violence, and the automation revolution. However, current transportation and land use management practices create many incentives for driving and disincentives for walking, biking, or taking the bus. One of the primary incentives to drive is the speed of car travel. Cars travel faster because of our construction of road networks with ever-greater vehicular capacity over the past century—the mechanism that results in induced demand.⁸⁰ Conversely, the lack of adequate bicycle, pedestrian and transit networks presents a severe disincentive for use of these modes.⁸¹

This induced demand incentive—the creation of a speedy and convenient national system of roadways and vehicles—is based upon massive public subsidies. The construction and maintenance of the U.S. road network has never been paid for entirely by drivers, but rather has required the use of hundreds of billions of dollars in other governmental funds.⁸² The fossil fuels which power most vehicles (and produce most of the electricity that powers the rest) receive additional billions in annual subsidies.⁸³ Many other, often overlooked, subsidies for cars and driving are hidden throughout federal, state and local legal codes.⁸⁴ These significant subsidies help explain the prevalence of the automobile in most American communities, despite the fact that owning and driving a personal vehicle is extremely expensive, generally costing between \$10,000 and \$19,000 per year.⁸⁵



Modern programmable parking meters in Boston. Photo credit: matthewreid/Wikimedia Commons.

Most of the subsidies for driving derive from decisions made at the federal and state government level. However, local governments also contribute significantly to driving incentives. Many strategies are available to local agencies in Humboldt County for realigning these incentives. These strategies generally fall into three categories: (1) Rewriting land use regulations so that new development is no longer required to be designed primarily for cars; (2) Managing and pricing street space (primarily curbs and

public parking lots) appropriately; (3) Creating new incentives to use other modes of

transportation in order to at least partially offset the driving subsidies built in by state and federal law and decades of infrastructure investment decisions.

Perhaps the most salient area of local government jurisdiction for realigning transportation incentives is private vehicle storage, or parking. Every local government in Humboldt County has regulations in effect which require new development to provide abundant free parking. Although such requirements are justified as necessary in order to serve existing demand from drivers, research demonstrates that in fact abundant parking is what causes more people to drive.⁸⁶ The fact that in Humboldt County the vast majority of public parking is free for drivers (although not for local governments which must construct and maintain the facilities) further enhances the incentive to drive a private vehicle. Changing parking regulations and charging market rates for public parking spaces would be transformative steps toward realigning local transportation incentives.

2.2.1 WHAT WE'RE ALREADY DOING

Several local jurisdictions in Humboldt County have made some progress toward reducing requirements for vehicular parking for new development. Eureka has exempted several kinds of development from minimum parking standards and allows any new development to reduce required vehicular parking for various reasons, including proximity to public transit and to high-quality bicycle facilities.⁸⁷ Eureka has also piloted a highly successful parklet program, which allows local businesses to convert on-street parking spaces into more vibrant and productive uses.

Arcata officially discourages excessive parking and has maximum as well as minimum parking requirements,⁸⁸ although in practice these provisions have had minimal effect. More significantly, Arcata no longer requires off-street parking at all for most development in the Central Commercial district.⁸⁹ Humboldt County's Board of Supervisors has adopted an ordinance which will allow the possibility of reducing required parking in mixed-use zones only by up to 50%.⁹⁰



The expansive parking lot at the McKinleyville Shopping Center. Photo credit: CRTP.

Local jurisdictions have also made some progress toward requiring bicycle parking for new development. Eureka requires new residential and commercial development to provide bicycle parking, although at a rate of only 5%-30% of required vehicular parking.⁹¹ Arcata requires all new development to provide bicycle parking at 50%-100% of required vehicular parking.⁹²

Local governments have also recently initiated some efforts toward employers and landlords providing incentives to use active transportation and transit. Perhaps most notably, Arcata is working with the developer of the Isackson's Affordable Housing Project in Arcata to ensure that future tenants are provided with free bus passes, as well as various bicycle and pedestrian amenities.⁹³ Humboldt County, Eureka, Arcata, and other local jurisdictions are also in the process of developing a program with the Humboldt Transit Authority (HTA) to offer free bus passes to their respective employees.

The cities of Eureka and Arcata have each adopted official goals of encouraging infill development, which will result in a more compact human landscape and therefore more walking, biking and transit use.⁹⁴ Arcata also has a well-established Transit Center in its downtown area which facilitates transfers between transit lines and between active transportation and transit.

There is also a small proportion of local public parking which is not completely free to drivers. Arcata charges for parking on a few blocks near the Humboldt State University campus, and Eureka charges in some locations near the county courthouse.

Finally, there are ongoing local efforts to improve the local transit system in ways that will incentivize more travel by transit. HTA is investigating how to redraw Eureka's bus routes to make them more direct and convenient.⁹⁵ The Humboldt County Association of Governments is considering whether to recommend the elimination of low-ridership detours from the Redwood Transit System for the same purpose, while ensuring continuing coverage of these areas with mobility-on-demand services.⁹⁶



Loaded bike racks at the
Arcata Plaza. Photo credit:
CRTP.

2.2.2 WHAT WE NEED TO START DOING

Humboldt County needs a comprehensive program to support and encourage landlords and employers to implement incentives for non-vehicular travel and other transportation demand management (TDM) policies and practices. As noted above, some of these practices are already being implemented on an ad hoc basis. However, to maximize effectiveness, a TDM/incentive program should have the following characteristics:

- It should contain strong incentives or requirements for both existing and future employers and landlords to implement effective measures. The rate of new construction in Humboldt County is not rapid enough to justify only applying such practices to future development. For example, only 116 multifamily housing units were constructed in the unincorporated areas of the county during the 5-year period from 2014-2018.⁹⁷
- It should be multi-jurisdictional, covering the entire county. Employment, services and housing are not distributed evenly among local jurisdictions, so many Humboldt County residents travel between jurisdictions on a daily basis. For example, 45% of countywide taxable sales are in Eureka, while only 20% of the population lives in that city.⁹⁸ Additionally, the HTA service area covers the entire county, so coordination with transit is most efficient on a countywide basis.
- It should include a range of measures applicable to the various residential and employment contexts found in the county.
- It should incentivize or require employers and landlords to implement both incentives to use active transportation or transit (e.g., free bus passes) and disincentives to drive (e.g., paying for parking). The most effective TDM programs include not only incentives but also disincentives.^{99,100,101}



A rendering of the planned Isaackson Affordable Housing Project in downtown Arcata.
Credit: City of Arcata.

Local governments should also begin reforming their curb management regimes in more densely developed areas such as downtown Eureka and Arcata. Eureka should expand its parklet program, and Arcata should start its own. The cities should also begin slowly transitioning on-street parking spaces to uses such as bike corrals, expanded bus stops, and loading/unloading zones for passengers and freight. A move away from ubiquitous on-street parking,

while still providing accessible loading zones for both freight and passengers (including those with limited mobility), will help direct us toward the fleet-based (utopian) AV future, rather than the privately owned (dystopian) future.¹⁰²

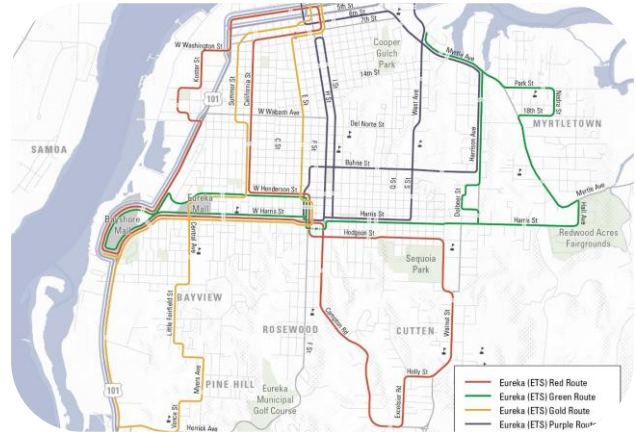
Finally, local governments must dramatically increase the quality and availability of bike parking. Just as the ubiquity of free car parking encourages driving, an abundance of free, convenient, and high-quality bike parking should encourage bicycling. There should be at least one bicycle corral per block in commercial areas, as well as both short- and long-term secure bike parking for all residents and employees at multifamily housing complexes and employment sites. Bicycle parking should be weather-protected and designed to accommodate all styles of bicycle, including bikes with trailers. Finally, local governments must abandon the common practice of placing public bike parking on sidewalks, causing bicyclists and pedestrians to compete for limited space. Instead, bike parking should replace car parking on the street.

2.2.3 WHAT WE NEED TO CHANGE

The Redwood Transit System, Eureka Transit System, and Arcata-Mad River Transit System have relatively high ridership for rural and small-town American transit systems.¹⁰³ However, they are not effective enough to convince a large portion of the local population to use them: only about 2% of Humboldt County residents commute by bus.¹⁰⁴ The Humboldt County public transit system needs reform and a significant financial investment to increase its mode share. Specifically, local jurisdictions including the Humboldt Transit Authority should:

- Eliminate fares to make all local transit free to riders, and identify or create an alternative local funding source to replace farebox revenue. Going fare-free is virtually guaranteed to result in a significant increase in ridership,¹⁰⁵ and the cost to taxpayers is negligible compared to the ongoing costs of subsidizing driving.

- Increase the frequency of all routes at all hours. Frequency of service consistently ranks among the most important determining factors for transit ridership.¹⁰⁶
- Redesign routes to increase directness and reduce travel time. Systems in Eureka and Arcata currently travel inefficient one-way loop routes, which favor coverage over ridership.¹⁰⁷ Similarly, the Redwood Transit System route includes some low-ridership diversions, such as Manila and the McKinleyville airport. These routes can be re-drawn to serve the vast majority of potential users more conveniently, while continuing to serve low-ridership areas with mobility-on-demand connecting services.¹⁰⁸
- Integrate all local transit systems (including the Arcata-Mad River Transit System), provide consistent branding and information, and invest heavily in comfortable and attractive bus stops.¹⁰⁹ Additionally, create transit hubs in Eureka, McKinleyville, and Fortuna that allow for convenient access to first- and last-mile solutions including walking, biking, shared micro-mobility services, and other current and future forms of mobility-on-demand. (This includes free and secure storage for bicycles and possibly other micromobility devices.) These kinds of “service quality” variables—which add up to convenience, comfort, and reliability—have been found in many studies to exert a very strong influence on the choice to use transit or not.¹¹⁰



Current Eureka bus routes. Credit: Fehr & Peers/Redwood Community Action Agency.

Local governments also need to tackle the issue of car parking, often the third rail of local politics. Free public car parking needs to be mostly or entirely eliminated from central business districts and other densely developed areas. As discussed above, much of the space currently dedicated to private car storage in the public right of way can be put to a variety of more productive uses. Parking spaces which remain should be metered or designated for use by people with disabilities.

For the small amount of parking in Humboldt County which is currently metered, charges are set too low for peak demand hours, as evidenced by the fact that the metered spaces are often full during these hours. Pursuant to best practices for pricing parking, charges should vary with variable demand, and should be set at levels which ensure that 1-2 parking spaces are available on any given block at any given time. This comes very close to meeting the market price for parking, while ensuring sufficient availability to eliminate the phenomenon of “cruising for parking.”¹¹¹ To ensure that such a program does not disproportionately or unfairly impact

lower-income road users, all revenues from parking charges should be dedicated to improving local public transit systems.

Local governments must also eliminate minimum parking requirements for all new development, and instead establish parking maximums. Unlike Arcata's current parking maximums, these new parking maximums must be set below the standard level of parking provided for new development over the last several decades. Only then will the new rules provide a disincentive for car ownership and driving.

Finally, local governments must eliminate traditional Euclidian zoning, which results in a separation of land uses, and modify zoning standards such as setbacks, floor area ratios, and height limits which reduce possible density in currently developed areas. Local governments should move to form-based codes and allow a mixture of uses in all areas. Both density and land use mix are strongly associated with transportation mode choice.^{112,113}

Strategy 2: Realign Incentives with the Public Good		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> ○ Limited reform of car parking requirements ○ Some requirements for bicycle parking ○ Ad hoc employee and tenant incentives ○ Official policies promoting infill development ○ Small amount of metered parking ○ Efforts to improve transit routes 	<ul style="list-style-type: none"> ○ Comprehensive and systematic program of employee and tenant incentives ○ Transition curb space toward active transportation, loading and commerce ○ Dramatically increase availability and quality of bicycle parking 	<ul style="list-style-type: none"> ○ Make transit fare-free ○ Increase frequency of transit ○ Redesign transit routes ○ Integrate all transit systems & improve service quality ○ Add transit hubs with convenient first/last mile mobility options ○ Charge market rates for parking ○ Eliminate minimum parking requirements and establish maximums ○ Switch from Euclidean zoning (separated uses)

		to form-based, mixed-use zoning
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2.3 SLOW DOWN

Higher vehicular speeds are closely correlated with greater risk of severe injury and death when a vehicle collides with a pedestrian¹¹⁴ or a bicyclist.¹¹⁵ High speeds also increase greenhouse gas emissions.¹¹⁶ Thus, it is clear that local governments should take steps to reduce speeds on local streets and roads.

Unfortunately, California law makes it very difficult to lower speed limits.¹¹⁷ However, many other tools to lower travel speeds are still available. Modifications to road design and other physical and technological interventions can be at least as effective as speed limits at controlling the speed of traffic.¹¹⁸ Road design interventions—many of which fall under the category of “traffic calming”—can have the added benefit of controlling the possible driving “behavior” of future AVs.¹¹⁹ Local governments must make current drivers and future AVs adapt to our communities, rather than the other way around.



A corner curb extension to slow turning vehicles and reduce pedestrian crossing distance. Photo credit: Richard Drdul/Wikimedia Commons.



Chicanes to slow vehicular speeds. Photo credit: Richard Drdul/Wikimedia Commons.

2.3.1 WHAT WE'RE ALREADY DOING

Local agencies in Humboldt County have implemented many traffic calming projects over the last decade or two. However, no systematic program for reducing vehicular speeds exists locally.

2.3.2 WHAT WE NEED TO START DOING

Local agencies need to adopt a policy of reducing vehicle speeds wherever possible, along with a set of stringent, context-sensitive design

standards for engineering interventions to reduce speeds. These standards must be research-based and distinguish between the needs of different locations and facility types—particularly between rural and in-town locations.

To ensure effective implementation, local agencies must also adopt a policy of incorporating these standards into any repair or major maintenance project.



Mid-block curb extensions or "bulb-outs" to reduce vehicular speed and pedestrian crossing distance. Photo credit: Richard Drdul/Wikimedia Commons.

2.3.3 WHAT WE NEED TO CHANGE

Local agencies must abandon the outdated management paradigm that prioritizes rapid movement of vehicles on public rights of way, particularly within towns and cities. Specifically, as noted above, local agencies must abandon the use of vehicular LOS as a management tool.

Strategy 3: Slow Down		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none"> Some traffic calming projects 	<ul style="list-style-type: none"> Adopt and implement a comprehensive, context-dependent policy of slowing vehicular travel speeds 	<ul style="list-style-type: none"> Abandon travel speed and congestion relief as management goals

2.4 PUT TECHNOLOGY TO WORK FOR EVERYONE

Technology is changing rapidly in the transportation sphere. This is true not just in automation and other onboard vehicle technology, but also in the technology of transportation infrastructure. It is incumbent on local agencies to ensure that new technologies are implemented in ways that improve safety, reliability and convenience for walking, biking and transit, and that onboard technologies in private vehicles do not threaten those qualities of our communities. Local agencies must also adopt available technologies to reduce the climate impacts of vehicular transportation, including supporting vehicular electrification.

2.4.1 WHAT WE'RE ALREADY DOING

Electric pedal-assist bicycles (e-bikes) produce only marginally more life-cycle greenhouse gas emissions than regular bicycles¹²⁰ but can empower people with certain health conditions and disabilities to ride and dramatically and extend the bicycling range of many other people. Therefore, they could play an important role in replacing car trips between communities and trips involving steep slopes in Humboldt County. The Redwood Coast Energy Authority (RCEA) created a pilot program of rebates for private purchases of e-bikes in 2020. The available rebates were all reserved within one month of the start of the program.¹²¹



Humboldt Transit Authority's electric bus. Photo credit: Schatz Energy Research Center.

Jurisdictions throughout the county have installed some vehicle activated signs which provide public feedback to drivers on their speed. Research indicates that these signs can be effective in reducing speeds and related collisions.¹²²

HTA has purchased and put into operation an electric bus, and has begun planning for a transition to a fully electrified bus fleet, including the necessary network of charging

stations. RCEA has an active program of promoting and planning for general vehicle electrification, including building and maintaining public charging stations.¹²³

2.4.2 WHAT WE NEED TO START DOING

Local agencies need to ensure that they have robust plans in place for integrating new technologies as they become available and affordable. The most important technology types

for which local agencies need to start planning now include fleet automation and vehicle-to-infrastructure and vehicle-to-vehicle communication technologies. The latter category includes developing and currently available technologies which allow vehicles to detect and avoid other vehicles, allow traffic signals to detect vehicles and adjust their operation accordingly, allow curbs to detect vehicles and regulate and charge for curb access, and allow streets to detect AVs and manage speeds and other operating parameters.¹²⁴

- Local agencies must plan for the use of new vehicle-to-infrastructure and vehicle-to-vehicle technologies to improve transit speed, reliability, and service quality.
- Local agencies must plan for the use of new vehicle-to-infrastructure communication to improve safety for people walking, biking and using other micromobility devices.
- Local agencies must plan for the use of vehicle-to-infrastructure communication in central business districts to dynamically manage curb access and pricing in real time.
- Local agencies must plan for the eventual replacement of buses with automated transit vehicles, as those vehicles become safer, more comfortable and more efficient than driver-controlled vehicles. This planning must include retraining current employees to minimize worker displacement.
- Local agencies must plan for the infrastructure necessary to incorporate fleets of smaller AVs into the public transit system. Such infrastructure may include new vehicle charging, staging and support facilities.¹²⁵



A vehicle-activated feedback sign. Photo credit: Richard Drdul/Wikimedia Commons.

Support for e-bikes also needs to continue and expand, including creating a permanent and fully funded e-bike rebate program.

Finally, local governments need to invest heavily in transit electrification to allow HTA to rapidly implement its electrification plans. RCEA should continue its ongoing efforts to support general vehicular electrification in the county.

2.4.3 WHAT WE NEED TO CHANGE

Local agencies need to reform current signalized intersections within their jurisdictions, using currently available technology to prioritize pedestrians, bicyclists, and buses over private vehicles:

- Install transit-priority signals on all major bus routes.
- At busy intersections, either program signals for bicycle and pedestrian leading intervals or install bicycle and pedestrian priority signals or all-way pedestrian “scrambles.”
- Program all pedestrian signals to provide sufficient time for older pedestrians and pedestrians with disabilities to safely cross the street.
- Eliminate pedestrian actuated signals (“beg buttons”) in favor of automatic pedestrian signals which more fully and safely integrate pedestrians into the traffic management system.¹²⁶



A pedestrian traffic signal. Photo credit: NordhornerII/Wikimedia Commons.

Strategy 4: Put Technology to Work for Everyone

<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none">○ Pilot e-bike rebate program○ Vehicle activated speed signs○ First steps of transit fleet electrification	<ul style="list-style-type: none">○ Write robust plans to ensure that vehicle-to-vehicle, vehicle-to-infrastructure, and automation technologies support transit, walking and biking○ Create a permanent and fully funded e-bike rebate○ Fully fund transit electrification	<ul style="list-style-type: none">○ Reform signalized intersections to prioritize pedestrians, bicyclists and buses

2.5 PROACTIVE, EQUITY-FOCUSED POLICYMAKING

If local communities are to be successful in tackling the challenges of climate chaos, the traffic violence crisis, and the automation revolution, the government agencies which act on their behalf must proactively draft policies and build infrastructure which reflects community priorities. Without action now, we will be stuck reacting to or even defending ourselves from choices made in Silicon Valley, Wall Street, Sacramento and Washington, DC.

Proactive policymaking should be based largely on the following principles:

- **Ensure transportation equity.** People of color, seniors, people in low-income communities, and people with disabilities all face greater risks of traffic violence than the population as a whole.^{127,128} Far fewer women than men currently commute by foot, by bike, or by transit in Humboldt County, suggesting that women find these modes less safe, convenient or accessible.¹²⁹ Climate chaos will have increasingly disparate impacts on already disadvantaged communities.¹³⁰ Early AV technologies have demonstrated a troubling lack of detection sensitivity for people of color.¹³¹ Planning efforts to address traffic violence, climate chaos and automation must put race, gender, disability and class equity front and center to ensure that current inequities are addressed and not perpetuated.
- **Prepare now for what we know is coming.** Many communities in coastal Humboldt County will be significantly affected by sea level rise.¹³² Many communities in inland areas will be impacted by increased wildfire.¹³³ Vehicular automation is steadily increasing year after year.¹³⁴ These trends are clear and well documented. In order to adapt proactively, local communities must identify the already-developed areas least susceptible to sea level rise and wildfire and prepare long-term plans for consolidating and densifying walkable, bikeable, transit-friendly development in these areas.
- **Make drivers—and future AVs—adapt to our communities, instead of the other way around.** The last time local communities in the US tried to adapt to a transformative new transportation technology, that technology was the car. The results included the destruction of historic communities to make way for urban freeways, the dismantling of public transportation systems, and the development of suburban sprawl which paved over vast areas of agricultural and wild lands. We cannot afford to make the same kind of mistakes by failing to take proactive measures to address climate chaos, the safety crisis, and the AV revolution.

2.5.1 WHAT WE'RE ALREADY DOING

"Equity for underserved populations" is included as part of one objectives of the county's current Regional Transportation Plan, and the Plan also includes some benchmarks related to investment in "environmental justice tracts."¹³⁵

Arcata is in the process of developing a comprehensive sea level rise policy,¹³⁶ and Humboldt County, the City of Eureka, the Humboldt County Association of Governments, and Caltrans District 1 are pursuing sea level rise planning for transportation infrastructure on one part of the Humboldt Bay shoreline.¹³⁷ There have been other scattered efforts over the last decade to address specific dimensions of the problem.

The Humboldt County Association of Governments is conducting proactive planning for new mobility-on-demand technologies.¹³⁸

2.5.2 WHAT WE NEED TO START DOING

Local agencies must adopt policies which require them to consider every decision in light of its equity impacts. This includes both explicit equity impacts along lines of race, gender, ability, and income, as well as indirect impacts such as those related to geography or mode of transportation.^{139,140} Specifically, local agencies should use the revenue collected from charging for parking (see Section 2.2) to support transit.¹⁴¹ It may be advisable for some local agencies to initially issue bonds backed by future parking revenue to ensure that transit operation are improved before the new parking charges go into effect.

Rather than merely inviting participation, local agencies should create structures which allow disadvantaged communities to lead planning processes which will impact them directly. Agencies should also examine their own internal procedures including hiring and promotion to ensure that equity is promoted at all levels.

In addition to equity, local agencies need to put sea level rise, wildfire and other climate trends at the center of their land use and transportation planning. To date, Arcata is the only local jurisdiction attempting to comprehensively address sea level rise, and no local jurisdiction has seriously addressed wildfire in transportation and land use planning. All local jurisdictions must make hard choices about which areas can be reasonably defended, and which must be subject to planned retreat. Regulatory and funding mechanisms must be created to enable and incentivize property owners in threatened outlying areas to move into towns and other developed areas, while protecting the rights of vulnerable and disadvantaged communities.



A 2016 King Tide in King Salmon is a warning of the coming impacts of sea level rise. Photo credit: Melissa Adams via Humboldt Baykeeper.

Proactive policymaking for transportation automation and other technological trends is addressed in Section 2.4.

2.5.3 WHAT WE NEED TO CHANGE

Transportation equity can no longer be relegated to a minor consideration or a box to check to ensure eligibility for state or federal funding. The impacts of the crisis of traffic violence, climate chaos, and transportation automation are not equitably distributed, so in responding to them it is especially critical to ensure that our responses promote equity rather than perpetuating a legacy of inequities. Streets should be designed for universal access, rather than simply meeting minimum legal standards for people with disabilities.¹⁴²

Local jurisdictions also need to stop allowing new development in areas threatened by sea level rise and high risk of wildfire, and stop allowing sprawling development anywhere. Recent decisions by the County to allow residential development by right on remote resource lands are a step in the wrong direction. The twentieth century style of car-oriented development has been a major contributing factor to climate chaos and the traffic violence crisis, and now its fragility is being revealed by the impacts of these phenomena. If we allow this style of development to continue, the automation revolution holds the potential to magnify those impacts.

Strategy 5: Proactive, Equity-Focused Policymaking		
<i>What We're Already Doing</i>	<i>What We Need to Start Doing</i>	<i>What We Need to Change</i>
<ul style="list-style-type: none">○ Limited inclusion of equity in planning documents○ Some sea level rise planning○ Mobility on demand planning	<ul style="list-style-type: none">○ Adopt robust equity policies○ Allow disadvantaged and vulnerable communities to lead planning processes○ Adopt comprehensive and realistic sea level rise and wildfire plans○ Consolidate development	<ul style="list-style-type: none">○ Take equity seriously○ Discontinue old sprawling development style○ Adopt universal design rather than minimum legal accessibility standards

2.6 CONCLUSIONS

In this report, we have laid out the key features of the three phenomena which will dominate the future of the transportation system in Humboldt County—climate chaos, the crisis of traffic violence, and the automation revolution—as well as how local communities can effectively tackle these phenomena if they act now. However, this report is clearly not comprehensive in nature. It was not our intent to document these phenomena or their implications completely. Rather, we intended to highlight the most important issues and challenges and recommend actions to address them, based on well-established bodies of evidence.

The agencies in charge of transportation and land use planning in Humboldt County are well aware of most of the issues and phenomena described in this report. As we have documented, there have already been attempts to address some of the most outstanding issues directly. And yet, despite being destined to dominate the future planning landscape, the three phenomena at the center of this report receive relatively little attention from many of these agencies. We speculate that there are many reasons for this disconnect, including inadequate resources for planning and infrastructure, long planning horizons (such that projects built today were often conceived decades ago), and professional cultures which are slow to change.

Whatever the reasons for the current situation, this report makes clear that it would be wise for local agencies to put these three phenomena at the center of their planning and construction agendas from this point forward. This will clearly not be easy. There will be significant challenges in the financial, political, and technical arenas. Yet failure to act now will incur much greater costs in the years to come.

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