November 5, 2015

Via Electronic Mail (loop1604@htnb.com)

Lena Camarillo
HNTB Corporation
85 NE Loop 410, Suite 304
San Antonio, Texas 78216

Re: Initial Comments Regarding Improvements to Loop 1604 from SH 151 to IH 10E

Dear Ms. Camarillo:

On behalf of the Greater Edwards Aquifer Alliance[1], AGUA[2], Save Our Springs Alliance ("SOS Alliance")[3] and . . . [others], we would like to thank you for the opportunity to provide initial comments on TxDOT's plan to improve Loop 1604 from SH 151 to IH 10 E.

As you know, this portion of roadway overlies the recharge zone for the Edwards Aquifer, the most ecologically sensitive region in Texas.[4] As such, any road improvements that substantially increase vehicle miles traveled ("VMT") over this area, given the concomitant direct and indirect impacts associated with road construction, operation, and the subsequent urbanization that surely follows, is likely to have a significant environmental impact. In that regard, it defies common sense for TxDOT to be focusing its efforts on developing an environmental assessment in lieu of a full environmental impact statement. It

[1] The Greater Edwards Aquifer Alliance unites thirty member groups from throughout the Edwards Region behind a comprehensive plan to protect the Edwards Aquifer, its springs and watersheds, and the Hill Country that sustains it.

[2] AGUA is a non-profit coalition of concerned individuals and citizen groups working together to preserve the Edwards Aquifer within Bexar County.

[3] SOS Alliance is a non-profit organization dedicated to preserving and protecting Barton Springs, the Edwards Aquifer, and the unique natural environment of the Texas Hill Country.

[4] Texas Water Development Board, *Aquifers of Texas* 14 (Nov. 1995) ("The aquifer feeds several well-known recreational springs and underlies some of the most environmentally sensitive areas in the state."); Edwards Plateau Ecoregional Planning Team, The Nature Conservancy, *A Biodiversity and Conservation Assessment of the Edwards Plateau Ecoregion* 1-2 (2004) ("The Edwards Plateau is truly a unique place, even from a global perspective. . . . It is this varied ecological setting that makes the Edwards Plateau one of the most diverse biological regions in the world.").

also defies federal and state regulations that require an EIS be prepared where it is "*likely*" that an action has "a significant impact on the environment."[5]

[5] 23 C.F.R. § 771.119(i); 43 Tex. Admin. Code §§ 2.42, 2.43.

Significance, in this context, is measured in relation to the context and intensity of impacts.[6] In the present case, the context of the proposed project is the sole source drinking water aquifer for over a million people, the home to numerous threatened and endangered species, an already-polluted airshed, and an area rapidly losing its rural nature and character. As such, even "slight" impacts rate as intense.[7]

Yet as the comments below demonstrate, improvements to Loop 1604 will hardly have "slight" impacts to the environment. Rather, the impacts will be *significant*. In that connection, we incorporate by reference the studies and documents cited herein and submitted along with our April 10, 2006 comments regarding Loop 1604 to be included in the record. We believe, based on this record, that the minimal threshold necessary for developing an EIS is cleared by a long shot. Based on this record, it would be arbitrary and capricious to determine that there is no likely significant environmental impact.

In sum, we ask only that FHWA and TxDOT do what the law requires them to do, and what they have already recognized they must do in similar situations:[8] initiate a process whereby an environmental impact statement is developed. Only through NEPA's EIS process can a full and complete understanding of the impacts associated with roadway improvements along the Loop 1604 corridor be developed so that the public can make an informed choice about such improvements.

I. THE PROJECT AREA IS THE MOST ECOLOGICALLY SENSITIVE REGION IN THE STATE

The area over which the northern half of Loop 1604 runs is the most ecologically sensitive area of Texas. It is home to multiple endangered species, and overlies the federally designated sole source drinking water aquifer that provides water to over 1 million people. The area currently technically fails to achieve EPA's 8-hour ozone standard in large part due to the increased traffic the proposed improvements are intended to address. San Antonio is also one of the fastest growing cities in the nation. That growth is especially intense along the Loop 1604 corridor to the North, overlying the Edwards Aquifer Recharge Zone. That growth has already outstripped the ability of local government to provide essential services such as adequate wastewater disposal systems leading to waste discharges that pollute already impaired waterways.[9] All told, then, the environment in the project area is simply waiting for the figurative straw to break the camel's back.

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[6] 40 C.F.R. § 1508.27.

[7] *See id*. § 1508.27(b)(3), (4), (5), (6), (7), (9).

[8] For instance, TxDOT is developing an environmental impact statement for the Trans Texas Corridor in part because the Edwards Aquifer recharge and contributing zones are environmentally sensitive. Texas Dept. of Transportation, *TTC-35 Tier One Draft EIS* 9 (FHWA-TX-EIS-05-01-D Apr. 2006).

[9] Lisa Sorg, *What Goes in Must Come out*, San Antonio Current, 4/5/06 ("population growth outpacing the treatment plant's capabilities").

A. The Edwards Plateau Is Home to Multiple Endangered Species

There are presently at least eleven federally listed species that occur in Bexar County, two neotropical migratory songbirds and nine karst invertebrates. These eleven listed species include the Golden-cheeked warbler (*Dendroica chrysoparia*), the black-capped vireo (*Vireo atricapilla*), the Helotes mold beetle (*Batrisodes venyivi*), Madla's Cave meshweaver (*C. madla*), the Robber Baron Cave meshweaver (*C. baronia)*, the Vespera Cave Meshweaver (*C. vespera*), the Braken Bat Cave Meshwevaer (*C. venii*), Government Canyon Bat Cave Spider (*Neoleptoneta microps*), the Robber Baron Cave harvestman (*Texella cokendolpheri*), and two beetles with no common name, *Rhadine exilis* and *Rhadine infernalis*.

Additionally, nine other species listed as threatened, endangered, or candidate species reside in the San Marcos, Comal, Fern Bank, and Hueco springs and their associated aquatic ecosystems. Seven of these species are endangered, including Peck's cave amphipod (*Stygobromus pecki*), Comal Springs riffle beetle (*Heterelmis comalensis*), Comal Springs dryopid beetle (*Stygoparnus comalensis*), San Marcos gambusia (*Gambusia georgei*), fountain darter (*Etheostoma fonticola*), Texas blind salamander (*Typhlomolge ratbuni*), and Texas wild-rice (*Zizania texana*). The San Marcos salamander (Eurycea nana) is listed as threatened and the Cagle's map turtle (*Graptemys caglie*) is designated as a candidate species.

Furthermore, there are an untold number of species waiting to be discovered. As one study stated, "[t]here are of course undiscovered caves with undiscovered species, undiscovered species in known caves, and undescribed species from one or more caves."[10]

Consequently, it is not just the known and listed species that are susceptible, it is the entire region's biodiversity that is at risk from habitat destruction;[11] disease and predation by invasive species;[12] and spills, leaking storage tanks, and other sources of surface and groundwater pollution.[13] Research has shown that amphibians, such as those found in the aquifer and its springs, are particularly sensitive to many contaminants including heavy

[10] David C. Culver, et al., *Obligate Cave Fauna of the 48 Continuous United States*, 14(2) J. Society for Conservation Biology 386 (Apr. 2000); *see also* David C. Culver and Boris Sket, *Hotspots of Subterranean Biodiversity in Caves and Well*, *62* Journal of Cave and Karst Studies 11, 16 (Apr. 2000) (noting that there are a great many undiscovered species at such sites as San Marcos Springs).

[11] For instance, it is estimated that 26 percent of known caves in Bexar County have been destroyed through filling, capping or covering by roads, and blasting by construction operations. United States Fish and Wildlife Service, *Final Rule to List Nine Bexar County, Texas Invertebrate Species as Endangered*, 65 Fed. Reg. 81,419, 81,425 (Dec. 26, 2000).

[12] For instance, of 36 caves visited while conducting a status survey of nine endangered invertebrate species, fire ants were found in 26 caves. Of 24 caves confirmed to contain one or more of these species, at least 15 had fire ant infestations at a time during the year when fire ants had not even likely reached peak densities. *Id*. at 81,426.

[13] *Id*. at 81,425.

metals, pesticides, nitrites, salts, and petroleum hydrocarbons.[14] The toxic effects from such contaminants may be either lethal or sublethal and may include morphological and developmental aberrations, lowered reproductive and survival rates, and changes in behavior and certain biochemical processes.[15] Even if a particular species is not directly impacted, its food chain certainly is.[16]

Unfortunately, tetrachloroethene (PCE), a solvent used in degreasing and dry cleaning, along with toluene and xylene—gasoline and paint solvents—have already been found in the springs in which many of these species live.[17] Even a compound that is an indicator of sewage has been detected.[18] Overall, then, the status quo for these species is particularly precarious even without the introduction of additional threats arising from the construction and maintenance of improvements to Loop 1604.

B. The Edwards Aquifer Is the Sole Drinking Water Supply for Over One Million People

Ever since 1975, the San Antonio segment of the Edwards Aquifer has been designated as the principal source of drinking water for San Antonio and the surrounding areas.[19] That means that, currently, the Edwards is the sole drinking water supply for over one million people.[20]

In designating the Edwards as a sole-source aquifer, the EPA administrator noted that the Edwards "is vulnerable to contamination through its recharge zone, particularly from streams crossing the zone."[21] Since contamination of a ground water aquifer is difficult or impossible to reverse, the Administrator found that "contamination of the Edwards Underground Reservoir would pose a significant hazard to those people dependent on the reservoir for drinking purposes."[22] .

Unfortunately, urban development has already impacted water quality in the aquifer. For instance, leaks and spills have already contaminated drinking water wells in the past.[23]

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[14] United States Fish & Wildlife Service, *Barton Springs Salamander Recovery Plan* 1.6-5 (Sept. 2005).

[15] *Id*.

[16] *Id*.

[17] Paul M. Buszka, Steven D. Zaugg, & Marilyn G. Werner, *Determination of Trace Concentrations of Volatile Organic Compounds in Ground Water Using Closed-Loop Stripping, Edwards Aquifer, Texas*, 45 Bull. Environ. Contam. Toxicol. 507, 510-13 (1990).

[18] *Id*.

[19] 40 Fed. Reg. 58,344 (Dec. 16, 1975).

[20] According to the 2000 Census, over 1.14 million people resided in San Antonio alone.

[21] 40 Fed. Reg. 58,344 (Dec. 16, 1975).

[22] *Id*.

[23] Rudolph Bush, *Gas Spill Fouls Third Trinity Aquifer Well*, San Antonio Express-News, 8/4/1999, at 3B.

One assessment of water quality throughout the San Antonio region of the Edwards Aquifer found 28 human-made volatile organic compounds in samples from 89 different wells.[24] These VOCs included carcinogenic benzene and toluene. The assessment concluded that the VOC detections were "associated with urban development" and that there exists a greater potential for VOC contamination because of increasing development in the aquifer recharge zone.[25]

The lack of any central distribution facility makes treatment for any contamination especially cost-ineffective. As such, the best protection for San Antonio's drinking water supply is prevention. For that reason, San Antonio voters have twice in the past six years approved 1/8-cent sales tax increases to pay for and permanently preserve land over the recharge zone. By contrast, TxDOT's proposed improvements open much of that land to increased and more intensive development.

C. The Geology of the Recharge Zone Makes It Particularly Sensitive to Pollution

The Edwards Aquifer Recharge Zone is marked by outcrops of porous and permeable Edwards Limestone (also known as karst limestone) that are exposed to the surface. This exposed rock features numerous caves, sinkholes, faults and fractures formed where rainfall and creek and stream flows have dissolved large amounts of the limestone such that surface water rapidly flows and percolates into the underground Edwards Aquifer. Due to the highly permeable nature of the recharge zone, the Aquifer is particularly vulnerable to pollution from runoff. For this reason, it is well recognized that the recharge zone is among the most environmentally sensitive areas in Texas.[26]

D. Air Quality in the Project Area Is Worsening

The San Antonio area, covering Bexar, Comal, and Guadalupe counties, currently fails to meet the federal 8-hour ozone national ambient air quality standard.[27] Between 2000 and 2002, the San Antonio area experienced 17 days of unhealthy air quality, a 14.3% increase over the number of such days between 1993 and 1997.[28] That number spiked to 26 between 2003 and 2005.[29] Meanwhile, as of 2002, 11.3% of San Antonio residents had been

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[24] Patricia B. Ging, Linda J. Judd, & Kirby H. Wynn, *Water-Quality Assessment of South-Central Texas—Occurrence and Distribution of Volatile Organic Compounds in Surface Water and Ground Water, 1983-94, and Implications for Future Monitoring*, United States Geological Survey, Water-Resources Investigations Report 97-4028, at 12 (1997).

[25] *Id*. at 16.

[26] *See* Texas Water Development Board, *supra* note 4, at 14.

[27] United States EPA, *Ozone Air Quality Data Update, 2002-2004*.

[28] Surface Transportation Policy Project, *Clearing the Air—Texas Factsheet* (2003).

[29] *See* Texas Dept. of Environmental Quality, *High Ozone in Your Metro Area*, *at* http://www.tceq.state.tx.us/cgi-bin/compliance/monops/ozone_summary.

diagnosed with asthma;[30] all while studies repeatedly demonstrate that even EPA's standards do not adequately protect against the development and exacerbation of such adverse health conditions.[31]

By far, the greatest contributor to these problems in San Antonio is vehicle exhaust. Indeed, one report concluded that vehicle exhaust contributed over 57% of all criteria pollutants in the San Antonio area—second in the nation.[32] These emissions, including toxic constituents, result in current annual health-care related costs approaching $200 million.[33] That number will only increase in the future.

E. Local Surface Waters Are Impaired by Pollution

Loop 1604 in the project area crosses at least six watersheds: Culebra Creek, Upper Leon Creek, Upper San Antonio River, Upper Salado Creek, Cibolo Creek, and Martinez Creek. Of these, Salado Creek, Upper San Antonio River, and Cibolo Creek are on Texas' 303(d) list of impaired waters variously for bacteria and depressed oxygen. Cibolo Creek already receives discharges from the Cibolo Creek Municipal Authority, which exceeded its permitted pollution limits during each of the 18 reporting periods between July 1, 2003 and December 31, 2004, polluting the creek with domestic sewage.[34] Between such discharges, which also occur along the San Antonio River, and the existing impairment in these waterbodies, it is patently clear that none of the waterways in the project area have any capacity to assimilate the increased pollutant loads that will result from construction and maintenance of improvements along Loop 1604.

F. The Texas Hill Country Is Rapidly Being Converted into Urban Sprawl

As development has encroached on the project area, the land has been cleared to replace rugged wooded hillsides with expansive, low-density residential developments with poor street connectivity. This type of "sprawling" development has lead to substantial decreases in forest canopy cover, with more than 22% of heavy tree canopy cover and 43% of medium density canopy being lost between 1985 and 2001.[35] The sprawl has also increased the impervious cover in the area as new roads, homes, and parking lots are put in place. Some pockets of standing forest, though, still remain, perched as reminders of an

[30] *Id.*

[31] Janneane F. Gent, et al., *Association of Low-Level Ozone and Fine Particles with Respiratory Symptoms in Children with Asthma*, 290 J. Am. Medical Assn. 1859, 1866-67 (Oct. 2003).

[32] Surface Transportation Policy Project, *Clearing the Air* 9 (2003).

[33] In 2001, health care related costs arising from air pollution from vehicles amounted to over $193 million. *Id.* at 36.

[34] Environment Texas, *Troubled Waters* 22 (Mar. 2006).

[35] American Forests, *Urban Ecosystem Analysis San Antonio, TX Region* 2 (2002).

environment under attack. These pockets are threatened by the additional development that improvements to Loop 1604 will enable.

Overall, then, the above demonstrates that the environment impacted by any project along the Loop 1604 corridor is particularly fragile and sensitive to disruption. It is clear, then, that any "slight" impact rates as intense.

II. ANY IMPACTS TO THE PROJECT AREA MUST BE JUSTIFIED BY SUBSTANTIAL EVIDENCE

In light of the special and precarious environmental setting described above, TxDOT must provide substantial justification for any disruption to that environment.[36] Accordingly, the very first thing that TxDOT must do is substantiate that a problem indeed exists along Loop 1604 that warrants some sort of environmentally invasive solution. TxDOT cannot simply state "that additional capacity is needed between two points."[37] TxDOT must provide proof of an actual problem that needs to be addressed.

So, is congestion really a problem along Loop 1604? A recent Harris Interactive survey of the general population revealed that congestion is the issue of *least* concern to individuals, across age groups, regions, and even population densities.[38] So, does TxDOT really need to reduce congestion? Perhaps not. Are people really clamoring for more capacity? Perhaps not, but it would be appropriate for TxDOT to find out what the users of Loop 1604 really want before imposing some unwanted solution from on high.

Furthermore, TxDOT must not "cook the books" in order to demonstrate need. As is often the case with highway construction, "'need' is a self-fulfilling prophesy [sic]."[39] TxDOT's projections of traffic volume must be independent of any improvements given that is it "implausible . . . that the same level of transportation needs will exist whether or not … [any improvements are] constructed."[40] Moreover, TxDOT must account for the induced travel that will arise from any capacity increasing projects, or otherwise, TxDOT will grossly

[36] *Sierra Club, Illinois Chapter v. U.S. Dept. of Transp.* 962 F .Supp. 1037, 1043 (N.D. Ill. 1997) (impacts must be adequately justified by project need).

[37] Memorandum from Acting Director, Office of Environmental Policy, Federal Highway Administration, to Regional Federal Highway Administrators and Federal Lands Highway Program Administrator 3 (Sept. 18, 1990), *at* http://www.fhwa.dot.gov/environment/need.htm.

[38] Harris Interactive, *Transportation Survey Results* 9-12 (2005), *at* http://www.uli.org/Content/ContentGroups/PressReleases/2005/RevisedSurveyResults.ppt.

[39] *Swain v. Brinegar*, 517 F.2d 766, 777 (7th Cir. 1975).

[40] *Sierra Club v. United States Dept. of Transp.*, 962 F. Supp. 1037, 1043 (N.D. Ill. 1997);

overstate the project's benefits while grossly understating its negative environmental impacts.[41]

So TxDOT must ask itself, is the capacity of the present roadway inadequate for current traffic? On what basis? What is the projected traffic *without improvements*? With improvements? What capacity is truly needed?

Determining capacity, however, is more complicated than just counting heads.[42] Other factors are far more important in determining capacity than simply population, which only accounted for 13% of the growth in driving between 1983 and 1990.[43] For instance, it is fairly clear that people are adapting their commuting behaviors to higher gas prices by relocating closer to work, changing their commute patterns, and using alternative means of transportation.[44] Consequently, each additional person counted might not translate into an additional vehicle on the road. Indeed, data from the Federal Highway Administration shows that vehicular travel on all roads in the U.S. in April 2006 was down from April 2005.[45] This is the second year in a row that this has occurred in spite of population growth and economic expansion. Are TxDOT's projections really viable then? Clearly, TxDOT must factor in higher gas prices along with other such factors that impact its travel forecasts.

TxDOT must also take into consideration the composition of traffic along Loop 1604. For instance, what percentage of travel is and will be single-passenger versus multiple passenger? What percentage is made up of commuters, local traffic, long distance travelers, or commerce? If TxDOT lacks such a basic understanding of the composition of the traffic along Loop 1604, how can TxDOT rationally propose solutions? Quite plainly, it cannot.

All told, then, TxDOT must engage in sufficient study to understand the nature and extent of any problem it is seeking to resolve. It is insufficient to simply rely on past projections that fail to take account of present reality. Proceeding without such study would be patently arbitrary and capricious.

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[41] Caroline J. Rodier, *A Review of the Representation of Induced Highway Travel in Current Travel and Land Use Models* 8 (July 2004).

[42] Indeed, to even be useful, population forecasts must take into account the fact that population growth over the recharge zone is severely limited due to the lack of available water supplies.

[43] Surface Transportation Policy Project, *Why Are the Roads So Congested?* 1 (Nov. 1999).

[44] Harris Interactive, *Transportation Survey Results* 10-12, 19, 23, 26 (2005), *at* http://www.uli.org/Content/ContentGroups/PressReleases/2005/RevisedSurveyResults.ppt; Press Release, The Urban Land Institute, *Gas Prices: The Tipping Point Toward Better Development? ULI's Nationwide Survey Explores Consumer Attitudes* ("High gas pump prices and suburban congestion are stimulating more interest in urban alternatives"

[45] April 2006 was down 0.4 percent compared with April of 2005. Similarly, vehicular travel in April of 2005 was 1.3 percent lower than April of 2004. *Traffic Volume Trends April 2006*, Federal Highway Administration, June 2006.

The arbitrary and capricious nature of such conduct, however, extends not only in the legal sense, but also in the practical sense, *especially* in the context of toll road financing, where faulty traffic projections lead to financial default and bankruptcy. For instance, a report by Standard & Poors reveals that traffic forecasts for toll roads are consistently biased toward greater traffic than actually materializes.[46] S&P found that key errors driving faulty forecasts included high tolls and miscalculating willingness to pay, economic downturns, land use scenarios that never transpired, lower than expected time savings, improvements to competitive roads, lower usage by trucks, and lower off-peak and weekend traffic.[47] Such overestimations routinely lead to the financial failure and fiscal bailout for toll roads across the country. For instance, in 2005, TxDOT had to buy back the Camino Columbia for $20 million upon that road's failure after only three years of operation; the Dulles Greenway defaulted in 1996, refinanced and sold a majority interest in itself for $533 million to an investment firm. Other roads are on their way to failure, all as a result of biased traffic projections. For instance, the Southern Connector in South Carolina had its bond rating dropped from "stable" to "negative" in 2002 based on actual traffic that was 45% of projections.[48] Similarly, the Pocahontas Parkway in Virginia had its bond rating dropped to less than investment grade due to actual traffic amounting to 57% of projections.[49] The San Joaquin Hills Toll Road in California had to replace $1.1 billion in bonds in 1997 or risk default.[50] All told, faulty traffic projections lead to ballooning debt payments and defaults, all of which amount to huge economic impacts that TxDOT must avoid given Texas' constrained fiscal situation. Such likely impacts of tolling, alone, warrant greater study within the context of an EIS.

III. TXDOT MUST INCLUDE AVOIDING ENVIRONMENTAL IMPACTS AS AN UNCOMPROMISING PROJECT GOAL

Once TxDOT has sufficiently studied the problem so as to fully understand it, TxDOT can then move on to define the project's purpose. Such a purpose, however, cannot be too narrow so as to impermissibly limit the realm of alternative improvements to be considered, nor too broad such that the project collapses under the weight of all the alternatives.[51] Accordingly, it would be unlawful for TxDOT to define the purpose of the

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[46] Standard and Poors, *Traffic Forecasting Risk: Study Update 2003* (Nov. 6, 2003).

[47] *Id*.

[48] United States General Accounting Office, *Highways and Transit: Private Sector Sponsorship of and Investment in Major Projects Has Been Limited* 49 (Mar. 2004).

[49] *Id*.

[50] Kelly Barron, *Roads Less Traveled*, Forbes Magazine, 9/3/01.

[51] *Simmons v. United States Army Corps of Eng'rs*, 120 F.3d 664, 666-67 (7th 1997); *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991) ("Yet an agency may not define the objectives of its action in terms so unreasonably narrow that only one alternative from among the environmentally benign ones in the agency's power would accomplish the goals of the agency's action . . . Nor may an agency frame its goals in terms so unreasonably broad that an infinite number of alternatives would accomplish those goals and the project would collapse under the weight of the possibilities."); *Davis v. Mineta*, 302 F.3d 1104, 1119-20

project in this case as "building a toll road to alleviate congestion." Such a description of the project's purpose is manifestly too narrow. Indeed, even defining this project as part of a starter toll road system is likewise too narrow of a purpose given that a toll road is the only acceptable alternative to that definition. Rather, TxDOT must define the project broadly all while being faithful to its own regulations, which require TxDOT to "protect, preserve and, when practicable, enhance the environment."[52] Indeed, not only must TxDOT "encourage environmentally sensitive solutions to transportation problems,"[53] it must proactively address environmental issues and "be a leader in identifying and implementing measures to avoid, minimize, or compensate for adverse environmental impacts with emphasis placed on environmental preservation and enhancement."[54] Accordingly, it is imperative that TxDOT incorporate environmental considerations into any project definition and follow through on its pledges.

IV. INCREASING ROAD CAPACITY IS LIKELY TO HAVE SIGNIFICANT IMPACTS ON THE HUMAN AND NATURAL ENVIRONMENT

Roads strongly affect surrounding ecosystems.[55] Whenever a road is built or expanded, there are three types of resulting impacts: construction impacts, operational and maintenance impacts, and long-term impacts, each with its own distinctive spatial and temporal frame and each with distinctive but cumulative impacts.[56]

Under federal regulations, TxDOT must analyze all impacts of any proposed project.[57] This includes not only ecological impacts, but also "aesthetic, historic, cultural,

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(10th Cir. 2002) ("if the purposes and needs of the Project were so narrowly construed as to mandate the extra capacity only at 11400 South, we would conclude that such a narrow definition would be contrary to the mandates of NEPA"); *Kootenai Tribe of Idaho v. Veneman*, 142 F. Supp. 2d 1231, 1244 (D. Idaho 2001) (finding unreasonably narrow objective).

[52] 43 Tex. Admin. Code § 2.2.

[53] 43 Tex. Admin. Code. § 2.4(2)(A) ("[t]he department will encourage . . . environmentally sensitive solutions to transportation problems."); *see also* Texas Dept. of Transp., *Tomorrow's Transportation System, Strategic Plan 2005-2009*, at 1.

[54] 43 Tex. Admin. Code. § 2.4(4)(C).

[55] *See generally* Paul L. Angermeier, Andrew P. Wheeler, and Amanda E. Rosenberger, *A Conceptual Framework for Assessing Impacts of Roads on Aquatic Biota*, Fisheries 19, 21-23 (Dec. 2004); Reed Noss, *The Ecological Effects of Roads –or- the Road to Destruction*, *at* http://www.wildlandscpr.org/resourcelibrary/reports/ecoleffectsroads.html; Michael E. Barrett, et al., *A Review and Evaluation of Literature Pertaining to the Quantity and Control of Pollution from Highway Runoff and Construction (CRWR Online Report 95-5)* (Center for Research in Water Resources April 1995); Caltrans, *A Review of the Contaminants and Toxicity Associated with Particles in Stormwater Runoff* (August 2003); Richard T. T. Forman, et al., *Road Ecology: Science and Solutions* 202-207 (2003).

[56] Angermeier, *supra* note 55, at 21-23.

[57] *See* 40 C.F.R. §§ 1508.7, 1508.8.

economic, social, or health [impacts], whether direct, indirect, or cumulative."[58] Consequently, each of the above phases and all of their impacts *must* be assessed.

A. Construction Impacts

The environmental impacts arising from road construction consist of direct, localized, and acute alterations of physical conditions. Even though highway construction may only cover a small portion of a watershed, "the effects can be substantial."[59] These impacts include the addition of fine sediments to nearby waterways, channelization of streams, disruption of groundwater flows, soil erosion, and habitat destruction.[60]

Furthermore, construction equipment contributes to noise and air pollution, along with light pollution from nighttime operations. There is also the ever present likelihood that existing infrastructure such as sewer lines or pipelines will be damaged resulting in spills and releases of sewage, chemicals, and other pollutants. For instance, while clearing right of way along US 281, construction equipment sheared off some valves on a sewage line resulting in raw sewage being spilled onto the ground and left to percolate into the aquifer.[61] Such an event occurring over the recharge zone during construction of the improvements to Loop 1604 will surely result in a significant impact to the environment.

Roadway construction also directly results in clearing right of way through existing and native vegetation. This not only has an aesthetic impact but it also facilitates the invasion of exotic species of weeds, pests, and pathogens, which can then disperse to colonize adjacent native communities. For example, clearing the right of way could lead to the spread of oak wilt disease.

Construction, of course, will also likely cause traffic delays and problems,[62] impacts that are all too often overlooked by planners. In many cases, driver delays due to construction are so long, and the time savings predicted from the finished project so minor, that it can take years for commuters to break even and begin to make up the time they lost during construction.[63]

On top of it all, it must not be forgotten that highway construction also adversely affects the Edwards Plateau's endangered species populations. For instance, past and future

[58] 40 C.F.R. § 1508.8.

[59] Barrett, *supra* note 55, at 51.

[60] *See id*. at 21 and studies cited therein.

[61] Amy Dorsett, *Sewer Leak Over Aquifer*, San Antonio Express-News (Jan. 12, 2006).

[62] Surface Transportation Policy Project, *Road Work Ahead: Is Construction Worth the Wait* 3 (1999).

[63] *Id*.

highway construction was identified as a specific threat to the golden-cheeked warbler.[64] These roads destroy and fragment warbler habitat.

In all, these are just some of the impacts associated with road construction. Collectively, as well as individually, these impacts constitute a likely significant impact to the environment.

B. Operation and Maintenance Impacts

Even after construction is complete, roads and highways continue to be environmentally "present" serving as constant sources of pollution. Paved surfaces increase total volume and maximum flow rates of runoff, causing erosion and altering stream hydrology.[65] They also interrupt existing sheet flows, acting as dams to redirect runoff from their original course.[66]

Typical pollutants found in this runoff include sediments, nutrients, including nitrogen and phosphorus, heavy metals such as lead, zinc, iron, copper, cadmium, chromium, nickel, manganese, cyanide, sulfates, and petroleum-based hydrocarbons.[67] Nutrients overload systems leading to long-term potential for eutrophication.[68] Sediments and particulates decrease flow capacity, reduce storage volumes, smother benthic organisms, decrease water clarity, and interfere with the respiration of small fish. Toxic heavy metals settle into sediments and are lethal to aquatic organisms.[69]

The source of all these toxic pollutants is the vehicles that use the road.[70] One assessment of chemicals found along roads found that 19 of the 23 pollutants detected came from passing automotive traffic and that a full one-third of roadside pollutants come specifically from oil, grease, and hydraulic fluids. Engine wear produces 30%; metal plating and rust, 22%; tire wear, 22%; fuel and exhaust, 22%; and brake lining wear, 17%.[71] Other pollutants come from the deposition of exhaust gases and fumes. Even road lights contain hazardous levels of mercury, halide, and sodium vapors.

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[64] United States Dept. of Fish and Wildlife, *Endangered and Threatened Wildlife and Plants; Final Rule to List the Golden-cheeked Warbler as Endangered*, 55 Fed. Reg. 53,153, 53,157 (Dec. 27, 1990).

[65] Barrett, *supra* note 55, at 33.

[66] *Id*.

[67] Office of Water, United States EPA, *Erosion, Sediment and Runoff Control for Roads and Highways* (EPA-841-F-95-008d, Dec. 1995).

[68] *Id*. at 34-35.

[69] *Id*. at 34.

[70] Forman, *supra* note 55, at 202-207.

[71] *Id*. at 202.

Toxic pollutants are also released into the environment from the millions of vehicle accidents that occur on the roads each year as well as illegal dumping.[72] As mentioned above, many of the endangered species found within the region are particularly sensitive to toxic pollutants. The potential for disaster, therefore, is high.

The impact from these pollutants, though, is not only limited to surface waterways. Groundwater is often affected as well, even without the assistance of the porous nature of the Edwards recharge zone.[73] For instance, zinc, iron, lead, and chromium have been found in groundwater underneath structural BMPs meant to control the discharge of such pollutants. Many studies have documented increasing levels of lead in plants with proximity to roads and with increasing traffic volumes.[74] The same is true for other heavy metals, which have been found to likewise increase with proximity to roads, increasing traffic volumes, and decreasing soil depth. Many of these metals bioaccumulate, causing mortality in earthworm-eating animals.

Roadways also have air impacts that directly lead to adverse health effects in the neighboring communities and even have regional and global ecological effects. The release and generation of such air pollutants such as ozone, greenhouse gases, nitrogen dioxide, VOCs, PM-10 and PM-2.5, and mobile source air toxics such as benzene and others contributes to asthma, childhood leukemia and other cancers including lung cancer, heart attacks, and increased risk of premature birth and low birth weights.[75] This is of especial concern in this particular case given that the Specht Elementary School along with several Sunday schools are within half a mile of Loop 1604.

As mentioned earlier, air pollution from transportation sources already results in annual health-care related costs approaching $200 million in the San Antonio region alone.[76] It would behoove TxDOT to know, then, what percentage of the additional VMT on an improved road will be comprised of polluting diesel trucks? What percent will be busses, single occupancy vehicles, etc. TxDOT must provide such analysis before it can dismiss the likely impacts to air from any improvements to Loop 1604.

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[72] *Id*. at 206.

[73] Barrett, *supra* note 55, at 44-47.

[74] Noss, *supra* note 55.

[75] *See generally* Sierra Club, *Highway Health Hazards* (2004). *See also* Michelle Wilhelm and Beate Ritz, *Residential Proximity to Traffic and Adverse Birth Outcomes in Los Angeles County, California, 1994-1996*, 111 Environmental Health Perspectives 207 (Feb. 2003); Murray M. Finkelstein, Michael Jerrett, and Malcom R. Sears, *Traffic Air Pollution and Mortality Rate Advancement Periods*, 160 Am. J. Epidemiol. 173 (2004); Janice J. Kim, et al., *Traffic-related Air Pollution near Busy Roads*, 170 Am. J. Respir. Crit Care Med 520 (2004); Ravi Maheswaran and Paul Ellio, *Stroke Mortality Associated with Living Near Main Roads in England and Wales*, Stroke 2776 (Dec. 2003); Gerard Hoek, et al., *Association Between Mortality and Indicators of Traffic-Related Air Pollution in the Netherlands: A Cohort Study*, The Lancet (Sept. 24, 2002); South Coast Air Quality Management District, *Multiple Air Toxics Exposure Study (MATES-II), Final Report* (Mar. 2000).

[76] Surface Transportation Policy Project, *supra* note 32, at 36.

TxDOT must also consider maintenance activities as well, such as full depth repairs, surface treatments, surface repairs, pothole patching, pavement jacking, cleaning pavement, guardrail repair, pavement marking, bridge surface cleaning, and deck repairs.[77] But it is not only repaving and repairing the actual roadway that has impacts, which are similar to those found during the construction phase, it is also mowing the grass along the right of way and applying pesticides and herbicides.[78] A survey of pollutants found along sides of roads revealed that roadbed and road surface wear accounted for 17% of the pollutants while herbicide and pesticide use accounted for 13%.[79]

All told, then, roads are a significant source of pollution into their surrounding environment.

Roads also generate noise. The impact of the noise, however, must not only be measured in terms of human ears, but also in terms of the impact on the auditory lives of wild animals in the area.[80] For instance, studies have shown that highway noise can disrupt communication between birds, territory establishment and defense, and even reproductive behavior in toads and treefrogs.[81]

Roads may also even have negative economic effects. For instance, roads with adjoining frontage roads appear to be associated with lower household incomes and lower population densities, and higher unemployment relative to similar corridors without frontage roads.[82] Indeed, traffic has an overall negative impact on single-family house prices.[83]

Roads also result in greater frequency of wildfires, more trash, and higher rates of vehicle-wildlife collisions and death.[84] Indeed, over half of the wildfires in the United States begin along roads, whether from sparks or from discarded cigarettes.

These are just some of the impacts that a road can have on its surrounding environment. TxDOT must analyze all of these impacts in determining whether or not there is a *likely* substantial impact on the human and natural environment from any proposed project.

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[77] Barrett, *supra* note 55, at 11.

[78] *Id*. at 10-11.

[79] Forman, *supra* note 55, at 202.

[80] *Id*. at 271-73.

[81] Noss, *supra* note 55.

[82] Kara M. Kockelman, et al., *Frontage Roads: An Assessment of Legal Issues, Design Decisions, Costs, Operations, and Land-Development Differences*, Paper Submitted to Journal of Transportation Engineering, Oct. 8, 2001.

[83] William T. Hughes and C.F. Sirmans, *Traffic Externalities and Single-Family House Prices*, 32 J. Regional Science 487-500 (1992).

[84] *See* Noss, *supra* note 55.

C. Long-term Impacts

It is a judicially recognized fact, that "[h]ighways create demand for travel and expansion by their very existence."[85] The ensuing development is all but foretold.[86] One study concluded that "highway capacity-increasing projects, which are typically a response to current or anticipated increase in travel demand, have coincided with immediate land-development activities."[87] Another study found a dominant causal influence flowing from highway expansion to population growth.[88] Yet another study substantially confirmed the hypothesis that "road improvements and the resulting swifter travel speeds spur building activities along a corridor."[89] The bottom line is that new homes, offices, and retail stores appear near improved freeways within two to four years after construction.[90] This is not new. Back in 1975, one study demonstrated that proximity to a controlled access highway enhanced population growth in Pennsylvania.[91]

As a consequence, it is readily foreseeable that any project along Loop 1604 will have growth inducing impacts, which federal regulations require TxDOT to analyze.[92] It will therefore be a far stretch for TxDOT to conclude that these impacts do not have a likely substantial impact on the environment given that they already have. For example, in 1999, a motorist backed into a gasoline pump at a Texaco station located along US 281, several miles into the recharge zone.[93] Though only a few gallons spilled from the pump itself, an unnoticed rupture in the line connecting the pump to the underground storage tank leaked an estimated 800 to 900 gallons of gasoline.[94] Within days, the spill contaminated several

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[85] *Sierra Club v. United States Dept. of Transp.*, 962 F. Supp. 1037, 1043 (N.D. Ill. 1997); *accord Swain v. Brinegar*, 517 F.2d 766, 777 (7th Cir. 1975) ("highways have a profound influence on population growth, high-density urbanization, industrial expansion, (and) resource exploitation"); *Mullin v. Skinner*, 756 F. Supp. 904, (E.D.N.C. 1990) ("It is an irrefutable reality that the easier it is to get somewhere, the more people will be inspired to do so."); *City of Davis v. Coleman*, 521 F.2d 661, 676 (9th Cir. 1975) ("If the interchange is built, development will occur.").

[86] Thomas W. Sanchez, *Land Use and Growth Impacts from Highway Capacity Increases*, J.Urban Planning and Development 75 (June 2004); Robert Cervero, *Road Expansion, Urban Growth, and Induced Travel: A Path Analysis*, 69 APA Journal 145, 156-57 (Spring 2003); Neal R. Peirce, *Expansion Induces Traffic* (reporting that in the five years before I-270 was widened, 1,745 new homes were approved in the 12 miles north of Rockville, the major community on the route, while in the five years after the road was widened, 13,642 new homes were approved).

[87] Sanchez, *supra* note 86, at 81.

[88] Paul R. Voss and Guangqing Chi, *Highways and Population Change*, 71 Rural Sociology 33 (2006).

[89] Cervero, *supra* note 86, at 156.

[90] *Id*. at 156-57.

[91] Voss, *supra* note 88, at 34; *see also* Ken Salgat, *Polk Parkway Spurs Development*, Tampa Bay Business Journal, Oct. 6, 2000; Neal R. Peirce, *supra* note 86.

[92] 40 C.F.R. § 1508.8(b).

[93] Rudolph Bush, *800-Gallon Spill May Pollute Aquifer*, San Antonio Express-News, 7/22/1999, at 1B.

[94] *Id*.

nearby water wells, all despite the fact that the gasoline station met all codes and environmental regulations.[95]

Thus, TxDOT need not speculate about possible likely environmental impacts. Such environmental impacts associated with urban development have already occurred. In fact, in 1988, 28 oil and chemical spills occurred in Bexar County, representing the greatest number of land-based spills in central Texas affecting surface and/or groundwater.[96] Furthermore, through just the first half of 1988, between 26 and 50 underground storage tanks were confirmed to be leaking, placing Bexar County as second among central Texas counties with underground storage leaks.[97] That was in 1988; "[i]ncreasing urbanization in Bexar County will increase the risk that leaks and spills may harm karst ecosystems."[98]

The literature also supports the fact that urbanization has significant environmental impacts. That literature uniformly reports that sprawling developments such as those that will surely crop up along Loop 1604 as a result of any improvements contribute large loads of pet wastes, nutrients from fertilizers, and toxic chemicals from pesticides to local waterways.[99] These developments also increase impervious cover, which is tantamount to increased runoff and pollution.[100] Increased impervious cover directly translates into higher peak stormwater discharge rates, greater runoff volumes, and higher floodplain elevations. Impervious surfaces also collect and accumulate pollutants deposited from the atmosphere, leaked from vehicles, and otherwise deposited on the impervious surface with nowhere else to go. During storms, all of this deposited material is quickly washed off and rapidly delivered to aquatic systems. The recognized consequences of this runoff includes flooding and property damage, streambank and streambed erosion, siltation and sedimentation, increased water temperature, harm to aquatic life, harm to coastal fisheries, harm to sport fishing, human illness, impacts to drinking water supply, and aesthetic losses.[101]

But again, the impacts from increased urbanization are not just limited to impacts to waterways. These impacts also include impacts to air. As one author put it, "[s]prawl means driving,"[102] which leads to greater air pollution, and mobile sources are already a significant source of air pollution in the San Antonio area.[103] Studies have shown that low density, low

[95] Bush, *supra* note 23, at 3B.

[96] United States Fish and Wildlife Service, *Final Rule to List Nine Bexar County, Texas Invertebrate Species as Endangered*, 65 Fed. Reg. 81,419, 81,425 (Dec. 26, 2000).

[97] *Id*.

[98] *Id*. at 81,426.

[99] Howard Frumkin, Lawrence Frank & Richard Jackson, *Urban Sprawl and Public Health* 65 (2004).

[100] *See generally*, Center for Watershed Protection, Site Planning for Urban Stream Protection 19-37; Thomas Schuler, The Importance of Perviousness

[101] Natural Resources Defense Council, *Stormwater Strategies*, ch. 3

[102] Frumkin, *supra* note 99, at 65.

[103] *Clearing the Air*, *supra* note 32; *see also* Frumkin, *supra* note 99, at 68.

land use mix and disconnected street networks consistently predict greater air pollution emissions, even after controlling for demographic variables.[104] These pollutants have impacts to respiratory health and mortality as described above.[105]

But, still, it is not just the air and water impacts that are associated with the development of sprawl, there are also lifestyle and health impacts as well as quality of life impacts. Lower densities foster less physical activity,[106] which in turn contributes to the burgeoning problem of obesity and diabetes in this country.[107] In fact, one study demonstrated that as the level of sprawl increases, so too does hypertension, body weight, and the probability of being obese. That study also demonstrated that more sprawl tended to predict higher prevalence of diabetes and heart disease.[108] Meanwhile, communities around the nation are discovering that revenues from new growth are often insufficient to outweigh the costs of higher demand for such public services as schools, police, fire, roads, and sewers. "As a result, existing taxpayers unknowingly subsidize much of the community expansion, especially the residential subdivision of unoccupied land."[109] Indeed, some communities are finding that it is cheaper to buy land for open space than to support its subdivision,[110] and that unchecked sprawl has shifted from an engine of growth to a force that threatens to inhibit growth and degrade quality of life.[111]

Furthermore, sprawl is also not very aesthetically pleasing. Cookie-cutter houses and McMansions along denuded hillsides are eyesores in comparison to the wooded and rugged hillsides of the Texas Hill Country. Those hillsides had been habitat for the various endangered species in the Edwards Plateau. Unfortunately, these sprawling developments do not provide the same level of ecological services as previously available. For this reason, consistent population growth is identified as a major threat to the golden-cheeked warbler as sprawling developments destroy and fragment warbler habitat.[112] Indeed, in 1990, the Bexar Audubon Society identified over 1,300 acres of dense housing and suburban development in

[104] Frumkin, *supra* note 99, at 78.

[105] *See also id*. at 80-89.

[106] *Id*. at 100.

[107] *Id*. at 107.

[108] *Id*. at 100-01.

[109] Michael J. Kinsley and L. Hunter Lovins, *Paying for Growth, Prospering from Development* 2 (Rocky Mountain Inst.) *at* http://www.rmi.org/images/other/EconRenew/ER96-15_Paying4Growth.pdf.

[110] *Id*.; *see also* Sierra Club, *Sprawl Costs Us All* 10-11 (2000).

[111] William Fulton and Steven Moss, *Beyond Sprawl*: *New Patterns of Growth to Fit the New California* (1995) *at* http://www.bankofamerica.com/environment/index.cfm?template=env_reports_speeches&context=sprawl.

[112] United States Dept. of Fish and Wildlife, *Endangered and Threatened Wildlife and Plants; Final Rule to List the Golden-cheeked Warbler as Endangered*, 55 Fed. Reg. 53,153, 53,157 (Dec. 27, 1990).

the midst of ideal warbler habitat.[113] Not exactly the most aesthetically pleasing landscape for either a human or a warbler.

All told, then, there are substantial, readily foreseeable impacts to any project along Loop 1604. These impacts extend well beyond the narrow right of way for the road.[114] TxDOT cannot turn a blind eye to these impacts to conclude that there is no likely substantial impact to the environment. TxDOT must raise its eyes up to the horizon to see the full extent of the environmental impacts of any proposed project. To fail to do so would violate both the letter and the spirit of NEPA and its implementing regulations.

D. Cumulative Impacts

All of these impacts just outlined only constitute the direct and indirect impacts from a project along Loop 1604. TxDOT must also consider the cumulative impacts, which consist of all of this project's direct and indirect impacts in conjunction with other direct and indirect impacts associated with other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other action.[115] Consequently, not only must TxDOT consider all the impacts of the housing development outlined above that is sure to follow improvements to Loop 1604, but TxDOT must also consider the impacts of other road projects in the region and the subsequent development that will thereby arise. All told, these impacts cannot simply be swept under the rug. It is quite clear that the end result of all of these projects is a singly paved polluted slab of sprawl with no accommodation for any natural environment. Improvements to Loop 1604 *will* have significant impacts on the environment and concluding otherwise is arbitrary and capricious.

V. TXDOT CAN ONLY RELY ON MITIGATION MEASURES TO THE EXTENT THAT THERE IS SUBSTANTIAL EVIDENCE OF THE EFFECTIVENESS OF SUCH MEASURES

In light of the fact that any improvements along Loop 1604 will have an impact on the environment, TxDOT is likely to propose some mitigation to reduce the level of those impacts to less than significant.[116] The mitigation measures that TxDOT can propose, though, must meet some minimal standards. A "perfunctory description" or a "mere listing" of mitigation measures without supporting analytical data is insufficient to support a finding of no impact.[117] As such, simply relying on existing regulations or construction and

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[113] *Id*.

[114] *See* Sanchez, *supra* note 86, at 78 (reporting that on average between 30-40% of "cells," grid areas 152m on a side, within 1.6km of road improvements get developed).

[115] 40 C.F.R. § 1508.7.

[116] *Davis v. Mineta*, 302 F.3d 1104, 1125 (10th Cir. 2002).

[117] *National Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 734 (9th Cir. 2001).

stormwater permits intended to protect the aquifer is not enough barring a more detailed description of the actual steps to be taken under those regulations and permits.[118]

Even still, TxDOT must demonstrate, through substantial evidence in the record, that those measures *will in fact* reduce the impacts.[119] Absent such evidence, concluding that all substantial impacts are mitigated to a level of insignificance is not only impermissibly conclusory, it is also arbitrary and capricious.[120] As the Ninth Circuit stated, "where significant environmental damage may occur to a treasured natural resource, the studies must be conducted first, not afterwards."[121]

Yet such evidence of the effectiveness of various regulations and permits to protect the Edwards Aquifer, though, will be hard for TxDOT to come by given the growing literature regarding the failure of these regulatory devices. For example, one study regarding the effectiveness of BMPs to control pollution emanating from road construction projects found "that even an extensive system of temporary controls is not adequate to prevent large amounts of suspended sediment from entering receiving waters [during construction]."[122] Studies and practical experience reveal that filters get almost immediately clogged such that all subsequent runoff and pollution bypasses the control.[123] Hazardous material traps similarly "cannot function as a hazardous materials collection basin during runoff events when the roads are wet and the chance for an accident is higher."[124] TCEQ, itself, even recognizes that these hazardous material traps are ineffective during rain events.[125] Even the efficiencies reported for various BMPs are "overestimated compared to the actual particle removal efficiencies observed in the field" such that any cursory reliance on the reported efficiencies is arbitrary.[126]

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[118] *See id*.

[119] *O'Reilly v. United States Army Corps of Eng'rs*, 2004 WL 179451, at *4-5 (E.D. La. 2004); *Western Land Exchange Project v. United States Bureau of Land Management*, 315 F. Supp. 2d 1068, 1091-92 (D. Nev. 2004).

[120] *O'Reilly*, 2004 WL 179451, at *5; *Western Land Exchange*, 315 F. Supp. 2d at 1092; *Wyoming Outdoor Council v. United States Army Corps of Engineers*, 351 F. Supp. 2d 1232, 1251-52 (D. Wyo. 2005).

[121] *National Parks & Conservation Ass'n v. Babbitt*, 241 F.3d 722, 736 (9th Cir. 2001).

[122] Michael E. Barrett, et al., *Technical Report CRWR 266—Water Quality and Quantity Impacts of Highway Construction and Operation: Summary and Conclusions* 33 (Center for Research in Water Resources, Nov. 1995).

[123] Sean Tenny, et al., *An Evaluation of Highway Runoff Filtration Systems (CRWR Technical Report 265)* 67 (Center for Research in Water Resources, Sept. 1995).

[124] *Id*.

[125] TCEQ, *Optional Enhanced Measures for the Protection of Water Quality in the Edwards Aquifer, An Appendix to RG-348*, at 18 (Feb. 2005) ("as long as a hazardous material spill does not occur during a rain event the system should contain the spill").

[126] Ana Marie Karmalegos, et al., *Particle Size Distribution of Highway Runoff and Modification Through Stormwater Treatment (CRWR Online Report 05-10)* 57 (Center for Research in Water Resources, Dec. 2005).

Some BMPs are simply just flat-out ineffective. For instance, one study demonstrated that the *median* removal of sediment in runoff from highway construction was 0%.[127] Other BMPs might be effective, but only for certain kinds of pollutants.[128] Still, even the most effective BMP is all too often "compromised by inadequate installation and maintenance."[129] One study revealed that up to 55% of TCEQ's required BMPs to control pollution from construction and development do not work properly. To simply conclude, then, that BMPs will be applied to reduce any impacts to a level below significance is specious absent greater study.

Nor can TxDOT find refuge in TCEQ's regulations regarding development in the recharge zone given that these regulations are widely recognized as being inadequate because they do not limit impervious cover or prohibit activities and land uses that threaten the aquifer.[130] For instance, there are no regulations regarding the siting of dry cleaners or other facilities that use hazardous materials. Consequently, spills and leaks will occur and will contaminate the aquifer. As mentioned above, this has already happened.[131] TCEQ has also permitted many projects with 90-100% impervious cover all while it is widely recognized that as little as 30% impervious cover severely impacts water quality such that streams become unable to support aquatic life.[132] TxDOT cannot rely on local ordinances either to fill the gaps because these regulations are often incompetent against a developer's grandfathering claims.[133] Indeed, if the sum total of all existing regulatory mechanisms were adequate to protect the sensitive nature of the Edwards Aquifer and recharge zones, the United States Fish & Wildlife Service would not have needed to list any of the region's endangered species.[134]

Overall, then, it would be arbitrary and capricious for TxDOT to rely on rules and regulations promulgated to "protect" the Edwards aquifer given that the evidence demonstrates that the rules are hardly protective. In order to be able to rely on mitigation to reduce the level of impact to less than significant, TxDOT must provide substantial evidence

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[127] Michael E. Barrett, *An Evaluation of the Use and Effectiveness of Temporary Sediment Controls (CRWR Online Report 95-6)* 53 (Center for Research in Water Resources Aug. 1995).

[128] Karmalegos, *supra* note 126, at 13-16, 57.

[129] Barrett, *supra* note 122, at 33.

[130] Christopher Anderson and Jerry Needham, *S.A. Panel Blasts TCEQ on Aquifer*, San Antonio Express-News, 1/21/2004.

[131] *See supra* at 15.

[132] The Texas Supreme Court has recognized that impervious cover limits are a nationally-recognized method of preserving water quality. *Quick v. City of Austin*, 7 S.W.3d 109, 119 (Tex. 1998).

[133] John Tedesco, *Avoiding Rules They Wrote*, San Antonio Express News (Oct. 18, 2005).

[134] *See* 50 C.F.R. § 424.11(c)(4) (listing the "inadequacy of existing regulatory mechanisms" as a factor in a decision to list a species as endangered).

that reliance on various water quality permits and regulations is justified.[135] In other words, TxDOT must prepare an EIS.

VI. TXDOT MUST SEEK TO ALLEVIATE CONGESTION BY REDUCING PEAK TRAVEL DEMAND RATHER THAN INCREASING CAPACITY

It has long been known that there is a relationship between the capacity of a road system and the demand for the use of that system. That relationship is such that capacity controls demand.[136] Accordingly, it is fruitless to focus on capacity-increasing options as demand will simply rise to meet the additional capacity, often, more quickly than expected.[137]

A. Adding Capacity in the Form of Toll Roads Is Not a Viable Alternative

Experience and practice clearly demonstrate that building extra capacity is nothing more than a band-aid solution treating a symptom but not the disease. Indeed, as along as peak travel demand is not addressed, any additional capacity will soon be overwhelmed and congestion reasserted at the same level as before. For instance, less than 8 years after expansion on I-270 outside of Washington D.C. was completed, traffic was once again reduced to a "rolling parking lot," with traffic peaking at levels projected for 20 years in the future.[138] As one expert stated,

> Unfortunately, once heavy peak-hour congestion has appeared in key parts of a region's road network, building new roads or expanding existing ones there does not reduce the intensity of such congestion much in the long run. Once commuters realize the capacity of specific roads has been increased, they will quickly shift their routes, timing, and modes of travel by moving to those roads during peak periods, thereby filling up the expanded capacity. . . . the resulting triple convergence will soon bring congestion back to its maximum levels during peak periods.[139]

Moreover, adding capacity in the form of toll roads in an already congested corridor is doubly foolhardy given that when toll lanes are built alongside non-tolled alternatives,

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[135] *National Parks & Conservation Ass'n v. Babbitt,* 241 F.3d 722, 736 (9th Cir. 2001).

[136] Robert L. Morris, *Traffic as a Function of Supply and Demand*, Traffic Quarterly, October 1977, at 593.

[137] *Id*.; Robert B. Noland, *Relationships Between Highway Capacity and Induced Vehicle Travel*, Transportation Research 70 (2001) ("Increased capacity clearly increases vehicle miles of travel beyond any short run congestion relief that may be obtained."); Peirce, *supra* note 86.

[138] Peirce, *supra* note 86.

[139] Downs, *supra* note 150, at 102.

congestion will not be alleviated, either in theory or practice.[140] This is so because toll roads can only succeed when there are significant speed differences between the toll road and any free alternative.[141] Indeed, the existence of non-tolled alternatives has been described as the "Achilles heel" of tolling. In order for people to opt for the toll road, "the free roadway must remain congested."[142]

It is for that reason that almost all privatized toll-road contracts include non-compete clauses designed to prevent improvements to nearby free roads.[143] For instance, a non-compete clause in the CA SR 91 contract prevented Orange County from improving conditions along the free access lanes to improve traffic flow,[144] even though traffic along the free lanes was crawling along at average peak hour speeds of no more than 15-20 mph.[145] Public outrage over the non-compete clause for SR 91 caused Orange County to buy back the toll lanes from the toll authority for $207.5 million.[146] A non-compete clause in Colorado required that the speed limit on adjacent roads be dropped and that extra traffic signals be installed in addition to limiting improvements.[147] The result of building a toll road alongside non-tolled alternatives, then, is clearly both a traffic and financial disaster: congestion will not be alleviated and substantial amounts of additional public money will have to be spent to correct that failure.

Yet that is exactly what the future entails for the Loop 1604 corridor given that TxDOT is committed to providing non-tolled alternatives to any toll-road solution: the Alamo RMA's strategic plan mandates that.[148] The situation, then, is just like it is with SR 91, and just like it was with SR 91, it can readily be projected that congestion along the Loop 1604 corridor will not be alleviated and that substantial amounts of future public funds will

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[140] Kenneth A. Small, The Value of Value Pricing, 18 Access 17 (spring 2001) (tolling can only work "if we fail to make significant progress toward reducing congestion overall"); Anthony Downs, *Why Traffic Congestion Is Here to Stay . . . and Will Get Worse*, 25 Access 19, 23 (Fall 2004) ("But HOT lanes will only work if accompanying lanes remain congested. So HOT lanes do not eliminate congestion; they merely increase movement choices for drivers.").

[141] Small, *supra* note 140, at 17.

[142] *Id*.

[143] United States General Accounting Office, *Highways and Transit: Private Sector Sponsorship of and Investment in Major Projects Has Been Limited* 3 (Mar. 2004) (reporting that four of five privately franchised toll road projects contained non-compete clauses whereby the states agreed not to build new roads or improve existing roads that would compete with the toll road).

[144] Sylvia A. Smith, *Privately Owned Roads Not New*, Fort-Wayne Journal Gazette, 1/23/06; *see also* Gordon Dickson, *When Good Toll-Road Ideas Turn Bad*, Dallas-Ft. Worth Star Telegram, 1/23/06.

[145] Edward Sullivan, *Priced New Lanes-California: Express Lanes on State Route 91 in Orange County*, 10/6/2003. By comparison, traffic in the tolled lanes whizzed along at 60-65 mph.

[146] GAO, *supra* note 143, at 44.

[147] *Major Moves, Major Cost*, Mooresville/Decatur Times, 2/22/06.

[148] Alamo Regional Mobility Authority, Strategic Plan 2005-2009, at 7, 10.

have to be spent. Indeed, given the substantial economic impacts that any non-compete clause will have, TxDOT must disclose any potential plans to include such clauses in any franchise agreements. Failing to do so is tantamount to committing a fraud on the public.

B. TxDOT Must Focus on Alternatives that Reduce Peak Travel Demand

Instead, TxDOT ought to be focusing on reducing peak demand along the Loop 1604 corridor. Ironically, the most straightforward way to address peak travel demand, however, is to do nothing. Indeed, in the long run, the most effective response to congestion is adaptation by individuals through adjusting their behavior.[149] Left alone, congestion increases the "price" of each marginal unit of travel to the level where the optimal number of drivers are on the road at any particular time. Congestion, then, is the principal means of allocating scarce road space among competing users. It is a symptom of the problem, not a problem in itself that needs to be solved.[150]

So, given that congestion is rooted in excess demand, the only real solution is to reduce peak travel demand. How can TxDOT do this? There are a lot of options that either individually, or in combination, can work to reduce peak travel demand. For instance, transit reduces peak travel demand by getting people of their cars. Likewise, ridesharing and telecommuting incentives along with park-n-ride programs and HOV lanes also get people out of their cars during the peak times. None of this should be new to TxDOT, though, given that all of these strategies are slated to be employed along the Loop 1604 corridor according to the San Antonio MPO's 2030 Metropolitan Transportation Plan.[151] In fact, FHWA's own guidance lists six categories of demand-management alternatives, including travel alternatives (alternate hours of travel, work schedules, telecommuting, etc.), land use alternatives (smart growth policies, pedestrian/bicycle connections, transit-oriented design), pricing alternatives (HOV lanes, parking pricing), HOV alternatives (rideshare matching, vanpools, priority HOV parking, etc.), transit alternatives (subsidized fares, trip itinerary planning), and freight alternatives (lane restrictions, delivery restrictions).[152]

TxDOT can also employ operational measures to ease the flow of traffic. For instance, TxDOT could implement advanced traffic signal coordination along with variable speed limit signs and time to destination signs. Websites showing real-time traffic conditions can also help alleviate congestion by informing commuters of a roadways' current status before departure. For instance, Oakland County in Michigan implemented advanced signal traffic coordination wherein real time traffic information is collected and displayed on a website while data from traffic cameras and in-road induction loops feed into a central

[149] *Id*. at 13.

[150] *See* Anthony Downs, *Still Stuck in Traffic* 5-6 (2004).

[151] San Antonio Metropolitan Planning Organization, 2030 Metropolitan Transportation Plan, chp. 10, Congestion Management System, pp 29-30. (2004).

[152] Office of Operations, Federal Highway Administration, *Traffic Congestion and Reliability: Trends and Advanced Strategies for Congestion Management*.

computer that controls signal timing according to traffic loads. As a result of this program, overall afternoon peak-period stop delays decreased from 12.6 hours to 10.1 hours, while the percentage of vehicles stopped at intersections dropped significantly.[153] Similarly, the Automated Traffic Surveillance and Control Program in Los Angeles uses a computerized signal control system that has been in operation since 1984 and manages 1,170 intersections and 4,509 detectors for signal timing optimization. The program there has resulted in a 13 percent decrease in fuel consumption, 14 percent decrease in emissions, 41 percent reduction in vehicle stops, 18 percent reduction in travel time, 16 percent increase in average speed, and a 44 percent decrease in delay, all without a single inch of additional capacity being built.[154]

In addition to such operational solutions to congestion, access management techniques have also proven effective in Delaware and elsewhere to reduce congestion along a roadway.[155] According to FHWA, there are at least four proven access management techniques to improve the movement of traffic, reduce the frequency of crashes, and reduce the number of vehicle conflicts. Those techniques include access spacing (increasing the distance between traffic signals, which improves the flow of traffic on major arterials, reduces congestion, and improves air quality for heavily traveled corridors), driveway spacing (fewer driveways spaced further apart, which allows for more orderly merging of traffic and presents fewer challenges to drivers), turning lanes (dedicated left- and right-turn lanes, indirect left-turns and U-turns, and roundabouts to keep through-traffic flowing), and median treatments (two-way left-turn lanes (TWLTL) and nontraversible, raised medians are examples of some of the most effective means to regulate access and reduce accidents).[156] Indeed, FHWA specifically recommends roundabouts as a potential solution for intersections with many conflict points.[157]

Only as a last resort should TxDOT consider increasing supply, and even then, TxDOT must first consider supply options that address peak travel demand. For instance, TxDOT could construct reversible commuter lanes to accommodate peak travel demand with minimal supply increases. Similarly, dedicated rapid bus transit lanes would increase the supply, but in such a way that demand would actually decrease rather than increase in response to the additional supply.

TxDOT ought not fall into the trap of thinking that building extra capacity is the solution. Doing so ignores the demand side of the problem. Absent measures to reduce

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[153] *Id*.

[154] Office of Operations, Federal Highway Administration, *Arterial Management: 21st Century Operations Using 21st Century Technologies* 2 (FHWA-OP-04-036, April 2004).

[155] DelDOT, *Access Management F.Y.I.*

[156] *Arterial Management*, at 2.

[157] *Id*.

demand at the same time as supply is increased will result in a new equilibrium marked by the same congestion exhibited before. That is hardly an appropriate "solution."

VII. TXDOT MUST CONSULT WITH EPA AND FWS

In conducting its environmental review, TxDOT must consult with and seek comment from EPA and Fish and Wildlife Service. The consultation with EPA is pursuant to 42 U.S.C. § 330h-3(e); the Fish and Wildlife consultation is pursuant to 16 U.S.C. § 1536. Absent these consultations, TxDOT not only acts contrary to law but loses the insight of such expert agencies.

VIII. CONCLUSION

In light of the above, it would be facile to claim that SOS Alliance and … are opposed to improvements along Loop 1604. That is not the case. We simply want the full extent of the environmental impacts associated with any project along Loop 1604 to be fully understood and adequately mitigated. Failing to do so risks too much. The Edwards Aquifer is simply too important to blindly destroy. Accordingly, we only ask that TxDOT begin the process of developing an EIS.

Please do not hesitate to contact us if you have any questions. We would be more than happy to meet with you, TxDOT and FHWA to address any of the issues raised herein.

Sincerely,