From: webmaster@bendoregon.gov [mailto:webmaster@bendoregon.gov]
Sent: Thursday, May 31, 2018 8:15 AM
To: CommunicationsShared <communications@bendoregon.gov>
Subject: walking/bike bridge

Message submitted from the <City of Bend> website.

Site Visitor Name: Judy Stoltz
Site Visitor Email: kjsoregon@gmail.com

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From: Dan Packman [mailto:packmandv@gmail.com]
Sent: Wednesday, June 27, 2018 2:53 PM
To: CommunicationsShared <communications@bendoregon.gov>
Cc: peter@wernerattorney.com
Subject: Traffic safety

Agenda item for the july 19 CTAC mtg. Police rarely enforce the no cell phone law, really useless. Soo many ignorant distracted drivers.

A friend in mich got state funds to make these signs. Local bike club installed them all over town.
Bend needs these, with a cell phone image crossed out too.
Popular in France.


9 km
JE DÉPASSE
1,50 m

MOTORISTS
5
FEET
ON ANY STREET
LOCAL ORDINANCE
#16-13

GIVE THEM 5-KEEP THEM ALIVE

Paid for by the DALMAC Fund

SHARE OUR ROADS

Kalamazoo Bicycle Club

From: Daniel Kennedy [mailto:pcguru.oregon@hotmail.com]
Sent: Thursday, June 7, 2018 11:39 AM
To: Jovita Anderson <janderson@bendoregon.gov>; Nick Arnis <narnis@bendoregon.gov>
Cc: stories@KTVZ.COM; CommunicationsShared <communications@bendoregon.gov>
Subject: Why should Bend, Oregonians, bother?

Dear TSP Committee, City of Bend, et. al.,

Many eons ago, I was an interim council position applicant and when asked about the decisions the current council had made that I thought needed the most work, I said: traffic planning. I specifically referenced the single lane round-a-bout at Reed Market that has SINCE been a problem. The council did NOT like my answer then and has done nothing to fix this, since.

Years later, during the Reed Market / train crossing proposals, I submitted a plan that was within the $31 million dollar budget for a bridge. Later on, it was announced on the radio that the $31 million that HAD ALREADY BEEN LEVERAGED against the taxpayers couldn't go to a bridge because a bridge was too expensive (quoting over $100 million???; which was a hijacked price by a BAD vendor). Now, Reed Market still backs up during train crossings (and it only cost us $30+ million)

In between then, I have made recommendations for additional proposals - and all for naught. No one is fixing the Brentwood to American Lane, unfinished "dirt road". No one is fixing the Purcell single lane "unfinished" road near NE Victor place. And, while Reed Market just got repaved for seemingly NO REASON - other roads, like Brookswood and SE Bridgeford, suffer from massive, car-damaging potholes and unfinished cut-outs. No one listened when some of us proposed a bus / city transit plan that included cutting out portions of sidewalks for an "off-street" bus stop - and now the buses stop in the MIDDLE of the street (in most cases) which is both ridiculous and dangerous.

Traffic and road planning in this town has a shameful history. The downtown parking meter suggestion was beyond ludicrous as it would only serve to hurt the citizens and businesses while doing NOTHING to reduce traffic and MASSIVELY increasing "policing" costs to the city (and taxpayers). The "bicyclers" in town that want to own the roadways that everyone else is paying for don't want cars on the roadways and seem to be the ones complaining the most - but they are NOT the majority. The lack of budget during harsh winter times has been astoundingly irresponsible. I know we have new council members - but as new members - they adopted these problems and it is time for change.

Honestly, given historical experience, I have no reason to believe that the Council or TSP committee will read this or care. Our council develops a "seemingly" non-public-serving agenda (that feels as though it is based on special interest and big business; and we can get into the Dairy Queen influence over the Highway 97 turn-offs if needed), and no longer listens to the REAL people who live here! Why should ANY of us who have lived here for over 20 years bother going to the meetings when NO ONE listens to us, or the ONLY suggestions you'll accept are based on decisions YOU have already pre-made (and oft times, some of them are really bad!).

Reed Market: backed up from one end to the other. Greenwood: congested. 3rd and Reed Market: constantly congested. Neff at Purcell: frequently / dangerously backed up. And, we're

not just talking about ruining people's gas mileage, hurting the economy, or making life hard on the citizens (beyond the stupid, ever-increasing property taxes) - we are talking about 911 emergency services that are NOT being served. But, there are solutions.

Downtown Bend has multiple locations that can be converted into car garages - MULTIPLE. Those garages can be pay or free (and see Portland for "responsible" car garage parking prices ranging from free to very low cost that makes attending special events / being a tourist, local or not, attractive). The East-to-West corridors can be expanded and improved (there IS room). The downtown parking needs no adjustment, just a car garage (or two) - period. And, for what it just cost to "refinish" Reed Market, you could have potentially fixed 3 - 4 "dirt" / unfinished road sections in town that are receiving ever-increasing usage, filled in a LOT of wheel and axle-damaging pot holes, and still had a budget for winter.

Furthermore, the planning / schedule of road repairs in this town is HORRIBLE. While doing work on the West-side, such as Century Drive, suddenly work is done along Reed Market, and passage from the North to South on the West side of town is severely hampered? Why? The work along the 27th street corridor and Reed Market Lane was spanned out so long that the "eyesore" for "very little" resolve, probably wasted more peoples' money and time than the City could ever repay. And, even when some of us proposed information campaigns that could ease traffic and help the citizens for very little cost - "ignored"!

Sure, there are people happy with you when you fix "their" section of road. But, the City should NOT be about focusing on big business or individual specialty interests. There needs to be:

1) An inventory of every road in this town and a rating of condition to determine the highest needs (from potholes to not being finished properly). No - this has not happened. Bridgeford is the perfect example. Go ahead, starting at Wilson (in sedan), just doing the speed limit, see how that works for you.

2) An inventory of the in-city boundaries for determining new / additional North - South opportunities and East-West corridor opportunities. I've seen the current plans and only "some" of them are okay - but will offer very little "fix".

3) Someone needs to call out the City Building planning commission for doing something so irresponsible as to allow such heavy levels of residential construction along the SINGLE LANE Empire corridor which now has the opportunity to be even more congested than it is now. Currently, everyone who drives down the middle of the bridge against the traffic lines - because the South-bound Highway 97 off-ramp turn-off, is backed up past multiple lights! This SHOULD have been an opportunity to double Empire along most of, or the entire corridor.

4) There needs to be an assessment of road widths along the busiest corridors and analysis to determine how to increase those to double / multiple lanes (WITHOUT ending in a single lane merge as happens all-too often). This "may" include having to work with some locations for relocation - but that's the consequence of the path now taken - and we just have to deal with it. For example, could Brookswood be expanded to 4 lanes along the Old Mill through to Powers? Yes - except for a few hiccups - it really could. Those hiccups suck - but if the Council is going to continue to drive out its citizens with new property fees anyway, at least you'll have the money for it.

4A) To this I would add: every member of the planning commission should be required, for two weeks, once the school season is back in full session, to drive (with cameras on) the entire 3rd street corridor, Reed Market, Greenwood, Neff, Purcell, 27th Street, Brookswood, Wall Street, Bond Street, Century Drive, and others (any one of us who have lived here for 20+ years and drive all the time could give you a complete list), in the morning starting at 7:30 am until 8:00 am (and then pick it back up again for the next section on the next morning if you don't make it all the way through - which many mornings, you can't), and again, starting at 2:45 / 3:00 pm until 4:00, and again from 4:50 pm, until about 6:00 pm. Then, you will get to know, first hand, what really needs your attention.

5) And so on and so on and so on - but frankly, I'm tired of repeatedly saying this to the City, back when it was not a big issue ... then when it started to become an issue - and now these matters are a constantly increasing issue.

If you want to help this City, then PLEASE STOP treating it like an 1800's retirement village! Bend, is NOT going to stay small. And, if the City Council members cared even in the slightest, they would STOP the property tax increases, incentivize the big businesses that want to come here, and the population could literally boom overnight (and then, they would have their money).

Bend is a City. There are literally thousands upon thousands of cities in America, many with similar type of growth patterns, upon which to model where we are now, and where we should expect to be. If you don't see many of us at your meeting today, it's not because we don't care or we aren't speaking up - it's because you aren't listening and we have to plan and prepare ourselves mentally for another day of congested, frustrating driving.

For whatever it's worth - I hope you think these issues through this time, without brash decisions or "temporary" / short-term fixes, and "foresee" consequences. I know this was long, and for those of you respectful enough to read all the way through, thank you. Unlike any other email to the City, I offer no solutions, this time. I'm not paid enough to do more free analysis that goes unheard, anyway. Still, I hope you think of the people on the roads, this time, because that's who you are supposed to be serving.

Thank you for your time. Please have a good day and a good meeting.

Respectfully

Daniel Kennedy, ***CSA***

Information Technology / Renewable Energy Specialist

Certified I.T. and Business Systems Analyst

From: webmaster@bendoregon.gov [mailto:webmaster@bendoregon.gov]
Sent: Monday, June 11, 2018 11:03 AM
To: Jacob Riggle <jriggle@bendoregon.gov>
Subject: Feedback for City of Bend

You have received this feedback from David MacGurn < dfmacgurn@gmail.com > for the following page:

https://www.bendoregon.gov/city-projects/transportation-system-plan?utm_source=Members&utm_campaign=fc10d915b8-Orchard+District+Board+Positions+Open!_COPY_01&utm_medium=email&utm_term=0_a65f7f7dd4-fc10d915b8-39110973

Bend living should always embrace quality of living first. A pedestrian and bike friendly, "Vision Zero", approach to transportation would be consistent with this goal. Lowering speed limits is obvious, low-hanging fruit. An electric, public bus system (possibly autonomous) composed of small, reliably scheduled buses would be clean and quiet. On some routes, dedicated bus lanes and/or street couplets would be desirable. New infrastructure is needed in some cases. The Hawthorne Street connection between east and west is an example. One possible solution to this vexing bridge past the parkway, 3rd Street and the railroad tracks maybe one or more small tunnels (Elon Musk's Boring Company). Perhaps one tunnel dedicated for bike and pedestrian travel and a second tunnel dedicated to intercity buses.

Emailed July 5, 2018

I have read through all the website and done the survey, but cannot find a place to send my individual comments on the Transportation Plan. If you are not the correct person, please forward these to the Committee/or person responsible for collecting comments.

1. Make it easier to comment on the plan. (A link to a contact person at the city.)
2. The plan for bicycles and alternative transportation is not at all adequate for the population growth anticipated over the next 20 years. Clearly, automobiles are the priority in the proposed plan.

Firstly, everyone on the advisory committee and staff should walk, ride bikes or take transit from their home to downtown or work for an entire week. Only by attempting to commute in these ways will you understand the obstacles the City puts in the way of alternative to the automobile.

Secondly, the roads chosen for bike lanes or road sharing are not safe or adequate. I ride from COCC downtown, and I always take Milwaukie because it has less traffic. (I have lost several bike lights because Milwaukie has so many bumps and potholes.)

Every street should have a bike lane! This is the only way drivers will get used to sharing the road. Every roundabout should have a bike entrance painted on it so drivers and bikers know that bikes are "like cars" and have the right of way inside the roundabout.

The roads chosen for bikeways are not the "easiest" path for biking. Bikers will not climb the hill to get to Portland Ave. More lanes need to be improved on "the flats." And, especially on roads that do not carry the automobile traffic.

Thirdly, there is no "vision" in the TSP for how Bend can become less dependent on cars. I continually stress to the City of Bend, that the overall land use plan needs to have communities/neighborhoods, connected by transit, bike paths and roads. All great cities are made up of neighborhoods with one strong core. Communities with neighborhood commercial and high density residential scattered throughout Bend would provide a sense of place within the larger city. These higher densities will allow transit to actually work, and connectors for bike more obvious.

Deb Brewer

2420 NW Monterey Pines Dr

Bend

From: webmaster@bendoregon.gov [mailto:webmaster@bendoregon.gov]
Sent: Tuesday, June 12, 2018 10:14 AM
To: CouncilAll <councilall@bendoregon.gov>
Subject: 15th & Knott Round About

Message submitted from the <City of Bend> website.

Site Visitor Name: Joann Jacobs
Site Visitor Email: joann@cascadeviewranch.com

We desparetly need a Round About at the intersection of 15th and Knott. Today, there was a 4 car crash. We are surprised in the increase of traffic at this intersection this summer.

Seriously, all the neighbors in this community fear who will be the next victim. The traffic on Knott is Fast and Furious. We take our life in our hands if we need to turn left or cross onto Tekampe. Please Help!

7/9/18
Hi Nick,

I just took the TSP survey. I realize a lot of work went into the documents and survey but I was disappointed I couldn't make any meaningful suggestions. The comments font was way to large thus discouraging thoughtful lengthy comments. I would like to suggest the Bend's legislative lobbyist try to change state law regarding tourism dollars and how it can be spent. We have a unique situation here that requires new thinking. We also need a gas sales tax so tourists help pay for the damage. Yes I understand that one failed but only for political reasons and people who lied about the facts.

School location is also part of the transportation problem. Schools should be located in neighborhoods not on the edge of town where the developer is building new housing. Where I grew up (many years ago in Madison, WI) the city was about same size as Bend and had an excellent public transportation system that kids took to school and then buses returned to their normal routes. Saved schools money and helped support public transportation.

I was also not able to comment on the trail map which appears to be in violation of State law and possibly Federal law depending on how one interprets the map. Bridges are not permitted in this section of Deschutes OR Scenic Waterway. The map appears to require condemnation of private property and a trail in the riparian zone of an ASI. Please tell me the city is not encouraging such actions.

Thanks for passing these comments on to survey people. I was impressed with the work and information that went into creating the documents.

Judy Clinton

PS. My comments don't address the problems of self driving vehicles which is looming in the future. Good luck on that one.

You have received this feedback from Judy B. Smith < jbsmithchica@mac.com > for the following page:

https://www.bendoregon.gov/city-projects/transportation-system-plan

Please consider arterials around Bend from the Parkway. Use overpasses over the Parkway for pedestrians. Consider a bridge from Highway 20 North West down Cooley and over to the West side of Bend.

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Advocates for Mental ...

Katie Hauck McClure shared a video.
June 2 at 7:35am

(Admin - pls remove if inappropriate for this group)
I'm on the Bend Transportation Committee and am wondering what people think about things like this? Are there any places where you think a protected bike lane would make it easier / more comfortable / more likely for you to ride your bike around town?

17,099 Views

Streetfilms
June 1 at 10:24am

Like Page

Check out Boston's newest protected bike lane that features good design, lots of green paint (#freshkermit) and safety features. A good start. A network of these certainly will get timid cyclists to bike more!

Like Comment

Hannah St John Stendahl, Debbie Stendahl McPherson and 74 others

Dianne MacGillivray I would love to see this here!
Like · Reply · 2d 2

Kathy Slocum 3rd street, Wilson, Greenwood Ave
Like · Reply · 2d · Edited 3

Kris Ellis Easter I think it is a great idea. However, our streets are already too narrow.
Like · Reply · 2d 5

Beth McCann Reed Mkt, also to connect east to west side of

ADD MEMBERS

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DESCRIPTION

Bend is a great community. This group is a place where Bendites ... See More

LOCATIONS

Bend, Oregon

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Groups make it easier than ever to share with friends, family and teammates. Create Group

RECENT GROUP PHOTOS See All



Suggested Groups See All

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Dee Bigelow We don't even get our roads fixed that are currently existing....
Don't start new things if the old things are not shiny yet.... Just what my grandpa used to say..

Like · Reply · 2d · Edited 4

Katie Hauck McClure Good input... if we keep things maintained on schedule they are a LOT cheaper.

Like · Reply · 2d 1

Dee Bigelow Katie Hauck McClure I'm not sure why it seems so hard. The bike Lanes are always full of objects. The street cleaners can't keep up... Why are we doing new things when our budget doesn't even let us do maintenance on our existing makes me crazy.

Like · Reply · 2d 2

Katie Hauck McClure Dee Bigelow ya I've been learning a lot and asking similar questions... seems the different funding sources pay for different things. Def weird.

Like · Reply · 2d

Dee Bigelow That's what's wrong with the whole system. You (the govt) get 100% of the pie. Then you divvy up a percentage to health, education and the rest of the pit goes to the states for fixing it... Now if you get to the end of your dollar before you've fin... See More

Like · Reply · 1d 1

Write a reply...

Shelley Mortensen Yes! 3rd, Greenwood and 27th. Would be so much safer for people who would like to bike commute but are too afraid of the traffic. Would help to alleviate the traffic congestion if we could get more people riding bikes instead of driving.

Like · Reply · 2d 3

Dee Bigelow I think we just need to be more cautious and slow down.... I'd rather see an officer being paid to monitor traffic violations. This will help all involved. Not just bikers.

Like · Reply · 2d 1

Write a reply...

Marge Lee I don't like riding bikes around here with all the cars whizzing by. But I agree with other posts that our streets are too narrow and not well maintained as it is. It's a big problem. But thank you, I'm glad you are thinking about it. For being so bike friendly, the roads don't feel bike friendly at all compared to other places I've visited.

Like · Reply · 2d 1

Jen Woodward I don't feel comfortable riding my bike on the road here even on streets with the large and slightly raised bike lane like W Reed Market. I wish there were a more connected route to completely keep you off the road like the Larkspur trail in all 4 ends of town.

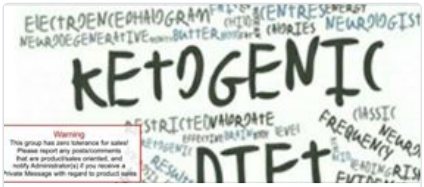
Like · Reply · 2d 3

Carisa Battin Would love to have this here! Would really help with traffic congestion if commuter biking was safer!

Like · Reply · 2d 1

Kris Ellis Easter Riverside St. on to Franklin St. (around Drake Park to downtown) is a very challenging design in my opinion. Bicycles are between fast moving vehicles (some very large) and, parked cars. All it would take is one person to open the door

SAND ADIKS
19,381 members Join



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Chat (22)

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Like · Reply · 2d 1

Darlene Grove I would definitely ride my bike more around town with a protected lane like this!
Like · Reply · 2d 3

Kelly Drinkward Stop ppl from speeding and being in a hurry everyday it would be nice to ditch the car for once.
Like · Reply · 2d 1

Terie Sandusky Yes, Please!!!! 1
Like · Reply · 2d

John Kellogg Portland has these. They wear poorly, paint fades, and sadly give bicyclist a false sense of safety. Maybe start with big green paint rings around pot holes.
East/west and N/S town should have and do have (Skyliner) segregated.bike paved trail away from.cars... See More
Like · Reply · 2d 1

Susan Rutter Zimmerman Yes! Brosterhous to 3rd and then all of 3rd and any routes that link east side to west side. I guess I'm suggesting the major east/west corridors -- Franklin, Olney ... help get east'ers to the west side for dinner, recreation and work without getting in their cars.
Like · Reply · 2d 3

Jim Roberts 3rd would be a tough one because of ownership (mostly the state--it's a highway), volume and maintenance (or lack there of). That said I can't offer a better one.
Like · Reply · 2d 2

Susan Rutter Zimmerman Jim Roberts make the planned railroad trail (parks n' rec) into a paved two-way bike path -- that gets bikers from north to south -- then connectivity east/west from that would be ..... not easy. But it's a start.
Like · Reply · 2d 2

Jim Roberts Susan yeah N/S isn't that difficult but the parkway and RR really cause problems with E/W. With the new Biz district perhaps reshaping that area removing the RR may be the long term answer. That would offer all sorts of options and improvements but we're talking decades on that dream.
Like · Reply · 1d

Write a reply...

Coleen Fechser-Goodner I don't know how you would widen the streets enough. Taking a lane away from drivers would not be a good option as the traffic is already bad
Like · Reply · 2d 3

Lisa Christopher Could we fix the potholes first.
Like · Reply · 2d 3

Ronda Phillips Jordan The whole city would need redesigned to accommodate this concept. Buildings can't just be pushed back and widening the road would create less parking for some businesses which is already an issue. However if there was space and funding for it (after already needed road repairs) it would be a great idea.
Like · Reply · 2d · Edited 3

Nicole Newton Honzel Find out how they are working in Portland. I am pretty sure they weren't all that great. A protected

Chat (22)

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Like · Reply · 2d

Robert Pfister Bend very much would economically benefit from having a true grid of safe bike paths - not lanes but separate safe paths

Like · Reply · 2d 4

Robert Pfister https://bikeleague.org/.../Bicycling_and_the_Economy-Econ...

Like · Reply · 2d 1

Judy Honey This is the single best idea I have heard yet for a real plan to accommodate bicycles! Bend, in its current state is far from a bike friendly town and I fear for my life every time I have been on a bike riding around! This city needs a real plan and this sounds like one. Why reinvent the wheel...follow Boston!

Like · Reply · 2d 1

Susan Rutter Zimmerman Totally agree with this -- was in Minneapolis last year biking around the whole city on dedicated paths. The planned path that parallels the railroad (Park n' Rec) would be a great start -- make it a wide paved path with two bike lanes going in both directions.

Like · Reply · 2d 1

Susan Rutter Zimmerman Much of the trail system that BPRD has laid out in its recent comprehensive plan would go toward achieving this if they paved and marked the trails.

Like · Reply · 2d 1

Write a reply...

Jennifer Weedin When I hear Bend was a bike friendly city I was happy. But when I moved here I was very disappointed. Not only is there really no pedestrian paths going from East to West and North to South, the actually streets and bike lanes are inconsistent. The peo... See More

Like · Reply · 2d 3

Sandee Prescott This would be great for Bend if there's room. We just moved away, but there were many areas that could benefit. Cyclists often ignore vehicles and expect cars to just stop/slow for them when they may not have right of way. That said, drivers are just a... See More

Like · Reply · 2d 1

Michael Betsch This sounds like something you might have found in the Emerald City of Oz but in a non-perfect world someone has to pay for this. Trucks and cars are taxed and bikes are not. Perhaps if bikes were taxed that could help pay for these projects, and how... See More

Like · Reply · 2d 5

Jim Roberts The reality of road funding in the US in general and here in Oregon specifically is that user fees and taxes pay for less than 50% of road construction and maintenance. The balance, here in Oregon, comes from general fund revenue. At the state level th... See More

Like · Reply · 2d 3

Michael Betsch I'm not asking bikers to pay for everything but a tax on new or used bikes when purchases from retailers would be helpful to the cause or just cancel all taxes purchases for cars and trucks too and then we'd be equal but then nothing would ever get don... See More

1

Chat (22)

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Jen Woodward A small tax on bike sales was instituted this year in OR.

Like · Reply · 2d 1

Andrew Newcomb I think instead of a small one time tax on new bike purchases that any bike being ridden on public streets should be registered and tagged through the DMV the the DMV needs to put all tag fees into the roads coffer.

Like · Reply · 1d 1

Jim Roberts Michael my point about funding is that people who ride bikes already pay a disproportionate amount of revenue into system relative to the demand they place on the same. If we are unwilling to have people who drive pay their full share how do we justify asking people who ride bikes to pay more?

My siting for a ped/bike bridge would not require any takings.

Like · Reply · 1d

Write a reply...

Phil Andrew Gordon Yep, roads already can't be fixed with lack of money, homelessness is skyrocketing and nothing is being done. BUT let's get right on this!

While super cool, it'd be impossible with our infrastructure and its costs. Plus it's about 1,478 on the list of things needed in Bend.

Like · Reply · 1d · Edited 6

Jim Roberts E/W connectivity is horrid--Franklin needs a huge and expensive re-do--and the rest are basically too far North to be effective. Love to see a dedicated path at about Harriman connecting downtown with the Maker's District.

Like · Reply · 2d 3

Judy Ann Lear I don't understand the Transportaion Advisory board....you push for people to walk/ride bikes and use the bus system...yet as soon as OSU pushed their way into the Westside, you shut down the two bus stops on Chandler because too many cars are parked o... See More

Like · Reply · 2d 6

Jackson Newman This is an important post! Thanks for presenting these questions.

Like · Reply · 2d 5

Michael Betsch Good points Judy. 3

Like · Reply · 2d

Judy Ann Lear OSU is NOT a good neighbor! Every spot on Chander and Yates (where we live in Mountain Laurel Lodge) is filled with OSU cars....Emergency vehicles can barely get into our parking lot....58 Seniors live here and we have many trips to rescue sick elders.

Like · Reply · 2d 3

Lisa Nordquist Baker Judy Ann Lear it's only going to get worse. I've heard that the new project at Rays also didn't plan enough parking. I'm not sure what these people are thinking.

Like · Reply · 2d 2

Judy Ann Lear $$$$ talks to Commissioners.....

Like · Reply · 2d 1

Jackson Newman Lisa Nordquist Baker what is the new project at Ray's?

1

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Judy Ann Lear Business on bottom, apartments 4 stories on top

Like · Reply · 23h

Write a reply...

Jackson Newman Bend is not bike friendly. 3

Like · Reply · 2d

Judy Ann Lear I was hit by a car on Portland @ Awbrey while riding in the bike lane...Gary E. Miller turned in front of me and I was badly injured....he drove off but a witness chased him down and called police....all he got was a failure to yeild...I had surgery to repair broken bone and PT for a year....drivers need to be held accountable for killing and injuring walkers and bike riders...I haven't riden my bike in town since... 7

Like · Reply · 2d

Dawn Michelle LaPolla That really sucks! You should sue!!!!! 1

Like · Reply · 1d

Judy Ann Lear It was 2012....his car insurance paid for all my surgery, PT for 1 1/2 years, everything....I handled my own case without an attorney and got a fair settlement....

Like · Reply · 1d

Write a reply...

Pamela Richter Absolutely! There have to be severe punishments for people who cause harm to anyone....other drivers, bicyclists, pedestrians...every one should be protected! 1

Like · Reply · 2d

Michelle Hart Love 💛 1

Like · Reply · 2d

David N. Welton Would love more bike infrastructure, but I do agree maintaining what's there already is important. Also, east-west connectors are the most critical bits right now. 3

Like · Reply · 2d

Donna Sassaman Bike paths, meaning not on the street, would be even better! I often comment how I'm surprised Bend doesn't have that, or plan it into all the new developments and communities that are being built. For me, from a safety perspective, roads are for CARS. Bikes should have their own separate path or trail. 6

Like · Reply · 2d

Gwen Shoemaker From Bend to Deschutes River Woods. 4

Like · Reply · 2d

Laurel Knight Great idea... No room on already narrow roads. So, perhaps find route that isn't already a road, one for East/West and one for North/South and create a safe bike path! Don't try to incorporate into existing roads...too many law breaking drivers and bikers to share space. Septate routes would be the only safe alternative. 7

Like · Reply · 2d

Miranda Holloway I think it's great- I love bike paths 2

Like · Reply · 2d

Julie Potter We need wider roads 2

Like · Reply · 1d

Carisa Battin There's research showing that drivers

Chat (22)

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Like · Reply · 1d 4

Write a reply...

Melissa Rollins-Rivera Detritot has a sales tax which I'm sure funds will be allocated to keep this well maintained. It would do bend/Oregon well to adopt a sales tax so that all of our tourists can contribute to paying for city and road improvements and maintenance --offsetting the cost we as residents of Oregon soley pay.

Like · Reply · 1d · Edited 2

Linda C Thornton City doesn't have money for this!!

Like · Reply · 1d 1

Katie Hauck McClure The money is scarce for sure. Where would you prioritize the spending?

Like · Reply · 1d · Edited 1

Pennie Sue Preston Lancaster They would if they keep ticking people who drive using there phones.

Like · Reply · 1d 2

Roxie Do Pothholes and repaving need to be done before spending money for a select few riders to use for six months out of the year.

Like · Reply · 1d

Write a reply...

Judy Ann Lear Well if they keep with ticketing drivers for phone violations they would have $$$

Like · Reply · 1d 3

Pennie Sue Preston Lancaster It's a really good thing I would ride my bike here in Bend Oregon if we had this I'm afraid of Drivers now !

Like · Reply · 1d 5

Karen Bullock Everywhere on the west side! It's so dangerous for bikers with all that traffic.

Like · Reply · 1d 2

Pennie Sue Preston Lancaster Yes it is East side not much better

Like · Reply · 1d 1

Corrina Osgood-Rottum NE has become terrible especially in school zones.

Like · Reply · 1d

Write a reply...

Josh Buchea I would LOVE to ride my bike to work every day. But I just won't do it because if you happen to be unfortunate enough to tussle with a car, the car wins every time. Something like this would be amazing and would make me feel safe enough to ride for transportation and not recreation only.

Like · Reply · 1d · Edited 8

Wendy Sutherland-Wood Love this! 2

Like · Reply · 1d

Karen Bullock If you do this Please use glass beads in the paint so it lasts longer and reflects better. All the citations the cops are giving to tourists may just be the "ticket" .😆 1

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Judy Ann Lear Mostly to locals I bet.... 1

Like · Reply · 1d

Karen Bullock Could be Judy Ann Lear. 1

Like · Reply · 1d

Judy Ann Lear Bet it was 100%....

Like · Reply · 1d

Write a reply...

Dawn Michelle LaPolla I know I'd feel a lot safer with my son riding his bike the 1.5 miles to highschool. Right now, I plan the drive him because the roads are just too congested and dangerous. 4

Like · Reply · 1d

Dawn Michelle LaPolla This is amazing!! Not only could it curb some of the high car traffic around Bend but would really add a quaintness to the town! It really could make Bend a cycling center!!! 7

Like · Reply · 1d · Edited

Darci Palmer Would be awesome on Greenwood between 3rd and 27th! I was going to say on 3rd too but then I realized that we always avoid riding on 3rd at all costs, so it might be a waste. 2

Like · Reply · 1d

Rene Riback its a great idea when you have new wide streets that accommodate for this room. if you are trying to squeeze those in older neighborhood with narrow lanes and parking on the street, you are asking for trouble. 2

Like · Reply · 1d

Cheryll Bennett We need whatever transportation can do to increase biking over car use, and we need safer biking lanes to do it. 4

Like · Reply · 1d

Mark Goody I LOVE this idea! The feeling of security that a bike lane provides is enough to completely change an experience from fear of riding with traffic to being able to enjoy your ride. I'm experienced in riding in traffic, but there are many people I've known who are new to cycling that get to freaked out to ride in traffic and that fear ruins the experience for them. 4

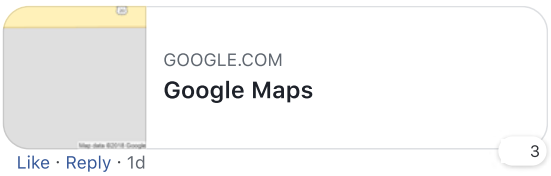
Like · Reply · 1d

Roxie Do What would save lives and prevent many close calls would be to actually get bicyclists to follow the rules of the road. I NEVER see the riders using signals, stopping and staying in the bike lanes. More often than not they are riding down the middle of... See More

Like · Reply · 1d

David N. Welton The two cyclist deaths I'm aware of recently were both caused by the drivers involved.

Also, if 5 lanes aren't enough for cars on Greenwood, I don't know what to say.... ... See More



3

Like · Reply · 1d

Katie Hauck McClure Both great points. Everyone needs to follow the rules... and we need to design the infrastructure to make it as easy as possible for 'safe to happen.'

Chat (22)

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Jim Roberts Why does it start with the most vulnerable user? I rarely see people driving cars follow the rules either. People are constantly speeding, cutting off others, not using their turn indicators or using them incorrectly, crossing solid white or double yel... See More

Like · Reply · 1d

3

Roxie Do I was not picking on the "most vulnerable user". My brothers were both hit by a car while biking. One was almost killed and spent three months in the hospital and then six months in a body cast. They were hit by a car on a non busy road in the country... See More

Like · Reply · 18h

Write a reply...

Tran Quach-Miller I've been riding in Bend with my kids on my bike for the last 8 years. We stay on bike lanes, use hand signals and use back streets as much as possible. I have to say that this year feels the most unsafe that it has ever been. Distracted driving and sp... See More

Like · Reply · 1d

6

Olivia Sathre I lived in Vancouver, BC for over three years and they have the biking thing down. They have streets designated as bike routes and on busy streets they have the bike lanes marked out like the picture above. I was always safe and never had any close calls. Here in Bend, I've almost been hit several times.

Like · Reply · 1d

3

Karen Hobbs I would love every road to have a bike lane
Last year I was spat at on Pettigrew by a driver who tried to force my husband and me off the road! Unbelievable! Even more unbelievable ? The guy who went to court and had to do community hours and pay for ... See More

Like · Reply · 15h

1

M Jill Mclaren Wow ! Amazing.. wish we had the roads to do this in Scotland

Like · Reply · 12h

Mary Hauck-Mcglone Wow! This is great! I'm thinking the green paint near driveways etc. is a cool way of adding additional protection for bikers!

Like · Reply · 7h

1

David N. Welton Timely article about how bike lanes can benefit local businesses: https://www.strongtowns.org/.../how-bike-lanes-benefit...

STRONGTOWNS.ORG

How Bike Lanes Benefit Businesses

3

Like · Reply · 5h

Write a comment...

Chat (22)

From: webmaster@bendoregon.gov [mailto:webmaster@bendoregon.gov]
Sent: Tuesday, June 12, 2018 9:53 AM
To: Jacob Riggle <jriggle@bendoregon.gov>
Subject: Feedback for City of Bend

You have received this feedback from Pam MacGurn < dmac3@bendbroadband.com > for the following page:

https://www.bendoregon.gov/city-projects/transportation-system-plan?utm_source=Members&utm_campaign=fc10d915b8-Orchard+District+Board+Positions+Open!_COPY_01&utm_medium=email&utm_term=0_a65f7f7dd4-fc10d915b8-39110973

Speed limits on Butler Mkt between Deschutes Mkt and Hamby are very high and unsafe. Eagle Road between Butler Mkt and Neff Road is also a major North-South race track with virtually no shoulder for cyclists.

From: Pat Miner <patmin@gmail.com>
Date: Sat, Jun 16, 2018, 7:03 PM
Subject: Status of Providence Drive in new transportation plan.
To: <Karenswirsky@gmail.com>

Hello Karen,
I have been referred to you for verification on the status of Providence Drive in the new transportation plan. Providence became a cut thru for traffic when the sewer upgrade on 27th began and we have experienced much more traffic and speeding ever since. We have concerns that Providence Dr. may be looked at as a collector road instead of a residential road. Could you please confirm the road status of Providence Dr.in the new transportation plan.

Thank you very much for your time and consideration,

Pat Miner
1386 Providence Dr.

From: Richard Gilbert [mailto:richardscottgilbert@gmail.com]
Sent: Tuesday, June 05, 2018 9:56 AM
To: Susanna Julber <sjulber@bendoregon.gov>
Cc: juleslax@gmail.com; cherylswagner@outlook.com; bergamasco@gmail.com; Bill Moseley <bmoseley@bendoregon.gov>; Sandy Coats <sandrajcoats@gmail.com>; kathyschroeder@gmail.com
Subject: May 30, 2018 CTAC Meeting

Ms. Julber,

By way of introduction, my name is Richard Gilbert. I'm a board member of the Summit West Neighborhood Association and also Chair and Project Coordinator of Walkable NWX, a Northwest Crossing neighborhood group advocating for the implementation of mitigation measures to address traffic safety impacts in NWX. (Walkable NWX is an affiliate of the SWNA.) Within this context, I provided public comments at the May 30, 2018 CTAC meeting.

The purpose of this email is to summarize the concerns that the members of Walkable NWX—and many other neighbors—have about pedestrian safety and attendant quality of life issues. These concerns are allied to CTAC goals, namely, ensuring safety for all users. In this setting, it is requested that the following comments be incorporated into CTAc's public record and that they provide a platform for future discussions regarding the implementation of mitigation measures to address public safety along NWX roadways.

CONCERNS:

Public safety is a critical issue: 1) along Northwest Crossing Drive, from the NW Lehmi Pass Dr. roundabout to the Compass Park roundabout and 2) along Mt. Washington Boulevard, from the NW Skyliners Rd. roundabout to the NW Shevlin Park Rd. roundabout.

PROBLEMS:

—Motorists and trucks traveling at dangerous speeds above the posted speed limits, especially along Northwest Crossing Drive, from NW Dorion Way east and downslope to the NW Lehmi Pass Dr. roundabout —All groups use the above roadway corridors, including families with children, senior citizens, and cyclists —Northwest Crossing Drive serves as a "residential street" and school-age children, walking home from High Lakes Elementary School, must cross this road —Lives are at risk and motor vehicle traffic fatalities and injuries are imminent

SOLUTIONS:

—Install 4-way stop sign intersections along Northwest Crossing Drive, at the intersections with NW High Lakes Loop and NW Dorion Way (this issue is important due to the downslope gradient of this road, which provides a platform for many motorists traveling easterly at high rates of speed) —Install travel-calming measures, such as speed cushions, along Northwest Crossing Drive (e.g., at the intersection with NW Frazer Ln.) —Install pedestrian-activated crosswalks along Mt. Washington Boulevard —Provide ongoing, increased police enforcement

Thank you for the opportunity to comment about traffic safety issues within Northwest Crossing. This issue is very important to the residents of the area, and members of Walkable NWX look forward to working with CTAC members to formulate solutions to ensure the safety of all users. If you have any questions or need further information, please contact me.

Sincerely,

Richard Gilbert
2474 NW Crossing Drive
Bend, OR 97703

TIM KNOPP
STATE SENATOR
DISTRICT 27

OREGON STATE SENATE

July 3, 2018

Dear Bend City Council,

I am writing to you to provide my input on the City's new Transportation System Plan. As you know, this summer provides a unique opportunity for improving transit in Bend: The City is updating its transportation plan, COIC is updating its transportation plan, and the new state transportation package has made additional funding available. We have an opportunity to improve public transit in Bend to adequately reflect the needs of our growing city.

While there are numerous issues related to transportation in Bend that I could address, I want to express a specific concern that the current configuration and operations at the Hawthorne Transit Center present a safety risk and are limiting opportunities for economic growth and development within the Bend Central District (BCD).

The Hawthorne Transit Center currently serves as the central hub for Bend's public transit system, but it lacks many of the basic amenities necessary to serve those who take the bus in our community. Riders have no access to restrooms at the transit center after 5pm, forcing them to seek out services at nearby businesses. The transit center also lacks basic modern technologies such as real-time reader boards with rider information to make transit accessible to all Bend residents.

I have serious safety concerns with the existing transit hub on 3rd Street and Hawthorne. One evening some weeks ago I was driving on Hawthorne and a woman who was clearly under the influence tried to accost my vehicle with me and my family inside. We were able to safely leave the area but I would never want my family or anyone else to have their safety threatened. Neighbors to the transit center have voiced to me, personally, concerns about safety for riders, with bus drivers, freight vehicles and cars competing for space and access to the busy street. As bus and freight traffic clogs the same, narrow street, pedestrians are forced to navigate around large vehicles with limited visibility. The chaos and confusion in such a tight space makes it dangerous for everyone.

I ask that Bend carefully consider and identify a proper location and configuration for its central transit center, with a focus on rider mobility, safety, housing and impacts to adjacent businesses and neighborhoods. I also ask that you support meaningful connections between the transit system and bicycle routes along 3rd street, to ensure a robust transportation network within the BCD.

I urge the city to develop a more appropriate, thoughtful solution that will support our residents, economic growth and redevelopment of the BCD.

Thank you for incorporating my concerns into the public input process for the development of the City's Transportation System Plan.

Sincerely,

State Senator Tim Knopp

Capitol Address: 900 Court St. NE, S-309, Salem, OR 97301
Phone: (503) 986-1727 - Email: sen.timknopp@state.or.us

From: Steve Porter [mailto:stevedporter@yahoo.com]
Sent: Monday, July 09, 2018 10:35 AM
To: Nick Arnis <narnis@bendoregon.gov>; Susanna Julber <sjulber@bendoregon.gov>; Eric King <eking@bendoregon.gov>
Cc: michellerakiec@yahoo.com
Subject: Public Comment Submission - Bend Citywide Transportation Advisory Committee

Dear Susanna, Eric, and Nick,

Please find attached to this email a PDF document that I would like to submit as a public comment pertaining to proceedings of the Bend Citywide Transportation Advisory Committee. Thank you for your help in this connection, and please let me know if you require anything further.

Kind regards,

Steve Porter

To: City of Bend Citywide Transportation Advisory Committee
Attn: Nick Arnis, Susanna Julber, and Eric King
From: Steve Porter and Michelle Porter, Residents of Bend
Date: July 9, 2018

Public Comment:

Evidence & Implications of Supply-Induced Demand in Transportation Systems

Dear Bend Citywide Transportation Advisory Committee:

We understand that you are in the process of forming plans for Bend's transportation system and that, as part of your work, you have been asked to develop proposals to "reduce congestion on major roads by expanding capacity" of vehicular roadways in and around Bend.

Due to what is known as "induced traffic," we advise against attempting to reduce congestion by expanding road capacity. It has been proven beyond any reasonable uncertainty that **adding roadway capacity does not relieve traffic congestion**. In the pages that follow, we explain this phenomenon, discussing the theory and empirical evidence relating to supply-induced demand with respect to transportation systems and the implications for Bend.

SUMMARY

- Induced traffic is roadway demand that is *self-generated* by road capacity expansion.
- Induced traffic consumes an average of 78% to 94% of any added road capacity and, depending on the particulars of expansion, induced traffic can consume more than 100% of new capacity.
- Because of the induced traffic effect, new road capacity does not decrease traffic congestion, reduce travel times, enhance travel time reliability, or accommodate new population growth.
- Expanded road capacity entails significant financial outlays for communities, both for initial infrastructure development and ongoing maintenance, as well as environmental costs. Since road expansion does not enhance traffic outcomes, the majority of these costs becomes waste.
- Reducing traffic congestion in Bend requires actions exclusive of adding roadway capacity; solutions emphasizing pedestrian, cyclist, and mass transit infrastructure enhancements should be prioritized since these do improve traffic outcomes.

SUPPLY-INDUCED DEMAND

Supply-induced demand (also called "induced demand") is a well known economic phenomenon under which a supply increase of a good or resource generates *its own* increase in the quantity of that resource which is demanded. That is, no factors other than the supply increase are necessary to provoke consumption growth.[1]

This phenomenon has been observed in roadway development across communities of various sizes both in the United States and abroad. Observations show that, if new road capacity is built, the induced demand effect consumes essentially all of the new capacity in a relatively short time frame. For these reasons, the induced demand effect is often referred to as "induced traffic" in the context of transportation systems.[2]

> The simple truth is that building more highways and widening existing roads, almost always motivated by concern over traffic, does nothing to reduce traffic. In the long run, it actually increases traffic. This revelation is so counterintuitive that it bears repeating: ***adding lanes makes traffic worse***.[3] (Emphasis added.)

Because the induced traffic effect associated with roadway expansion often approximately equals the volume of supply growth, additional roadway construction does not alleviate road congestion, reduce travel times, diminish fuel wasting, improve travel-time reliability, or accommodate new population growth. Rather, the increased volume of generated traffic simply consumes the new roadway capacity, and the initial states of road congestion, excess fuel burning, and travel times are unimproved, or worsened, following the supply investment. These effects are so well established by empirical study that researchers have called induced traffic and its negative consequences the "fundamental law of road congestion."[4]

The induced traffic effect is due to three key factors: 1) stimulation of so-called latent demand; 2) displacement of non-automotive transportation modes; and 3) land use changes.

---

[1] Supply-induced demand is fully consistent with the Law of Demand as well as with the normal workings of supply and demand in economic markets. With respect to roadways, the general absence of an efficient price mechanism causes road consumption to take on characteristics associated with public or commons goods - i.e., oversubscription and depletion that cannot be reliably remedied by supply expansion. Induced demand can be depicted graphically. See the attached "Graphical Appendix."

[2] "Induced demand is the name for what happens when increasing the supply of roadways lowers the time cost of driving, causing more people to drive and obliterating any reduction in congestion." (Speck, J., *Walkable City*, North Point Press (2012).) Induced traffic also has been observed in connection with non-road automotive infrastructure development such as parking. (Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011).)

[3] Duany, A., et al., *Suburban Nation*, North Point Press (2000).

[4] Duranton, G. and M. Turner, "The Fundamental Law of Road Congestion: Evidence from US Cities," *American Economic Review*, Vol. 101 (2011).

Latent Demand

New road supply provokes behavioral changes among drivers that cause them to make less efficient use of roadways, an effect that is often called "latent demand" (also known as a "generative" effect).[5]

Key changes among drivers include:

- Reduced emphasis on trip and/or route planning, such that each vehicle trip is conducted along less orderly routes and thus consumes more road capacity;
- Diminished "grouping" of errands into single round-trip circuits, so that additional driving trips are made;
- Curtailed participation in ride-share and carpool programs, bringing additional vehicles to the roadways; and
- Slackened discrimination as to the timing of trips, causing more trips to be made during peak driving hours when the effects of congestion, fuel wasting, and travel time disruption are most salient.[6]

These behavioral changes collectively increase vehicle miles traveled ("VMTs") among existing drivers after road expansion. Notably, since the changes are not geared around value-enhancing trips, the average value of each VMT is lower following the expansion; that is, roadway usage efficiency declines, with more "empty miles" driven.[7]

Displacement

The displacement of non-driving transportation modes is a second type of behavioral effect and refers to the "crowding out" of non-automotive travel when transportation infrastructure tilts more heavily toward automotive transport (also known as a "redistributive" effect).[8]

Displacement causes people who would not have traveled by automobile *before* the installation of new road capacity to begin traveling by automobile *after* the installation. People who otherwise would have walked, cycled, or used mass transit become drivers following the roadway expansion.

---

[5] Cervero, R., "Induced Demand: An Urban and Metropolitan Perspective," Paper prepared for Policy Forum: Working Together to Address Induced Demand (March 2001).

[6] Noland, R.B. and L. Lem, "A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the US and the UK," *Transportation Research Part D*, 7 (2002).

[7] Kooshian, C. and S. Winkelman, *Growing Wealthier*, Center for Clean Air Policy (2011).

[8] Cervero, R., "Induced Demand: An Urban and Metropolitan Perspective," Paper prepared for Policy Forum: Working Together to Address Induced Demand (March 2001).

Displacement occurs because, as additional roadways are developed, the ease, safety, and general attractiveness of walking, cycling, and mass transit decline. As illustration, consider the palatability of walking along or across a four-lane highway as opposed to a two-lane street. In a more general way, it can be stated that, as a region's transportation system becomes increasingly oriented around automotive transportation, the usage of non-automotive transport is less likely to be adopted.[9] Displacement thereby results in additional vehicle miles traveled by those who would have used non-driving modes but-for the incremental roadway construction.

A more subtle ramification of displacement is found in the distortion of consumer behaviors. People who would not have owned an automobile but-for the roadway expansions are motivated to purchase one afterward. Following acquisition of a vehicle, an increasing share of that user's trips will be made via car,[10] extending displacement.[11]

Substitutions from non-automotive transport to car travel have substantial implications for so-called "network effects" of non-driving modes in a transportation system.[12] As more people choose to drive (and as those motorists each drive more miles over more trips), it becomes less attractive - and statistically more dangerous - for other transportation system users to utilize non-driving modalities. It has been shown that the greater the share of trips in a transportation system made by pedestrians and/or cyclists, the safer the system is for all pedestrians and cyclists. As safety increases, more pedestrian and cyclist uptake is generated, engendering a virtuous cycle of increased safety, reduced automotive reliance, and diminished traffic congestion. However, when transportation network roadway development causes displacement, those network effect benefits are reversed, shunting would-be pedestrians and cyclists into cars in increasing volumes.[13]

---

[9] Tovar, M., and Kilbane-Dawe, "Effects of 20mph Zones on Cycling and Walking Behaviours in London," Par Hill Research Ltd. (2013).

[10] Sunk cost claiming, for instance, would explain such effect.

[11] From an economic perspective, such purchase is unambiguously inefficient from both the purchaser's perspective and from society's perspective. The purchaser acquires the vehicle due to an actual or anticipated loss in effective mobility and/or safety (i.e., the purchase is an act of remediation), and it subjects buyers to debt accumulation and cash flow constraints associated with loss of financial durability. Society suffers because of the negative externalities associated with vehicle ownership and use including pollution and public health costs. Moreover, purchase of a vehicle typically leeches consumer spending and investment out of a local economy due to the economics of the automobile industry, with about 85% of dollars flowing out of the local economy (See: Speck, J., *Walkable City*, North Point Press (2012).). Since Bend's local economy does not substantially provide automobile parts or finished assembly manufacturing, Bend would experience such siphoning to its full extent.

[12] Liebowtiz, S.J. and S. Margolis, "Network Externalities (Effects),"

[13] As more people in a transportation network commute by walking or cycling, the statistical likelihood of death or injury among all pedestrians and cyclists declines. It becomes safer for each pedestrian or cyclists in the transportation system every time one additional person walks or cycles. This pattern is consistent with the economics of network effects wherein the value of something for each user increases every time a new user is acquired. As illustration, telecommunications equipment and social media platforms are well known for their network effects.

Jacobsen, P., "Safety in Numbers: More Walkers and Bicyclists, Safer Walking and Bicycling," *Injury Prevention*, Vol. 9 (2003).

The effects of displacement bear crucially on traffic flows during peak driving hours when pedestrians, cyclists, and mass transit riders are most helpful in reducing congestion.[14]

Displacement is particularly pronounced when infrastructure budgeting decisions require prioritizing either incremental roadways or incremental pedestrian, cyclist, and mass transit facilities. In the event roadway development is prioritized, the displacement effect is large and leads to a correspondingly large total induced traffic effect.

Land Use

The expansion or addition of roadways can alter land use patterns, which results in incremental driving, added dependence upon vehicles, and "lock-in" of traffic due to the structural nature of the effects of land usage.

Upon the expansion of roadways, residences and workplaces often relocate to utilize the newly added capacity. Residents and offices tend to migrate to places along the corridors of added road capacity, where the expected benefits of reduced commuting time will be enjoyed. Such change follows a logic of relocation from areas of relatively high density, where automotive transportation is less likely used, to areas of relatively low density, where driving is more likely necessitated.

This change in land usage is tantamount to a de-densification of residences and workplaces, which causes increased automotive utilization and engenders automotive dependence, an effect intensified through a feedback loop. Larger distances for everyday travel stimulate greater vehicle usage; greater vehicle usage deters non-automotive transport due to safety-related network effects; and the degradation of attractiveness for non-automotive transportation funnels more commuters into cars, even for shorter-distance trips.

Land use changes also cause traffic "lock-in" by virtue of structural effects on road use. That is, increased vehicle usage is non-discretionary once residents and workers have settled their homes and workplaces; they must commute to and from these destinations. As traffic becomes locked-in, drivers cannot adjust in the face of mounting traffic congestion as other factors of induced traffic are brought to bear. Accordingly, post-expansion

[14] Cass, N. and J. Faulconbridge, "Commuting Practices: New Insights into Modal Shift from Theories of Social Practice," *Transport Policy*, Vol. 45 (2016).

traffic congestion can exceed pre-expansion congestion levels, causing traffic to be *worse* after the roadway investment.[15]

The implications of land use changes on induced traffic can be difficult to model *ex ante* since it is not always known, nor can it often be reasonably predicted, what future developments may occur along expanded corridors or how those developments will affect transportation system user behaviors and traffic levels.[16] Because different types or scales of developments have dramatically different levels of traffic impact, this confounds accurate expectations of future traffic levels.[17] Notwithstanding this *ex ante* limitation, *ex post* empirical studies show land use effects can be substantial, with strong bearing on long-run induced traffic values.

Combined with latent demand and displacement effects, land use pattern changes bring about significant induced traffic levels following roadway expansion such that, on average, 78% to 94% of added capacity is consumed by induced traffic, leaving very little excess capacity to accommodate population growth or to reduce congestion.[18]

---

[15] Rodier, C., et al., "Anatomy of Induced Travel: Using an Integrated Land Use and Transportation Model in the Sacramento Region" (November 2000).

Johnston, R., et al., "Applying an Integrated Model to the Evaluation of Travel Demand Management Policies in the Sacramento Region," Mineta Transportation Institute for Surface Transportation Policy Studies, College of Business, San Jose State University (September 2001).

"An Analysis of the Relationship Between Highway Expansion and Congestion in Metropolitan Areas: Lessons from the 15-Year Texas Transportation Institute Study," Surface Transportation Policy Project (November 1998).

Duranton, G. and M. Turner, "The Fundamental Law of Road Congestion: Evidence from US Cities," *American Economic Review*, Vol. 101 (2011).

[16] Such observation is consistent with analysis of "complex systems," which include systems comprised of individual agents whose responses to environmental stimuli affect other agents' responses, which in turn impact all agents' actions and, ultimately, alter the environment, leading to cascades of changes and responses that can unfold in unpredictable arrangements. For these reasons, modeling complex systems *ex ante* is known to be difficult.

Yaneer, B., "General Features of Complex Systems," *Knowledge Management, Organizational Intelligence and Learning, and Complexity*, Vol. 1 UNESCO EOLSS (2014).

[17] It has been thoroughly established that "statistical" resources used to estimate trip generation levels associated with different developments are based upon unreliable survey data, do not adhere to accepted standards of statistical rigor, and are often misapplied when used to estimate prospective traffic levels. The inadequacy of these resources compounds modeling problems.

Shoup, D. *The High Cost of Free Parking*, American Planning Association Planners Press (2011).

[18] The "Empirical Evidence" section of this report provides basis for these figures.

RAMIFICATIONS OF INDUCED TRAFFIC

Three significant ramifications stem from induced traffic, two of which have long-term financial implications and should thus be considered alongside any proposals for new roadway budgeting. The third effect is social in nature.

Financial Waste

The first consequence is that financial outlays used to expand roadway capacity go largely to waste. Owing to the induced traffic effect, roadway expansions generate their own increase in roadway demand, which causes the expansion to substantially fail at improving road congestion and travel times. That is, expansions do not generate meaningful societal benefit because induced demand effects consume most of the additional road supply. Investments financing capacity expansions are therefore principally wasted, with those outlays becoming irrecoverable losses.

In addition to financial losses associated with initial development costs, the ongoing outlays needed for the upkeep of additional roadway capacity also result in waste. Since maintenance of an expanded road system that has not improved traffic outcomes generates no societal benefit, the ongoing spending is misapplied. This is especially problematic for future budgeting discretion because maintenance costs represent continuing, required payments; inefficiency and waste become designed into future budgets.

Empirical evidence shows that, for every $1.00 spent on roadway expansion and added maintenance, approximately $0.78 to $0.94 becomes waste.[19]

Natural Resources Depletion

The second consequence is that expanded road capacity and its attendant induced traffic effects consume substantial natural resources, which would not have been consumed but-for the roadway expansion. These natural resource costs include land wasting, fuel wasting, air pollution, and water pollution, among others, all expended without any meaningful offsetting relief of traffic congestion. Accordingly, this expenditure of natural resources becomes a loss, since the increase in wasting and pollution that owe to the induced traffic effect reduces social welfare without mitigating benefit.

The corollary of these natural resource losses is that future financial investments will be required to recover land, air, and water quality that is deteriorated by the larger road system and higher traffic counts. Since it is more costly to damage and subsequently recover environmental quality than it is to conserve environmental quality in the first

[19] Basis for these numbers is detailed in the “Empirical Evidence” section of this report. In short, these waste figures reflect quantitative studies of the induced demand effect in transportation systems that show, on average, 78% to 94% of expanded road capacity is consumed by induced traffic within 3 to 4 years of the expansion.

place, this implies high future financial burdens for environmental recovery, or a permanently crippled environmental state, which presents its own costs.[20]

Social Welfare Loss

As road capacity is expanded and as more automotive traffic is induced to traverse the transportation system, several elements of social welfare are harmed. Mechanisms harming social welfare include:

- Visual intrusion, relating to the diminution of environmental aesthetic quality brought on by additional driven and parked cars as well as other new automotive infrastructure;
- Noise and vibration, spawned by additional automotive transportation, which is a main source of noise generation in urban and suburban environments;
- Loss of social spaces and loss of green spaces, brought about by the development of larger roadways that consume areas beneficial to social and health outcomes in the community;
- Collisions and loss of life, generated by greater automotive utilization that increases the statistical likelihood of driver, pedestrian, and cyclist loss of life; and
- "Severance," which is the social cost imposed on communities that become separated by enlarged and/or faster roadways.[21]

Here it is relevant to address another element of social welfare that could, at first glance, appear to offset certain of these losses but in fact compounds social welfare loss. It can be argued that a "revealed preference" for drivers to undertake less structured and less efficient roadway travel (e.g., by not grouping errands, taking more discrete vehicle trips, and traveling more vehicle miles) shows that increased road supply enhances those drivers' well being by allowing them to express this preference. Although this logic is facially appealing, it does not withstand scrutiny. For one, the tautological underpinnings of "revealed preference" have been refuted by findings from behavioral economics showing that, simply because a consumer undertakes an action (or purchases a good), that act does not *ipso facto* indicate the consumer has behaved in accordance with his or her best interest or stated preferences.[22] Simply put, people can and do make systematic mistakes.

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[20] Natural resources are generally recognized to confer economic and social benefits captured under the headings of "environmental services" and "ecosystem services." These include such things as carbon-dioxide capture, rainwater/runoff management, soil erosion mitigation, ecosystem support, habitats, etc. These benefits provide positive economic value that is lost when the resources are displaced. If the resources are not subsequently recovered through remediation efforts, those losses become permanent. If remediation efforts are undertaken, the environmental services value loss is curtailed, but remediation costs are realized. In either case, economic losses are incurred that exceed any "losses" associated with forgoing roadway development that generates no benefit.

[21] "Reclaiming City Streets for People: Chaos or Quality of Life?" European Commission, Directorate-General for the Environment (2004).

[22] Beshears, J., et al., "How Are Preferences Revealed?" Paper prepared for the Happiness and Public Economics Conference, London School of Economics (September 2006).

Second, Americans report that driving in an automobile is among the least enjoyable and most stressful elements of life, so it is unlikely that additional driving miles would substantially enhance drivers' well being.[23] If anything, incremental driving associated with induced traffic reduces social welfare among drivers, rather than enhances it, and thereby contributes to overall social welfare losses.[24]

This second point is supported by studies showing that modal substitution from vehicles to non-vehicle transport is highly sensitive to reductions in vehicle infrastructure or increases in non-vehicle infrastructure. This implies that drivers default to vehicle transportation for lack of viability in alternatives.[25] Indeed, Janette Sadik-Khan, chair of the National Association of City Transportation Officials attributes traffic congestion to "too many people driving without credible transportation alternatives."[26] Absence of reasonable choice generally harms social welfare.[27]

Finally, increases in lane-miles and VMTs are *not* indicative of increased economic activity. An inverse relationship exists between a region's road building levels and its employment levels,[28] and modal substitution from driving is associated with gains in productivity,[29] increased innovation,[30] and greater social connections[31] - all indicators of social welfare accrual that occurs when road expansion is stemmed, and all indicators of social welfare losses that amass when roads are expanded and higher VMTs are induced.

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[23] Or, more completely: It is unlikely that welfare losses from additional driving mileage would be sufficiently offset by welfare gains associated with less investment in errand planning.

[24] Krueger, A., et al., "National Time Accounting: The Currency of Life," in *Measuring the Subjective Well-Being of Nations: National Accounts of Time Use and Well-Being* (Krueger, A., Ed.), Chicago University Press (2009).

[25] Cairns, S., et al., *Traffic Impact of Highway Capacity Reductions: Assessment of the Evidence*, Landor Publishing (1998).

Kruse, J., "Remove It and They Will Disappear: Why Building New Roads Isn't Always the Answer," Surface Transportation Policy Project Progress VII (March 1998).

Pucher, J. and R. Buehler, "Safer Cycling Through Improved Infrastructure," *American Journal of Public Health*, Vol. 106, No. 12 (December 2016).

Steer Davies Gleave, "Research into the Impacts of 20mph Speed Limits and Zones, (November 2014).

[26] Sadik-Khan, J. *Streetfight*, Viking (2016).

[27] This is a foundational economic concept. Constraints on choice, particularly when evidence shows that constrained options are preferred and generate positive externalities, are axiomatically reflective of harmed social welfare.

[28] Kruse, J., "Remove It and They Will Disappear: Why Building New Roads Isn't Always the Answer," Surface Transportation Policy Project Progress VII (March 1998).

[29] Kooshian, C. and S. Winkelman, *Growing Wealthier*, Center for Clean Air Policy (2011).

[30] Speck, J., *Walkable City*, North Point Press (2012).

[31] Appleyard, D., *Livable Streets*, University of California Press (1982).

EMPIRICAL EVIDENCE OF INDUCED DEMAND

Empirical studies of the induced traffic effect show that additional supply begets its own demand, thus leading to the negative consequences discussed above.[32] It is accordingly the case that increases in roadway capacity generate harms on financial, environmental, and social resources without any meaningful long-run benefit for traffic congestion, fuel efficiency, travel times, or travel-time reliability.[33]

The Hansen Study

One landmark study evaluating the induced traffic effect analyzes a set of panel data drawn from 14 metropolitan areas in California, covering 16 years. This study (the "Hansen Study") shows causality between road capacity growth and roadway demand, concluding that road expansion in metro areas, on its own, induces new traffic sufficient to consume *90%* of the added supply within four years.[34]

Summarily, separate and apart from any other factors that may affect roadway demand (such as population growth), the simple addition of road capacity is itself sufficient to incite *incremental driving that depletes 90% of the added capacity*. Only about 10% of any new capacity actually goes toward the reduction of pre-intervention traffic congestion or toward the accommodation of new population growth.

This finding translates into a *financial loss factor of nearly 90%* on any new capacity investments. For every dollar spent on new roadway capacity, about $0.90 of that dollar would be lost and irrecoverable, with no offsetting benefit. Additional losses would be represented by environmental and social costs generated by the expansion.

The Hansen Study's lead author summarizes his conclusions as follows (emphasis added):

> **New roads generate substantial new traffic** in metropolitan regions. A 1.0 percent increase in lane miles induces a 0.9 percent increase in VMT [vehicle miles traveled]...

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[32] For simplicity, all elasticity values are reported in this section are shown in absolute value.

[33] The empirical studies discussed here exhibit observed induced demand levels consistent with those found using computer simulation models developed to analyze and forecast demand patterns.

Rodier, C., et al., "Anatomy of Induced Travel: Using an Integrated Land Use and Transportation Model in the Sacramento Region" (November 2000).

Johnston, R., et al., "Applying an Integrated Model to the Evaluation of Travel Demand Management Policies in the Sacramento Region," Mineta Transportation Institute for Surface Transportation Policy Studies, College of Business, San Jose State University (September 2001).

[34] Hansen, M. and Y. Huang, "Road Supply and Traffic in California Urban Areas," *Transportation Research*, Vol. 31, No. 3 (1997).

> With so much induced traffic, **adding road capacity does little to reduce congestion**.[35]

The STPP Study

A second study, conducted by the Surface Transportation Policy Project, analyzes 15 years' worth of data collected from 70 U.S. metropolitan areas by the Texas Transportation Institute (the "STPP Study").[36] The STPP Study includes the following summary of its findings (emphasis added):

> …**metro areas that invested heavily in road capacity expansion fared no better in easing congestion than metro areas that did not**. Trends in congestion show that areas that exhibited greater growth in lane capacity spent roughly $22 billion more on road construction than those that didn't, yet ended up with slightly **higher congestion costs per person, wasted fuel, and travel delay**.

The STPP Study is observational in nature and does not attempt to quantify the induced traffic effect directly. Nonetheless, the analysis demonstrates that *heavy investment in road capacity is not sufficient to cure traffic congestion*, and *worse traffic outcomes are more likely to be observed in regions with high roadway growth*.

Regions with higher road construction also suffer greater financial burdens than those with lower levels of construction. All these findings are consistent with the theory and other empirical evidence of a large induced traffic factor.

The UK Study

A third study was commissioned by the UK Department of Transport (the "UK Study") to evaluate the induced traffic effect for purposes of understanding the phenomenon and incorporating it into transportation system planning.[37]

Following an exhaustive evaluation of the theoretical and empirical evidence surrounding induced traffic, the UK Study concludes that the induced traffic effect substantially consumes new roadway capacity, leaving essentially no residual capacity for congestion relief or the accommodation of new population growth.

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[35] Hansen, M., "Do New Highways Generate Traffic?" *Access*, No. 7 (Fall 1995).

[36] "An Analysis of the Relationship Between Highway Expansion and Congestion in Metropolitan Areas: Lessons from the 15-Year Texas Transportation Institute Study," Surface Transportation Policy Project (November 1998).

[37] "Trunk Roads and the Generation of Traffic," Standing Advisory Committee on Trunk Road Assessment, UK Department of Transport (1994).

This study is sometimes called the "Goodwin" study or is known by the acronym for the Standing Advisory Committee on Trunk Road Assessment ("SACTRA").

The report identifies a "demand elasticity" for roadway consumption of approximately 1.0. Such an elasticity value indicates that, for every increase in road capacity, there will be an approximately equal increase in traffic – all brought on by the induced traffic effect – within a few years of the expansion's completion.

That is, the long-term result of any roadway capacity increase is expected to be *zero improvement in traffic congestion or travel time and zero accommodation of new population growth*.

All investment dollars would accordingly be total losses, and society would be made worse off (due to environmental and social costs) without any offsetting traffic benefits. On the basis of this study and others like it, the British have curtailed road-building budgets, and the Transport Minister has stated, "The fact of the matter is that we cannot tackle our traffic problems by building more roads."[38]

The Noland Study

A fourth study (the "Noland Study") reviews the statistical research conducted by more than a dozen quantitative analyses measuring induced traffic across a variety of time periods and geographies (i.e., both urban and rural, and both in the United States and the UK).[39]

According to this review, the observed average long-run (i.e., generally about 3 years) values for the induced traffic effect range from approximately 79% to 93%, indicating that very little traffic congestion benefit is attained from roadway capacity increases, despite the high costs of development and maintenance.[40]

These induced traffic effect values demonstrate that approximately *four-fifths to nine-tenths of all new road capacity is consumed by induced traffic* within a few years following the new installation, implying *financial waste associated with every dollar of capacity expansion investment in the range of $0.79 to $0.93*.

Accordingly, the Noland Study concludes that the financial, environmental, and social costs incurred to support new roadway capacity generate substantial wastage and losses.

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[38] Duany, A., et al., *Suburban Nation*, North Point Press (2000).

[39] These include the UK Study, the Hansen Study, previous work by Hansen ("Cervero/Hansen"), previous work by Noland ("Noland 1" and "Noland/Cowart") and a simulation model analysis ("Rodier").

Noland, R.B. and L. Lem, "A Review of the Evidence for Induced Travel and Changes in Transportation and Environmental Policy in the US and the UK," *Transportation Research Part D*, 7 (2002).

[40] This computed result of 79% to 93% is consistent with a review of research undertaken by the Victoria Transport Policy Institute, findings of which indicate a long-run range of 65% to 86%, using a slightly different methodology. (Litman, T., "Generated Traffic and Induced Travel: Implications for Transport Planning," Victoria Transportation Policy Institute (April 17, 2017).)

The Duranton Study

A fifth analysis (the "Duranton Study") was published in the prestigious *American Economic Review*.[41] This analysis evaluates city-level average annual daily traffic and roadway development data from the U.S. covering the period 1983 to 2003, subjecting the data to various econometric models to determine long-run demand elasticity values.

The Duranton Study concludes that *elasticities range from 0.67 to 1.03*, depending upon model specifications, with the study's authors indicating that *the upper range of calculated values is the "most defensible estimate" of the responsiveness of traffic to roadway expansion*. That is, for every one lane-mile of roadway added, the result is induced traffic that consumes as much as 103% of that additional capacity, exclusive of population growth or other factors.

The Duranton Study published after the Noland Study, so its results are not included in the Noland Study's review. When the Duranton Study's results are incorporated, aggregated estimates of economic analyses of the induced traffic effect range from 0.78 to 0.94, as shown in Figure 1.

Other Studies

Additional research efforts have been made to understand the mechanisms underpinning induced traffic and to quantify the effect, including those shown in Figure 1 but not separately discussed.

Certain studies have followed econometric methodologies similar to those used in the Hansen Study, the UK Study, and the Duranton Study (i.e., the Cervero/Hansen, Noland/Cowart, and Noland 1 studies). Others have utilized sophisticated computer simulation modeling (i.e., Rodier). While the various approaches have resulted in some modest diversity in findings, the most notable feature of the body of empirical work is its level of agreement: *induced traffic is a predictable, persistent, and significant result of lane-mile growth, regardless of the geography, population, or time period studied*.

Summary of Empirical Studies of Induced Traffic

The below table summarizes empirical results of analyses quantifying the induced traffic effect over long-run intervals.

Short-term studies (i.e., those estimating demand elasticity values over short-run intervals two years or less) are excluded from consideration here. Short-run evaluations, by their design and often by their authors' own admission, fail to completely capture the full effects of induced demand.

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[41] Duranton, G. and M. Turner, "The Fundamental Law of Road Congestion: Evidence from US Cities," *American Economic Review*, Vol. 101 (2011).

Moreover, within the context of Bend's transportation planning initiatives, it is appropriate to consider only long-run effects since the capital investments made in any roadway expansion would be considered long-run investments. It would be improper to evaluate only the short-term effects of long-term projects.

Figure 1

Estimated Long-Run Demand Elasticity for Automotive Roadways
Summary of Empirical Studies

Analysis	Demand Elasticity Estimate Range Low	High
UK Study	1.00	1.00
Hansen Study	0.90	0.90
Noland 1	0.70	1.00
Noland/Cowart	0.80	1.00
Cervero/Hansen	0.56	0.56
Duranton Study	0.67	1.03
Rodier	0.80	1.10
Average	**0.78**	**0.94**

Note:
Calculated demand elasticity average ranges include values from studies specifying long-run demand effects. All figures shown in absolute value.

The Induced Demand Effect and Non-Automotive Infrastructure

Induced demand also has been observed in connection with cycling and pedestrian infrastructure. For instance, one analysis (the "Pucher Study") considers the effects of bikeway expansions in U.S. cities on demand for bike trips. The Pucher Study calculates percentage increases in bikeways over periods as long as 15 years in 10 major U.S. cities. It then compares those supply increases with changes in bike trips made over the same period.[42]

In Minneapolis, Minnesota, for example, an increase in the bikeway network of 113% is observed, and the percentage growth rate of bicycle trips made in the city is 203%. The computed "sensitivity of bike trip demand to bike infrastructure growth" in Minneapolis is accordingly 1.8. For each one percentage point increase in the

[42] Pucher, J. and R. Buehler, "Safer Cycling Through Improved Infrastructure," *American Journal of Public Health*, Vol. 106, No. 12 (December 2016).

bikeway network, Minneapolis has seen a 1.8 percentage point increase in bike trips made in the city, a result that is slightly below average. In Washington, D.C., bike infrastructure was increased 101% and the city registered 384% growth in bike trips, an above-average sensitivity of 3.8. In Portland, Oregon, the sensitivity of bike trip demand to bike infrastructure growth is 7.4.

Across all 10 of the evaluated cities, the average "sensitivity of bike trip demand to bike infrastructure growth," a statistic similar in nature to induced demand, is a little over 2.5. In other words, the demand for bicycle trips appears highly sensitive to increases in bike network infrastructure.[43]

The Pucher Study summarizes (emphasis added):

> …**bicycle infrastructure can indeed help improve cycling safety and increase cycling levels**. That is clearly demonstrated by decades of evidence… More and better bicycle infrastructure and safer cycling would encourage Americans to make more of their daily trips by bicycle…

These findings support the notion that the induced demand effect in transportation systems applies as much to non-automotive modes as to automotive transport. On this basis, it can be stated that investments made in non-automotive transportation infrastructure can relieve automotive traffic congestion since, as people are provided viability in non-automotive transport, VMT demand evaporates.

This mechanism of VMT reduction can be detailed as follows. When additional people walk or cycle, those people undertake a simple substitution – walk or cycle rather than drive – and thereby reduce vehicle miles traveled in the transportation system. Each person who takes a trip on foot or bike equates to one fewer trip made by car, so the removal of cars (and VMTs) from the transportation system occurs in quantities commensurate with increases in walking and biking. It is through this mechanism that increased pedestrian and bicycle network infrastructure supply can result in lower traffic congestion, even in the absence of increased automobile infrastructure supply (and, indeed, perhaps most strongly in the absence of increased automotive roadway capacity).

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[43] This study makes no attempt to distinguish the effects of supply expansion from other factors that could influence demand for bike trips. Nonetheless, due to the breadth and duration of the analysis, as well as the large observed increases in bike trips, there is strong (if not statistical) evidence of a positive induced demand effect with respect to bicycle transport.

Other studies have developed statistical relationships between bicycle infrastructure and ridership, thereby illustrating induced demand effects. For instance, they have found that bikeway "connectivity and directness are important factors in predicting bicycle commuting after controlling for demographic variables and the size of the city." (See: Schoner, J., "The Missing Link: Bicycle Infrastructure Networks and Ridership in 74 US Cities," *Transportation*, Vol. 41, No. 6 (November 2014). See also: Krizek, K., et al., "Analyzing the Effect of Bicycle Facilities on Commute Mode Share Over Time," *Journal of Urban Planning and Development*, Vol. 135, No. 2 (June 2009).)

Notably, on a cost-per-mile basis, *new bikeway infrastructure can cost in the range of 95% to 99% less than new automotive roadway*.[44] Such cost differential, when considered in conjunction with induced demand effects, argues strongly in favor of non-automotive infrastructure expansion as means of reducing traffic congestion.

The below table summarizes the Pucher Study's findings and shows the calculated sensitivity level of bike trips vis-à-vis bikeway supply.

Figure 2

Growth in Bikeway Networks and Bicycle Trips
Pucher Study

City	Years	Growth in Bikeway Network (%)	Growth in Bicycle Trips (%)	Bicycle Trip Demand Sensitivity to Infrastructure Growth
Portland, OR	2000-2015	53%	391%	7.4
Washington, DC	2000-2015	101%	384%	3.8
New York, NY	2000-2015	381%	207%	0.5
Minneapolis, MN	2000-2015	113%	203%	1.8
San Francisco, CA	2000-2015	172%	167%	1.0
Cambridge, MA	2000-2015	27%	134%	5.0
Chicago, IL	2005-2015	135%	167%	1.2
Seattle, WA	2005-2015	236%	123%	0.5
Los Angeles, CA	2005-2015	130%	114%	0.9
Philadelphia, PA	2008-2015	17%	51%	3.0
Average				**2.5**

Source:
Pucher, J. and R. Buehler, "Safer Cycling Through Improved Infrastructure," *American Journal of Public Health*, Vol. 106, No. 12 (2016).

Note:
Bike Trip Demand Sensitivity to Infrastructure Growth calculated as Growth in Bicycle Trips (%) / Growth in Bikeway Network (%).

[44] Weigand, L., et al., "Cost Analysis of Bicycle Facilities: Cases from Cities in the Portland, OR Region," Portland State University Center for Urban Studies (June 2013).

Litman, T., "Whose Roads? Evaluating Bicyclists' and Pedestrians' Right to Use Public Roadways," Victoria Transport Policy Institute (December 2013).

REDUCED DEMAND

The economics of induced demand also work in reverse. If roadway capacity declines, then vehicle traffic falls. This is known as "reduced demand," and like induced demand, it is well known and empirically validated. In short, reduced demand is "what happens when 'vital' arteries are removed from cities. The traffic just goes away."[45] As summarized by a *Newsweek* article (emphasis added):

> …demand from drivers tends to quickly overcome the new supply; today traffic engineers acknowledge that **building new roads usually makes traffic worse**…[and] **closing roads can reduce congestion**.[46]

Reduced demand can be spurred by the closure of roads, reduction of lane-miles, and abatement of roadway capacity expansion. This strategy to reduce traffic congestion and improve transportation efficiency has been successfully undertaken in a variety of instances, including high-profile situations such as in San Francisco (at the Embarcadero Freeway, following its collapse and, additionally, at the Central Freeway), New York City (at Broadway near Times Square), Portland, Oregon (on Harbor Drive), Milwaukee (on the Park East Freeway), Madrid, Spain (at Rio Madrid), and Seoul, South Korea, where an expressway carrying 168,000 cars per day was removed.[47]

In all cases, system-wide traffic conditions improved and, due to well established inverse relationships between vehicle usage and land use/real estate values, general and sometimes substantive improvements in land use and real estate values were observed.[48] Additionally, broader measures of local economic activity have been found to

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[45] Speck, J., *Walkable City*, North Point Press (2012).

[46] Summers, N., "New York City Embraces a Bold New Traffic Theory," *Newsweek* (February 26, 2009).

[47] Siegel, C., "From Induced Demand to Reduced Demand," Preservation Institute (2007).

Speck, J., *Walkable City*, North Point Press (2012).

Sadik-Khan, J. *Streetfight*, Viking (2016).

[48] Two effects explain changes in land use/real estate value in connection with vehicle usage. First, increased vehicle volume and speed are associated with particulate matter and noise pollution intensification that harm real estate value and hedonic states of land use. Second, pedestrian and cyclist usage and access, which rise and fall inversely with vehicle traffic, are associated with enhanced land uses and real estate values. Reductions in vehicle intensity give rise to non-automotive transport usage and thus enhanced real estate conditions.

Bateman, I., et al., "The Effect of Road Traffic on Residential Property Values: A Literature Review and Hedonic Pricing Study," Scottish Executive Development Department (January 2001).

Pignier, N., "The Impact of Traffic Noise on Economy and Environment: A Short Literature Study," KTH Royal Institute of Technology (2015).

Ozdenerol, E., et al., "The Impact of Traffic Noise on Housing Values," *Journal of Real Estate Practice and Education*, Vol. 18, No. 1 (July 2015).

Bokhari, S., "How Much Is a Point of Walk Score Worth?" Redfin Housing Market News (August 3, 2016).

exhibit an inverse relationship with respect to vehicular infrastructure development. As more is spent on road development, local unemployment rates tend to increase, while the removal of lane-miles tends to boost local employment,[49] and productivity and innovation levels tend to increase.[50]

Empirical research quantifying the effects of reduced demand strategies on traffic counts has been conducted across dozens of locales. Two comprehensive studies demonstrate that, depending upon the particulars of the road closure strategy, 14% to 60% of traffic disappears from the transportation network following closures.

The first study indicates that, despite the typical "predictions of major traffic chaos [associated with road closure strategies]…examination of the evidence [shows] that the predictions rarely, if ever, prove accurate." When reduced demand strategies are employed, "prolonged, long-term gridlock is simply not restored." Rather, across a multitude of studied cases where road capacities were reduced in areas as a means to address traffic congestion, the approach resulted in "significant reductions in the total amount of traffic on the networks studied. On average 14-25% of the traffic that used to use the affected route, could not be found on neighboring streets."[51]

Separately, an empirical study observing 60 road closures determined that between 20% and 60% of driving trips disappeared, on net, from the transportation system.[52]

The mechanisms by which this traffic reduction occurs precisely mirror the processes that underpin induced demand: driver behavior changes to reflect the conditions by making more efficient use of vehicle trips and roadways; more people carpool and participate in ride-shares; marginal drivers switch modes to walking, cycling, or other alternative transit; and people choose to maintain or consolidate their housing and work geographies rather than increase their commute requirements. Reduced demand strategies are thus associated with increased efficiency in transportation systems - the elimination of "empty miles" and low-value vehicle trips characterized by over-reliance upon vehicle travel when induced demand effects play out are reversed when reduced demand approaches are used.

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[49] Moreover, by not spending funds to build futile lane-miles, city revenue can be spent on projects that do benefit the economic and life-quality outcomes of residents.

Kruse, J., "Remove It and They Will Disappear: Why Building New Roads Isn't Always the Answer," Surface Transportation Policy Project Progress VII (March 1998).

[50] Kooshian, C. and S. Winkelman, *Growing Wealthier*, Center for Clean Air Policy (2011).

Speck, J., *Walkable City*, North Point Press (2012).

[51] Cairns, S., et al., *Traffic Impact of Highway Capacity Reductions: Assessment of the Evidence*, Landor Publishing (1998).

[52] Kruse, J., "Remove It and They Will Disappear: Why Building New Roads Isn't Always the Answer," Surface Transportation Policy Project Progress VII (March 1998).

CONCLUSIONS

Based on the foregoing, the following conclusions can be drawn:

1. Overwhelming evidence demonstrates that neither existing traffic congestion nor future population growth can be reliably addressed by adding road capacity. This is because of the induced traffic effect, which consumes the majority, if not all, of any new roadway supply in a short period.

2. The costs and waste associated with new road capacity, expanded road maintenance, and increased automobile utilization are staggeringly high in financial, environmental, and social terms.

3. Road capacity investments are self-defeating: The aim of road investments is ostensibly to improve the quality of life for people using and living near the transportation system; however, road capacity investments consign those who use and live near the transportation system to a lower quality of life due to reduced environmental and social conditions and no meaningful reduction in traffic congestion.

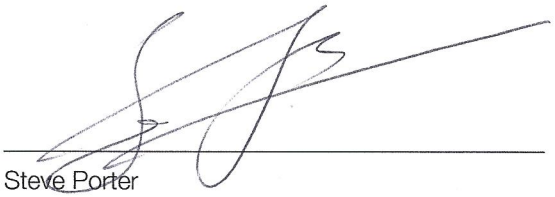
4. To the extent proposed roadway infrastructure projects do not properly incorporate induced demand effects (i.e., by recognizing that demand elasticity is large and increases over time), such projects will be systematically overvalued, and alternative arrangements (e.g., congestion pricing schemes or non-automotive transport networks) will be systematically undervalued, resulting in poor planning outcomes.

5. It is not advisable for Bend to increase its road capacity for automotive travel without properly accounting for induced demand.

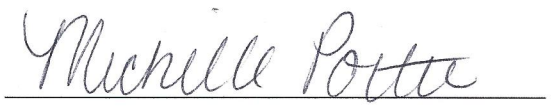
6. Infrastructural developments prioritizing non-automotive transport are superior investments for Bend's future. Since supply-induced demand effects also apply to non-automotive modes, infrastructure growth supporting these alternatives would enhance their uptake and reduce automobile reliance. Capacity increases for non-automotive modes would alleviate road congestion efficiently, as use of these modes directly pulls VMTs from roads and improves social and environmental outcomes, while requiring relatively low investments.

7. The Citywide Transportation Advisory Committee should prioritize funding and infrastructure enhancements for non-automotive transport in Bend and should view with skepticism any promise of traffic congestion relief through roadway expansion.

Thank you for your consideration of this important topic as you proceed with making recommendations about the future of Bend's transportation system.



Steve Porter



Michelle Porter

GRAPHICAL APPENDIX

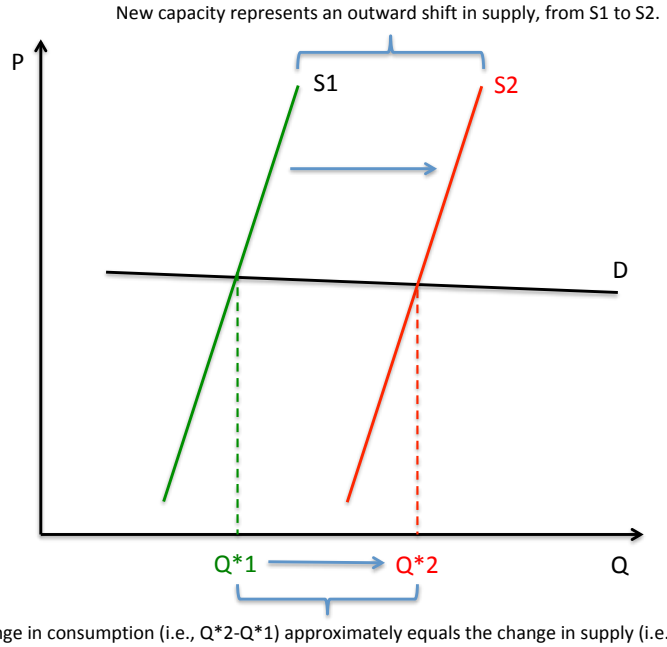
The induced traffic effect is entirely consistent with the typical workings of supply and demand within markets. Empirical research relating to induced traffic takes place within this framework, defining the "elasticity" (and thus deriving the slope) of the demand curve for roadways. While many may assume a perfectly inelastic (i.e., vertical) demand slope exists, empirical evidence shows that demand can be viewed as nearly perfectly elastic (i.e., flat).

Accordingly, the induced traffic effect can be graphically illustrated as follows, where:

D = Demand for roadways, typically "vehicle miles traveled." Evidence shows demand is highly elastic. The demand function shown represents existing demand; that is, it does not reflect any exogenous factors such as population growth, etc., which would be reflected in an outward shift of the demand curve.

S = Supply of roadways, typically "lane-miles." Supply elasticity does not bear on the outcome of the analysis shown here, so the supply curve's slope (i.e., whether lane-mile supply is highly inelastic or not) does not matter.

Q* = The "market clearing" consumption quantity of miles traveled (i.e., the point of supply and demand equilibrium).



Change in consumption (i.e., Q*2-Q*1) approximately equals the change in supply (i.e., S2-S1). Therefore, little, if any, congestion benefit will be observed post-intervention.

ABOUT THE AUTHORS

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Steve is a recognized authority on economic analysis and valuation. He has provided expert testimony in high-stakes commercial litigation on topics including economics, valuation, statistics, econometrics, market definition, consumer choice, business strategy, and pricing, among others. He has consulted with Fortune 500 corporations on intellectual property licensing, asset transactions, and valuation issues, and he has conducted economic impact analyses, including work performed on behalf of the Los Angeles Superior Court. His articles have published in the *Journal of Legal Economics*, *les Nouvelles*, the *Patent, Trademark & Copyright Journal*, the *Journal of the Patent and Trademark Office Society*, and *Intellectual Asset Management*, among others. He also is co-author of *IP Strategy, Valuation, and Damages* (LexisNexis), a treatise on intellectual property economics. Steve has been an invited speaker before the Chicago Bar Association, the Attorney General's Office of the State of Arizona, and various law firms and corporations, where he has lectured on topics ranging from economic analysis and valuation to econometrics and game theory, and he has been quoted by and featured in the editorials section of the *Wall Street Journal*. Steve is a recipient of the William J. McKinstry Award in economics, the *Wall Street Journal* Scholar Award, the Micronomics Economic Research Award, and the IE Fund Leadership Scholar Award. He has served as a teaching assistant in economics at the Dolibois European Center in Luxembourg, an ad-hoc referee for the *Journal of Forensic Economics*, and as Co-Chair and an Executive Committee Member of Young Professionals Advisory Council at the Farmer School of Business. Steve graduated *summa cum laude* and with University Honors from Miami University in Oxford, Ohio, completing dual majors in economics and marketing. He was granted his MBA, with honors by the Dean and Board of Academic Affairs, from IE Business School in Madrid, Spain, graduating 5th in a class of more than 400. Steve holds the Series 65 securities license.

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