



City of Austin

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Watershed Protection Department
P.O. Box 1088, Austin, Texas 78767

August 13, 2014

Texas Department of Transportation
Austin District
Attn: Stacey Benningfield
P.O. Drawer 15426
Austin, TX 78761-5426

Dear Ms. Benningfield:

The City of Austin's comments on the State Highway 45 Southwest (SH45 SW) draft Environmental Impact Statement (DEIS) are attached for your review and consideration. The City appreciates being included as a participating agency in the environmental review and for the discussions between our organizations over the past year regarding the City's concerns about this project. As City staff has stated many times, decisions about the proposed roadway should be based on the best available scientific and engineering information analyses. We hope that the comments we are providing on the DEIS are helpful in meeting our shared goals of protecting the very sensitive environment in the area and providing effective transportation for Austin and surrounding areas.

As discussed in the July 23, 2014 letter from Austin City Manager Marc Ott, the City finds that the DEIS does not adequately demonstrate that impacts to the natural and human environment will not be significant. There are ongoing environmental studies, including TXDOT's own karst survey, that are likely to provide information critical to a thorough assessment of the environmental impacts of the proposed project. The DEIS falls short in its consideration of project alternatives, in the transportation analysis, in the evaluation of the effectiveness of temporary and permanent water quality controls, and in its assessment of potential impacts to endangered species, sensitive karst features, groundwater, and surface water. Without adequate scientific and engineering analyses, a proper assessment of sensitive environmental features, and a more rigorous analysis of best practices to minimize water quality degradation, the DEIS is incomplete and does not meet the standards in state law for a Finding of No Significant Impact (FONSI). Furthermore, it does not reach the publicly stated goal that SH45 SW will be the most environmentally sensitive road ever built in Travis County.

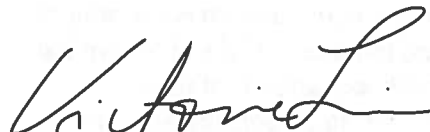
Of particular concern to the City is protection of Flint Ridge Cave, a cave protected under Austin and Travis County's federal Balcones Canyonlands Conservation Plan permit (BCCP). Because Flint Ridge Cave is designated in the BCCP as mitigation for development activity in large areas of western Travis County, the level of protection necessary is higher than other similar, but not protected, karst features. The DEIS does not currently demonstrate how the project will achieve that level of protection.


In meetings with TXDOT and the Central Texas Regional Mobility Authority (CTRMA) there have been discussions about incorporation of water quality controls to achieve a non-degradation water quality standard equivalent to that required for new development in this area. The water quality controls and standards described in the DEIS will not achieve that level of water quality protection. The City would like TXDOT and CTRMA to consider adoption of water quality treatment standards that meet the community's standard-of-practice for non-degradation. There may be opportunities for the City, TXDOT, and CTRMA to work together to reduce the impact to the project of meeting this standard and provide a superior level of environmental protection than is currently proposed. We suggest that a small group from the Technical Work Group could work directly with the project design team to discuss how the project could achieve a non-degradation water quality standard.

The City has requested that the DEIS be withdrawn, revised, and re-published to allow this important additional work to be completed. If that is not feasible, the City would welcome an opportunity to participate in an alternative process to incorporate pending environmental studies and enhanced environmental design standards into the environmental impact analysis and in the design of the roadway.

Again, we appreciate the cooperation and consideration TXDOT and CTRMA have provided the City over the last year as this project moved through initial assessment and design. We realize that TXDOT and CTRMA have many projects underway or proposed in the Austin area and we look forward to working together to improve mobility throughout the region. Our staff is available to meet with the TXDOT and CTRMA project team to review and further discuss our comments. The City's lead for the SH45 environmental review is Chuck Lesniak, the City's Environmental Officer. Please contact him at your convenience at (512) 974-2699 with any questions or to arrange a meeting to discuss the City's comments.

Sincerely,


Victoria J. Li, P.E., Director
Watershed Protection Department


Rob Spillar, P.E., Director
Transportation Department

Attachment

Cc: Marc Ott, City Manager
Sue Edwards, Assistant City Manager
Robert Goode, Assistant City Manager
Chuck Lesniak, Environmental Officer
Mike Personett, Watershed Protection Department
Willy Conrad, Austin Water
Mitzi Cotton, Law Department



Comments on the Draft Environmental Impact Statement for the Proposed State Highway 45 Southwest

City of Austin, Texas

1.0 Introduction

On June 27, 2014 the Texas Department of Transportation (TxDOT) published for public comment a draft Environmental Impact Statement (DEIS) for the proposed State Highway 45 Southwest (SH45 SW). The DEIS identifies a “preferred alternative”, which would involve the construction of a limited access tolled roadway consisting of four lanes, shoulders, and a shared-use path for pedestrians and bicyclists. The preferred alternative would traverse approximately four miles of currently undeveloped land within in an existing state-owned right-of-way and would connect the southern terminus of MoPac (Loop 1) with FM1626. A public hearing to accept public comment on the DEIS occurred on July 29, 2014 and the public comment period on the DEIS is scheduled to close on August 13, 2014. The final EIS (FEIS) and a record-of-decision (ROD) are anticipated in early 2015.

The preferred alternative is the latest incarnation of what was once referred to as Segment 3A of the Austin Outer Parkway (a.k.a. outer loop) that was first proposed in the mid-1980s. The City of Austin (the City) has long had an interest in the proposed project, both in terms of its potential effects on regional mobility and its potential adverse impacts on sensitive environmental resources. For the current environmental review process, the City requested and received participating agency status and in that request the City stated its readiness “...to assist with a careful and thorough evaluation of the SH45 SW project through the Federal environmental review process prescribed by the National Environmental Policy Act (NEPA).” Previously, in comments submitted by the City on the scope of the environmental review (document dated October 8, 2013), the City reiterated the importance of there being “...a full and balanced evaluation of the potential benefits, costs, mobility and environmental impacts of SH45 SW and its alternatives, including alternative alignments, improvements to existing roadways and the ‘no build’ alternative.”

Technical and management staff representing three City departments (Transportation, Water, and Watershed Protection) have thoroughly reviewed the DEIS and are of the general opinion that it falls well short of the City's stated expectations that there be an objective, balanced, and thorough review of the potential environmental impacts of the project based on the best available scientific information and engineering analysis. Overall, the City believes the DEIS is fundamentally flawed, and that some of the flaws are the result of deficiencies in process while many others are of a technical nature. Accordingly, in a letter from the City Manager to TxDOT dated July 23, 2014, the City formally requested that the DEIS be withdrawn and reissued only when its many significant flaws and deficiencies have been adequately addressed.

Discussed below are the City's most significant comments and concerns about the DEIS, as well as suggestions about how to address its shortcomings. Additional detailed comments on the DEIS, appendices, and supporting documents are attached.

2.0 Deficiencies in the Environmental Review Process

The City believes that the environmental review process as a whole, and the resulting DEIS, is fundamentally flawed in that it appears to have been predisposed to a finding that the preferred alternative is needed, will provide significant mobility benefits, and that it can be constructed and operated without significant impacts to sensitive environmental resources. Specifically, the City views the process itself to be flawed on the basis of the following:

- The environmental review was to have been conducted under the Federal NEPA, but actions were taken to shift allocated Federal funding out of the budget to enable the environmental review to proceed under State regulations. This was done with the publicly stated objective of expediting the environmental review process. Also, during the course of the environmental review process project funding agreements have been executed with Travis and Hays counties and the presumed implementing agency, the Central Texas Regional Mobility Authority (CTRMA), has initiated a procurement process for engineering design services well in advance of the draft EIS, which could limit the ability of the chosen design engineer to incorporate the requirements of the EIS..
- The formulation and evaluation of alternatives is developed in such a way as to favor the preferred alternative. This is discussed further below.
- The DEIS was issued prior to the completion of several critically important investigations that are either currently underway or only recently completed and not fully documented, the results of which may influence the key findings in the DEIS. Further, the published schedule for the FEIS and ROD will not allow time for completion of all ongoing studies in time for the results to be considered in the FEIS. These studies described below.
- With the exception of the indirect effects analysis, the defined study area for the environmental review is limited to the areas in immediate proximity to the right-of-way. To ensure a thorough review of potential impacts and alternatives, the study area should be expanded to include Slaughter Lane and the entirety of Brodie Lane south of Slaughter and east to Manchaca Road and west to the Oak Hill area.
- While there has been a "participating agency" process that has included the City of Austin and other governmental entities, it has not been as robust as might have been expected for a project with such a long history of controversy and with very well-known concerns about the environmental sensitivity of the project area. The Technical Working Group and its subgroups on

karst and water quality protection have not met frequently or long enough to fully delve into these complex issues in a fully collaborative manner. For example, the TxDOT and City of Austin personnel were to have collaborated closely to refresh an engineering analysis of stormwater treatment strategies previously conducted. This collaboration did not occur. Also, City staff has repeatedly suggested that a single technical working group be established to address common issues of concern about other potential TxDOT/CTRMA roadway projects that are within the Barton Springs Zone (BSZ) of the Edwards Aquifer (i.e., the Oakhill Parkway and potential expansion of South MoPac including the intersections at Slaughter Lane and La Crosse Avenue).

- On several occasions in Technical Work Group meetings and other forums, City staff has suggested that the environmental review of the proposed SH45 SW be looked at in a broader regional context. Specifically, the City has concerns about the potential cumulative impacts of the aforementioned major roadway projects on the quality of water recharging the BSZ, in the aquifer, and at Barton Springs. This suggestion was not addressed in the DEIS.

3.0 Compatibility with the City's Comprehensive Land Use Plan – Imagine Austin

The City of Austin's Charter requires adoption of a comprehensive plan that includes the City's policies for growth and development of land within the corporate limits and the extraterritorial jurisdiction of the City. In June 2012, the Austin City Council, after nearly three years of extensive community involvement and input, adopted a new comprehensive land use plan, known as the *Imagine Austin Comprehensive Plan* (IACP). The IACP provides a vision to guide the City's development and re-development over a 30-year period. Central elements of that vision are that Austin will become more compact and connected and that the City will sustainably manage natural resources, preserve and protect environmentally sensitive areas, and integrate nature into the City.

In terms of the proposed SH45 SW project, the IACP is clear that the City does not support the project. Of particular note is that the SH 45 SW connection was purposefully excluded from the Roadway Networks (Figure 4.4) and Growth Concept (Figure 4.5) maps of the adopted IACP. In addition, the following "priority actions" are called out in the IACP:

- *"Ensure consistency between the Growth Concept Map Series and regional transportation plans by amending the Austin Metropolitan Area Transportation Plan to remove SH 45 SW and requesting its removal from the Capital Area Metropolitan Planning Organization 2035 Regional Transportation Plan."* (Policy Action LUT A46)
- *"Protect Austin's natural resources and environmental systems by limiting land use and transportation development in sensitive environmental areas and preserving areas of open space."* (Policy Action LUT P22)

On May 15, 2014 the Austin City Council adopted a resolution (CR20140515-022) which acknowledges the conflict between the IACP and "...confirms its serious concern about the proposed SH45 SW toll road based on currently available information.". The DEIS should disclose and acknowledge that SH45 SW is in conflict with Austin's comprehensive plan and because most of the road is within Austin's jurisdiction the DEIS should consider how SH45, if built, could address the goals of the IACP.

4.0 Purpose and Need

State regulations require that all reasonable alternatives that meet the stated purpose and need for a roadway project be evaluated in the environmental review process (43 TAC 2.84). As described in the DEIS, the purpose and need for the project appears to be based solely on projected future travel delays and does not give adequate consideration to the need to increase the capacity of the larger roadway network in the area. In the DEIS the “need” or justification for the project is based on the results of modeling that “...indicate that travel times along existing routes in northern Hays and southern Travis Counties in 2035 are projected to be nearly 80 percent longer on average than observed travel times in 2014.” The DEIS goes on to conclude that the construction of the preferred alternative will reduce travel times on non-tolled roadways by approximately 23 to 28 percent. Contrary to the implications of the DEIS, commuters passing through and residents of the area will not experience relief from future congestion. In fact, modeling indicates that under the preferred alternative, projected travel times along non-tolled roadways are reduced approximately 25 percent below those projected without the tollway. This is still an increase of roughly 60 percent by 2035 rather than the 80 percent increase with the road project. A 60% increase in travel time is a significant increase and raises the question as to whether the preferred alternative is a wise investment in terms of its financial and environmental costs versus projected mobility benefits and whether there are other alternatives with the potential to achieve equal or greater mobility benefits with less cost and/or risk of irreversible environmental impact.

5.0 Alternatives Analysis

The DEIS is also generally lacking in a thorough analysis of alternatives and consideration of “system” impacts and does not provide sufficient detail for the reader to understand the analysis of alternatives. Specific concerns about the definition and analysis of alternatives are:

- Of the preliminary roadway construction alternatives considered, aside from the “Upgrade Existing Roadways” preliminary alternative, the remaining two are tollways either on a new location or the existing state-owned right-of-way. This improperly slants the analysis in favor of the preferred alternative as the ROW already exists.
- To meet stated purpose and need, the DEIS “Upgrade Existing Roadways” preliminary alternative identified a four lane highway with frontage roads and a 300-foot ROW. Frontage roads are necessary because the adjacent land along existing roadways is already developed. Expansions to Brodie Lane, Slaughter Lane, and Manchaca Road were eliminated as alternatives because the potential impact of a four lane highway with frontage roads will have 167 total relocations/displacements (Brodie/Slaughter) or 225 total relocations/displacements (Manchaca-FM2304/Slaughter). Although the DEIS states “*residential and commercial relocations could potentially be reduced...it would not be possible to totally eliminate all relocations....this alternative is not considered reasonable and was eliminated from further consideration.*” (DEIS, p. 18). With reduced ROW, displacements could be reduced but to what extent remains unknown as it was eliminated from further consideration.
- The potential to maximize existing roadways as urban arterials should have, but was not, fully considered. While cost is a major consideration in any improvements within the existing roadway corridors, 3-, 4-, or even 5-lane cross sections with signalized intersections or non-signalized continuous flow intersections could be viable and might provide relief to congestions and alter travel times similar to what might be accomplished by the current preferred alternative.

- The DEIS did not provide sufficient technical analysis of the alternative to demonstrate an ability to satisfy the stated purpose and need.
- The DEIS fails to consider the individual or collective costs, benefits, and impacts of an “arterial solution” involving additional multiple routes (e.g., Brodie Lane, Manchaca Road, South 1st Street, FM 1626).
- The DEIS fails to adequately consider and evaluate the potential to improve mobility through the implementation of Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies, both individually and in combination with the potential improvements described generally above.

6.0 Independent Utility and Cumulative Impacts

According to the DEIS, the proposed project is said to have “independent utility” as a stand-alone transportation improvement that is not dependent upon other transportation improvements in the area. While this finding may be correct based on a strict application of the State’s definition of “independent utility”, it is apparent that in reality the proposed project is not independent but rather is part of a larger, interconnected regional transportation network. This is evidenced in part by the fact that the project is included in the Capital Area Metropolitan Planning Organization (CAMPO) 2035 Regional Transportation Plan which “...*identifies the construction of SH 45SW between FM 1626 and MoPac as part of the region’s transportation improvements*” and that the proposed project is expected to “...*contribute to improving the overall function of the transportation system in this area.*” (DEIS Chapter 1- Purpose and Need for the Action p. 10) Modeling to evaluate the projected mobility benefits of the preferred alternative was conducted at a regional scale with the assumption that all related improvements included in the CAMPO 2035 Regional Transportation Plan are in place and operational. These include potential major improvements to South Loop 1 (i.e., addition of managed lanes, reconfiguration of intersections on South Loop 1 at Slaughter Lane and LaCrosse Avenue) and improvements to the U.S. Highway 290 and State Highway 71 in the Oak Hill area (i.e., the Oakhill Parkway).

The CAMPO 2035 Plan includes SH 45 SW from FM 1626 to IH 35 as a preliminary design study, without funds for engineering and construction. Other potential future roadway projects have recently come to the fore in discussions about development of the 2040 CAMPO regional transportation plan. Specifically, requests have been made to model, evaluate and consider funding sources to plan a future extension of SH 45 SW from the current termini at RM 1825 north across Lake Austin to FM 620 in the full purpose limits of the City . SH 45 SW, FM 1626 to IH35, is proposed for modeling in the CAMPO 2040 Plan update process as a 6-lane elevated toll road. These discussions suggest that the preferred alternative is in fact being viewed by some as one component of a larger regional project that would complete the southern and western segments of an outer loop.

Because of the determination that the preferred alternative has independent utility, the scope of the environmental review has been limited to the defined study area. As previously noted, the study area should be expanded to include the extent of the existing arterials and other roadways that were included in travel time modeling. Furthermore, potential environmental impacts of the preferred alternative cannot be fully understood in isolation but rather should be evaluated at a regional scale that includes analysis of the potential cumulative impacts of other potential roadway projects, specifically the aforementioned improvements to MoPac South and the Oak Hill Parkway. All of these projects overlie the BSZ and all have the potential to increase water pollutant loads and degrade the quality of water entering into, withdrawn from, and discharged from the Barton Springs Segment of the Edwards Aquifer.

The proposed roadway only serves to deliver traffic from FM1626 to South MoPac, neither of which are dense residential or commercial nodes. Thus it is clear that SH45 is not independent, but simply a segment of a larger state road network. As such, the City believes these to be connected and/or cumulative actions as defined by 40 CFR Section 1508.25(a) and that a programmatic EIS should be conducted under the Federal NEPA process.

7.0 Impacts to Sensitive Karst Features

It is well-established that the density of major karst recharge features (caves and large sinkholes) in and near the SH45 SW right-of-way are among the highest densities found in the Edwards Aquifer Recharge Zone. It is also well-established scientifically that a significant portion of recharge occurs in upland areas in a diffuse manner, in addition to concentrated recharge at observable karst features. Accordingly, the City has serious concerns about the potential adverse impacts of the preferred alternative on known karst features, on subsurface features that do not have expression on the land surface, and on diffuse recharge in areas altered by the project.

The City appreciates the significant additional field work that has and is being performed by TxDOT to identify and characterize karst features within the right-of-way. However, as previously noted, the DEIS should not have been released prior to the completion of all geological investigations, including particularly the completion of the City's current investigation to determine the extent of the subsurface drainage basin to Flint Ridge Cave, which is discussed below.

The Balcones Canyonlands Preserve system (BCP) was established by the City of Austin and Travis County to protect various rare, threatened, and endangered species. As partners in the BCP, the City and Travis County jointly hold an 'incidental take' permit under the federal Endangered Species Act. By providing species protection on preserve lands, private land development and public infrastructure development in other areas of Travis County is possible without site-specific mitigation and individual incidental take permits.

One of the sinkhole basins that the SH45 right-of-way traverses is the 50-acre catchment area for Flint Ridge Cave. The SH 45 SW ROW passes within 150 feet of the cave entrance and passes over portions of the known subsurface extent of the cave (see attached map of Flint Ridge surface catchment). The cave provides habitat for rare troglobitic karst invertebrates including *Circurina bandida* and *Rhadine austinica*, both of which are listed as species of concern (SOC) under the Balcones Canyonlands Conservation Plan (BCCP) permit. Potentially other SOC have been observed in Flint Ridge Cave during faunal surveys, including *Eidmannella reclusa* and *Speodesmus N. S.*, although further biological investigation is necessary to distinguish the specific species present in the cave. Because of the presence of these species, Flint Ridge Cave is one of 62 caves that are protected under the BCCP permit. If the BCP is unable to protect these species then future listing as endangered or threatened species by the U.S. Fish and Wildlife Service (USFWS) is a possibility. Importantly, the City and Travis County could also incur fines or other expenses for failure to comply with the BCP permit with a likely scenario being that the permit will require amendment, which, in addition to being a potentially lengthy and costly process, could have implications for private land development and public infrastructure development in a large area of western Travis County.

Until recently the proposed SH45 SW was not obligated to comply with the BCCP permit or the federal Endangered Species Act. This is because the species in Flint Ridge Cave are not currently listed by the federal government as endangered or threatened. However, as noted previously, Travis County, Hays County, and Central Texas Regional Mobility Authority have entered into an agreement to jointly fund the proposed project. Because of this funding agreement, in combination with a 1996

agreement between Travis County and the City to create the BCCP, the proposed project appears to now be a County project that must comply with BCCP permit.

Prior to the initiation of the environmental review process for the proposed SH45 SW the City strongly suggested that TxDOT undertake or agree to participate in a study to better delineate the subsurface drainage area of Flint Ridge Cave. As the study was not included in the scope of work for the environmental review, in early 2014 the City decided to undertake the study on its own, which is being conducted by City personnel with specific expertise in this type of analysis. The study involves the use of dye tracers to map subsurface flow patterns in the vicinity of the cave.

The City's primary interest in conducting the study is to ensure that both the City and Travis County remain fully compliant with the terms and conditions of the BCCP permit. The information to be obtained through the study, in combination with available information about surface drainage patterns, is considered essential to understanding the potential risks posed by implementation of the preferred alternative and it is essential to the identification of strategies to avoid, minimize, and/or mitigate potential adverse impacts from roadway construction and operation. While the DEIS proposes design concepts for the preferred alternative to avoid and minimize impacts to Flint Ridge Cave, the City cannot determine whether those concepts will be sufficient to achieve the very high level of protection that is required for a cave listed in the BCCP permit. It is the City's position, therefore, is that a final EIS and record of decision should be delayed until this information is available and is fully considered and incorporated into the EIS. This should include development of more detailed engineering designs of the proposed impact avoidance measures that are described conceptually in the DEIS.

8.0 Potential Impacts to the Barton Springs Segment of the Edwards Aquifer

The City of Austin has previously expressed and continues to have serious concerns about the potential adverse impacts of the preferred alternative on the quantity and quality of recharge to the Barton Springs Segment of the Edwards Aquifer, and to nearby users of water supply from the aquifer and to endangered species at Barton Springs. While these concerns, which are further described below, are discussed in the DEIS, the City does not believe that the analyses represented in the DEIS are sufficient to support the finding that the preferred alternative can be implemented with minimal impact to the natural environment and with no impact to federally list endangered species. As previously noted, any such determination should be withheld until all geological field investigations are completed, particularly the aforementioned study to determine the subsurface drainage area of Flint Ridge Cave. And more specifically, it is premature to conclude that the proposed "avoidance" measures described in the DEIS can be adequately evaluated and properly designed before the completion of the Flint Ridge Cave study and without quantification of the overall loss of aquifer recharge from implementation of the preferred alternative or without quantification of the pollutant loads for constituents other than Total Suspended Solids (TSS).

Recharge to Barton Springs - Studies have demonstrated that a high percentage of rainfall in the area of the SH45 SW right-of-way directly recharges the Edwards Aquifer. Roughly two-thirds of the 8,300 segment from Mopac South to Bear Creek cross internal sinkhole drainage basins that supply recharge to the Edwards Aquifer. There are at least fourteen identified caves within one-quarter of a mile of the proposed designated right-of-way (ROW). Additionally, the main channel of Bear Creek downstream of the SH45 SW right-of-way contains swallets (creek-channel sinkholes) that directly recharge the aquifer in the range of 10 to 20 cubic feet per second when the creek is flowing. These swallets are prone to plugging by fine-grained sediment, which reduces recharge and could be irreversible. None of this information was specifically incorporated into the DEIS; although it was provided to TxDOT during the Technical Work Group process.

Proximity to Local Public and Private Water Supply Wells - The Barton Springs Zone of the Edwards Aquifer is a designated sole source aquifer under the Federal Safe Drinking Water Act. The SH45 SW right-of-way is also within the City's Drinking Water Protection Zone. There are numerous public and private water supply well systems that lie down-gradient of the right-of-way. Contaminated stormwater runoff has the potential to impact drinking water supplies in portions of Shady Hollow, Copper Hills, SW Territory, and Marbridge Foundation (see attached map of well recovery from 2007 dye tracing). Of note is that the Edwards Aquifer is understood to provide little natural attenuation of contaminants, except by dilution with natural runoff sources (Hauwert, 2009). This information was not considered in determining protective measures outlined in the DEIS.

Federally-Protected Endangered Species - As noted, the City of Austin holds an Incidental Take Permit from the U.S. Fish and Wildlife Service (USFWS) for the endangered Barton Springs Salamander (*Eurycea sosorum*) and for the recently listed Austin Blind Salamander (*Eurycea waterlooensis*). Dye tracer studies performed by the City in the vicinity of the SH45 SW right-of-way have demonstrated a strong hydraulic connection with Barton Springs. Four groundwater tracers injected in the vicinity of the intersection of SH45 SW and Mopac South in 2007 and initially arrived at Barton Springs within two to four days. Long-term monitoring indicates that there has been some decline in water quality in the Barton Springs Zone (Mahler et al., 2006; Herrington et al., 2010; Mahler et al., 2011). Any loss of recharge to the aquifer or degradation of water quality as a result of the proposed project would negatively impact these federally-listed endangered species. Any direct or indirect impacts to listed species or their habitat constitutes "take" under the federal Endangered Species Act, which requires authorization from the U.S. Fish and Wildlife Service.

9.0 Environmental Compliance Management Plan

The City is encouraged by the discussions presented in Appendix H (pp. H-20) of the DEIS with regard to an Environmental Compliance Management Plan (ECMP) for the proposed project. From this discussion it appears that TxDOT/CTRMA has embraced many of the elements of the City's Environmental Commissioning (EC) process for the design, construction, and start-up of Water Treatment Plant No. 4. The City's EC process for the water treatment plant was a topic of discussion in the Technical Work Group and in subsequent meetings with CTRMA staff. However, the discussion of the ECMP in Appendix H of the DEIS is lacking specificity and is missing several critically important elements including:

- Acknowledgement that the ECMP is a process that will be employed throughout the design, construction, and start-up of the project that includes an environmental compliance "team" that is independent of but integrated with the design and construction team;
- Acknowledgement that the environmental compliance team will possess the technical capabilities and expertise required to provide effective independent oversight;
- Clearly defined environmental protection goals and measurable performance standards;
- A clear process for incorporation of environmental protection measures into project design and in construction management;
- Environmental monitoring during and after construction to ensure that environmental performance standards are being met; and

An adaptive management process to adjust project plans when goals and standards are not being met or when unanticipated events or conditions occur.

In addition to incorporation of the above elements into the discussion of the ECMP in Appendix H, the City would like to see this discussion in the body of the DEIS along with a commitment by the implementing agency (i.e., CTRMA) to develop and implement a robust environmental compliance process in collaboration with the City.

10.0 Monitoring, Assessment, and Adaptive Management

If the proposed SH45 SW goes forward it is essential that there be a robust ongoing environmental monitoring, assessment, and adaptive management program with clearly defined goals for environmental protection that will ensure full protection of BCP permit caves, City of Austin Water Quality Protection Lands, and the quality of water in nearby water wells, creeks, and at Barton Springs. The purpose of environmental monitoring and assessment is to detect problems early so that adaptive management responses can be implemented in a timely manner. For example, sediment discharges from the roadway and its appurtenances, particularly during construction, may require alterations in temporary and/or permanent stormwater controls and could require periodic physical removal of accumulated sediment to restore impaired aquifer recharge volume. Similarly, hydrologic and habitat conditions in Flint Ridge Cave will need to be monitored in perpetuity to ensure that the cave is not being adversely impacted by the roadway.

The need for and costs of an ongoing environmental monitoring, assessment, and adaptive management program must be addressed in the final EIS. Additionally, there should be a commitment by the implementing agency (i.e., CTRMA) that all reasonable measures will be taken to rectify any problems that are identified through monitoring and assessment, including modifications to facilities and/or alteration of roadway operations.

City of Austin
Submittal Review Comments
Project Title: SH45
Report: SH45 Draft Environmental Impact Statement
Date: August 13, 2014

No.	Page	Sec.	Review Comments:
1	0	General	There is no reference to or discussion of the 1990 Consent Decree with the Barton Springs Edwards Aquifer Conservation District. The Consent Decree states that the BSEACD will have input on how SH45SW will be built, operated and maintained. There is no proposed mechanism in the DEIS to implement this requirement.
2	0	General	The project is acknowledged to be in an environmentally sensitive area by virtue of overlying the Edwards Aquifer, a karst aquifer system noted as being the most sensitive in the state to pollution by TCEQ and a sole source aquifer. The karst features, which make the aquifer sensitive, included in the DEIS are from work conducted in 2007 and do not include results of the most recent efforts. Results of the most recent karst studies are to be included in the final EIS but that bypasses significant public input as REQUIRED for an EIS.
3	0	General	In the area of Flint Ridge Cave the road profiles show the road on up to 20 ft of fill. This amount of fill raises the roadway above tree line in many places. The amount of fill should be reduced significantly by reducing proposed highway speed to reduce curvature values or elevating the multiuse path instead of the roadway. COA constructed a number of visual cross sections which indicate that the road, despite being relatively distant, will be highly visible from adjacent neighborhoods.
4	0	General	Will the roadway have lighting? If so how tall will the light poles be? Any lights used should be focused entirely downward to reduce light pollution.
5	0	General	There is a major problem with the references in the DEIS. The reference format in Section 8 makes it difficult to locate a specific reference, many examples of references that do not support the statements they follow, or the DEIS interpretation of the reference is totally incorrect.
6	0	General	This document contains abundant usage of conditional wording which is misleading. Words like "should" and "would" should be replaced by action verbs such as "shall" and "will" so that the reader can be assured that CTRMA/TxDoT is going to do what is stated. This is necessary to determine what is an need versus a commitment.
7	0	General	Given the MOU between TxDOT and the Texas Commission on Environmental Quality (TCEQ) 43 TAC 2.305 it is not clear why TCEQ was not invited to be a "coordinating agency" in the DEIS preparation. This would have given TCEQ a chance to work more closely with TxDOT and CTRMA in preparation of the DEIS and have more of an impact on the project than simply being another "participating" agency. This would seem to be a requirement of the MOU in 2.305(b)(2)(B) since TCEQ has "jurisdiction by law" over the project via the Edwards Aquifer Rules 30 TAC 213.
8	0	General	Given their expertise in the subject area, jurisdiction by law and MOU with TxDOT, it is also unclear why the Texas Parks and Wildlife Department (TPWD) was not invited to be a "coordinating agency". The MOU in 43 TAC 2.206 would also seem to provide triggers for special coordination on the project with TPWD.
9	ES-11	ES.5	It is stated that impacts to geologic resources as a result of the Build Alternative are anticipated to be minor, but that additional karst investigations are currently underway. It is not possible to assess the potential impacts on geologic and karst resources until these investigations are completed.
10	ES-12	ES.5	COA has conducted a recent analysis of the surface catchment of Flint Ridge Cave surface catchment using 1 ft contour intervals (versus 2 ft used by the TxDoT consultant) and observations from the historic October 2013 rains. That analysis shows the surface catchment to be 57.8 acres versus the 43.8 used in the DEIS.
11	ES-12	ES.5	It is stated that 5.6 acres of Flint Ridge surface catchment will be covered by impervious surfaces but does not note how many acres of the catchment will be disturbed or diverted by the east side berm.
12	ES-12	ES.5	Text does not acknowledge that part of the cave underlies the ROW.

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13	ES-12	ES.5	Direct impacts to the natural environment - do the 47.9 ac of impervious cover include the berm planned to divert polluted runoff away from Flint Ridge Cave, WQ Ponds, and the clay layer planned to be installed to prevent polluted runoff from infiltrating into Flint Ridge Cave?
14	ES-13	ES.6	Substantially is defined in TxDOT guidance for cumulative and indirect impacts. This should be in a glossary. From the TxDOT definition, this conclusion is not supported by the analysis provided. Further, surface and groundwater resources in the proposed project's AOI are not anticipated to be substantially adversely affected due to the large amount of preserved WQPLs and the implementation of BMPs. Additionally, several regulations are in place to protect water quality from the effects of induced development, including TCEQ regulations requiring BMPs and preparation of SW3Ps, City of Austin drainage/water quality requirements and ordinances, and Section 404 of the CWA.
15	ES-13	ES.5	The report references COA ordinances and implies that these and other ordinances would protect the aquifer from future development when most of the area serviced by SH45 is outside COA jurisdiction.
16	ES-13	ES.5	How will discharge of treated runoff into Bear Creek affect overall recharge to the Barton Springs portion of the Edwards Aquifer?
17	ES-13	ES.5	Asserts that WQPL was acquired to mitigate for development that might occur because of SH45. There is no document from the City anywhere that establishes the public purpose of WQPL as mitigation for new development. Instead the public purpose is to preserve water quality and quantity by limiting new development over the aquifer by removing land available for development. Any new development associated with SH45 would be adverse to the purpose for WQPL.
18	ES-13	ES.5	Does last sentence of last paragraph in Water quality section imply that SH45 will be constructed to COA Water Quality standards (implied SOS)?
19	ES-14	ES.5	States there will be no direct impact to threatened and endangered species. However, ROW is within 100M of identified GCWA habitat on the Tabor and Edwards Crossing WQPL tracts. The USFWS standard of indirect effects on GCWA is development and disturbance within 100 meters of nesting birds. There may well be indirect effects to GCWA.
20	ES-14	ES.5	Describes no direct effect to Austin Blind salamander, yet USFWS listing notice describes any impact to critical habitat would be considered take. Since runoff from site flows directly to Barton Springs assertions about WQ effects are questionable. There may be direct effects to ABS.
21	ES-14	ES.5	Describes insignificant changes to WQ due to operations as being mitigated by potential future development in study area. USFWS listing notice does not provide for this.
22	ES-14	ES.5	Vegetation - Does the 159 ac of vegetation impacted vegetation include areas disturbed by berms, bentonite cap, and diversion structure to Flint Ridge Cave?
23	ES-15	ES.5	The No Build Alternative states that it is assumed that all other projects listed in the CAMPO 2035 RTP would be implemented. However, neither the benefits nor impacts of all of these other projects being implemented are analyzed as a part of the No Build alternative.
24	ES-17	ES.6	The technical workgroup meetings were not long enough and did not occur frequently enough to enable participants to provide constructive input to reduce the environmental impact of the project.
25	ES-5	ES.3	The DEIS cites population growth figures for census tracts "surrounding the proposed project area" but does not specify these tracts to allow for verification. There is also a vague reference to a CAMPO forecast for the area without the necessary specificity.

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26	ES-6	ES.4	Based on the analysis of environmental, social, and economic impacts associated with both the Build and No Build Alternatives, the Build Alternative was identified as the Preferred Alternative for the proposed project. The evaluation of the Build and No Build Alternatives was based on the following criteria. The text goes on to provide bullet items of the criteria with no real attempt at analysis using an objective qualitative or quantitative method.;
27	ES-6	ES.4	All alternatives except for the Build in Existing ROW and No Build were discounted. It is not adequate for an Environmental Impact Statement to only review the preferred alternative and a no build alternative.
28	ES-6	ES.4	Summary of Alternatives, Preliminary and Reasonable alternatives - discusses potential impacts to WQPL as reasoning to exclude potential alternatives. It does not discuss need to acquire land rights on WQPL for berms and additional "Flint Ridge Cave Watershed" and changes to natural surface and subsurface flows to divert un-affected flows into Flint Ridge Cave to replace diverted affected flows from the preferred alternative.
29	ES-7	ES.4	It is misleading to say that the project avoids direct impacts to WQPL since approximately 38 acres of WQPL was purchased for the ROW so WQPL has been impacted.
30	ES-7	ES.4	Preferred alternative cites impacts to preserve lands as reasoning for selecting build alternative as preferred, yet analysis does not speak to effects to preserve land for build alt.
31	ES-8	ES.5	This section states that the City of Austin et al. have stated that the road will have a limited influence on development in the area. Please provide a reference for each agency listed in which that statement is supported. 19.8% of the land in the study area may be developed in the future (see table 3.1-1). This contradicts what has occurred due to transportation projects elsewhere in the region.
32	ES-8	ES.5	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. Indirect impacts associated with induced growth are not anticipated to be significant under the Build Alternative due to the limited access nature of the rate of growth already occurring in the area (even in the absence of the proposed facility).roadway, the large amount of protected lands in the proposed project's area of influence (AOI – area in which project-related impacts that are removed in time or distance from the proposed project site itself may still occur), and the high rate of growth already occurring in the area (even in the absence of the proposed facility).
33	ES-8	ES.5	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. The proposed project's influence on development is not anticipated to be significant, especially given the Austin area's high rate of growth overall and within the study area.
34	ES-8	ES.5	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. While induced growth can indirectly impact water quality and groundwater recharge primarily through increased impervious cover, induced growth as a result of the Build Alternative is not anticipated to be significant.
35	ES-8	ES.5	States that direct project related impacts to land use would not occur. Yet, proposal to divert overland flow will divert runoff from one sub-watershed to another affecting not only the sub-watershed being substituted but also watersheds downslope and subsurface drainage downslope limiting their effectiveness as protected watersheds serving BSEA. The diversion facility would become a direct project related impact and development on WQPL.

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36	ES-9	ES.5	Insert this paragraph first - "the proposed project is in Hays and Travis counties, which is in an area in attainment or unclassifiable for all national ambient air quality standards (NAAQS), including ozone; therefore, the transportation conformity rules do not apply."
37	ES-9	ES.5	Modify this statement - " A quantitative analysis of air quality impacts resulting from the Build Alternative was not completed for this environmental impact analysis as traffic projections for the design year are 34,400 vehicles per day (vpd), well under the 140,000 vpd threshold for a Traffic Air Quality Analysis. " To read as - A quantitative analysis of air quality impacts resulting from the Build Alternative was not completed for this environmental impact analysis. Traffic projections for the design year are 34,400 vehicles per day (vpd), well under the 140,000 vpd threshold for a Carbon Monoxide (CO) Traffic Air Quality Analysis.
38	ES-9	ES.5	Rather than stating that the VMT will be slightly higher under the Build Alternative, please provide a percentage to let the reader know how much higher the VMT is expected to be.
39	ES-9	ES.5	A quantitative analysis of air quality impacts was not done because the VMT was under a regulatory threshold for such an analysis. In keeping with the stated TxDOT goal of developing the most environmentally safe project given the sensitivity of the area, such analysis could have shown the superiority of the DEIS rather than business as usual. This is only an example of a common flaw in the DEIS and the inconsistency that is seen throughout the "analyses" in the document.
40	1	1.1	The study area should encompass more area, perhaps even as far east as Manchaca Lane (since the upgrade of Manchaca Road was considered in one of the preliminary alternatives.)
41	1	1.1	Study area should extend to include Slaughter Lane and all of Brodie Lane south of Slaughter Lane
42	1	1.1.1	Question: Will Preferred Alternative project predetermine location/type of improvements within FM 1626 corridor eastward to IH 35? If no, why not? (The extension of SH 45 SW is included in <i>Hays County Transportation Plan</i> .)
43	5	1.2	Question: What impact has the purchase of project ROW and deeding to State by Hays & Travis Counties had on the selection of Preferred Alternative (New Tollway on Existing State-owned ROW Alternative)?
44	6	1.4	The purpose and need seems to be based on future travel delays and does not speak to the corridor within a system. It does not quantify the capacity needs, and does not speak to the system and how the roadways to the south are limited. FM 1626 is currently a 2 lane rural roadway, which generally could be upgraded to a 4 lane at-grade roadway. Assuming that there is not a plan to make it a freeway, and that signals will be needed at intersections along the road, the proposed SH 45 has twice the capacity of the linkage to the south. This does not include any potential operations changes to Brodie and Manchaca. If SH 45 is extended to Interstate 35, the full capacity could be used.
45	6	1.4	RTG,2014 formulas and calculations should be in Appendix
46	6	1.4	Please use compound annualized population growth rates in Paragraphs 1 & 2, not simple percentage increases, for both historic and future growth rates.
47	9	1.4	Brodie Lane is classified as a major arterial from US 290 to FM 1626
48	13	1.5	The Other Project Goals do not include reference to the terms of the judgment of the 1990 Consent Decree with the Barton Springs Edwards Aquifer, or discussion that the road will be consistent with the non-degradation requirement of the City of Austin Save Our Springs Ordinance. "Other Project Goals" should include "the preservation of the quality and quantity of recharge to the Edwards Aquifer."

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49	13	1.5	The wording of the TxDOT environmental goals (Other Project-Related Goals, making the appear to be an afterthought) for the project have subtly changed from those discussed at numerous meetings on the project. Rather than a superior project and the most environmentally sensitive roadway designed, it is now to be constructed in a "environmentally sensitive manner that minimizes, to the maximum extent practicable, the potential impacts to the Edwards Aquifer from construction and operation of the roadway". It is clear that the written goals are a far cry from those in previous verbal commitments.
50	13	ES.5	Discussion of census blocks having more than 50% minority population is provided but with no direct citation of these census blocks.
51	13	ES.5	A general dismissal of any potentially negative impacts of the toll without any backup data or reference. The DEIS basically states that there will an annual impact of about \$600 without any analysis of how this fee will affect the population of users.
52	13	ES.5	Discussion of census blocks having more than 50% minority population is provided but with no direct citation of these census blocks.
53	15	2.1	Why wasn't a new non-tolled roadway on existing state-owned ROW a preliminary alternative?
54	16	2.1.3	Why didn't the " upgrade of one or more existing roadways " include a consideration of just upgraded arterials?
55	16	2.1.3	State definition of "highway"; if frontage roads are included is highway assumed to be toll or non-toll? State typical total ROW required for 4-lane highway in text after "additional ROW would be required."
56	16	2.1.4	Question/Clarify in second sentence: would this alternative include frontage roads in ROW, in addition to stated main lanes and interchanges?
57	16	2.2.1	Please identify the specific TSM strategies implemented on Brodie Lane, Manchaca Road and Slaughter Lane, and the level of mobility improvement achieved by the strategies prior to conclusion TSM Alternative can not improve system connectivity or offer an alternative route to congested local roadways.
58	17	2.2.3	Why is upgrading to a highway facility with frontage the only alternative? Why not arterial 4-lane or 5-lane cross section?
59	17	2.2.3	The analysis presented removes improvements to Brodie and Manchaca as alternatives because it assumes that grade separated roadways in 300 feet of right-of-way would be needed to handle the need. It is difficult to tell if the need is met, because the need is based on delay and not on balancing system wide capacity. A simple analogy would be there is a 2 inch hose full of water coming north in the morning from Hays County, that feeds two 1 inch hoses (Brodie and Manchaca), and we are now going to build a 4 inch hose to connect to MOPAC. It would reduce the pressure (delay) in the system, but would not increase the capacity of the system. DEIS did not look at combination of improvements to Brodie and Manchaca that could provide the needed capacity. The report just says widen either roadway to a freeway would cause too much disruption to the neighborhoods
60	17	2.2.3	Please evaluate upgrade of Brodie Lane to 4-lane divided arterial with grade separated interchange at Slaughter & Brodie Lanes. Required ROW for MAD 4 is 100 - 120 feet.
61	17	2.2.2	The TDM Alternative discusses one TDM, transit. Please discuss TDM strategies and whether purpose and need can be met by common TDMs (bike, walk, flex schedules, mixed land use activity centers adopted in MPO Plan, alternative schedules, telecommute/tele-technologies). These approaches are mentioned on Page 15, "2.1.2 Travel Demand Management (TDM)".
62	17	2.2.3	Please evaluate upgrade of Manchaca Road to 4-lane divided arterial with grade separated interchange at Slaughter & Manchaca, if warranted. Required ROW for MAD 4 is 100 - 120 feet, less than 300 feet for Alternative eliminated from further consideration. (No additional Slaughter Lane ROW beyond Manchaca at Slaughter intersection/interchange. FM 2304 not in BS-EAR or BS-EAC zones.)

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63	25	2.30	Regarding the underpass for the Violet Crown Trail, will this underpass be large enough for a standard truck to pass through? Maintenance and security for the proposed trail may be hampered if this is not the case.
64	25	2.3	Regarding the underpass for the Violet Crown Trail, this must be located much further north to avoid impacting the Flint Ridge Basin. The trail was always expected to join or cross the SH45 ROW as north as possible and then follow the ROW to where it connects to the trail continuation on the other side of the ROW.
65	25	2.3	APPENDIX C: Safety concerns regarding shared use path (SUP) crossings of turn lanes, connectors, main lanes at intersections/interchanges at S. Loop 1, Bliss Spillar Road, FM 1626. Provide additional details on Schematics in Appendix C and evaluate bicycle, pedestrian, ADA safety at all SUP crossings of Build Alternative.
66	27	2.4	Why is a tolled facility the PA and not a toll free?
67	29	2.4	Figure 2.4-1 does not depict areas outside ROW where runoff from highway will be diverted to and areas outside ROW where runoff will be diverted from to serve Flint Ridge Cave as areas of disturbance from SH45SW.
68	32	3.1.1	There is no COA 2012 reference listed in Section 8
69	32	3.1.1	Mention of Census data on new residential construction within the study area without specific attribution or direct listing of these data.
70	33	3.1.1	Correct Fig. 3.1-1 to show Avana Full Purpose Annexation in southwest Study Area. http://austintexas.gov/department/annexation-extraterritorial-jurisdiction-planning/
71	35	3.1.1	The map shows the entirety of the Grey Rock Ridge Subdivision as residential. The subdivision plan seems to set aside open space that is not shown.
72	35	3.1.1	The map shows a tract in Shady Oaks Estate, section 2 that is south of the neighborhood park as "Developable Land." This tract is a common area used for open space or drainage and probably not developable.\
73	38	3.1	Table 3.1-1 shows different amounts of developable land than listed on page 41.
74	39	3.1.1	<i>Imagine Austin</i> , while incorporating adopted Neighborhood Plans, contains the <i>Imagine Austin</i> Growth Concept Map. The adopted Growth Concept does make future land use goals and recommendations; please correct third paragraph to reflect content of Concept. ftp://ftp.ci.austin.tx.us/GIS-Data/planning/maps/Fig_4.5_Growth_Concept_Map_24x36-2_Map.jpg Also, revise content of third paragraph to reference Imagine Austin Roadway Networks, Transit Networks, Bicycle & Pedestrian Networks (Figures 4.4, 4.3, 4.2 at http://www.austintexas.gov/department/our-plan-future)
75	39	3.1.1	This section acknowledges WQPL mission and goals but does not speak to the method of removing property from land available for development. This speaks to TxDOT expectation that WQPL will mitigate future development.
76	40	3.1.1	Omitted material. Discuss goals of Travis County draft Land, Water, and Transportation Plan, approved for Public Review & Comment by Travis Co. Commissioners Court, July 1, 2014, Item 14. Access backup here: http://traviscountytexas.com/Citizens/FileOpen.aspx?Type=1&ID=1378&Inline=True
77	41	3.1.1	Omitted material. CAMPO 2030 Plan includes SH 45 SW, FM 1626 - IH 35, Sponsor Hays County, 100% Locally Funded Project. \$8.2 million for environmental and preliminary engineering analysis, Open year 2020 - 2025. http://www.campotexas.org/wp-content/uploads/2013/10/CAMPO_2035_Plan_Adopted_May_242010wMods.pdf
78	42	3.1.1	Table 3.1-2: Veritas Academy is Expired as of July 7, 2014

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79	45	3.1.3	If 19.8% of the study area is developable land accessible by the roadway, then encroachment effects are not insignificant and the impact of development of this land should be included in the surface water and groundwater water quality impacts associated with this project.
80	45	3.1.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>The direct impacts to land use associated with the Build Alternative are not expected to be significant. Further, any direct impacts that would occur outside the ROW would be anticipated to be temporary and associated with construction.</i>
81	45	3.1.2	States that no conversion of land use from non-transportation to transportation use will occur. This is inaccurate as the build alternative includes plans to divert water from outside ROW to Flint Ridge Cave. This should be considered a transportation land use that effects the overall amount of recharge (surface and subsurface).
82	46	3.2.1	DEIS shows Table 3.2.1 and uses data for entire, whole census tracts giving populations and population growth from 1990 to 2000 and then to 2010. The actual study area is a rectilinear polygon and only partially overlaps with the five census tracts. The vast majority of the population growth that occurred form 1990 to 2010 within the set census tracts happened outside of the actual study area. Approximately about 15% of the growth listed on the table occurred within the actual study area. Table 3.2.1 is grossly misleading.
83	56	3.2.1	Using tract-level median household income (MHI) and then stating that no tract's MHI is below the federal poverty level and therefore there are no low income populations is a highly unorthodox way of testing for EJ issues, especially given the fact that in an earlier section the DEIS offers actual poverty rates for the collection of block groups in the area.
84	56	3.2.1	Using tract-level median household income (MHI) and then stating that no tract's MHI is below the federal poverty level and therefore there are no low income populations is a highly unorthodox way of testing for EJ issues, especially given the fact that in an earlier section the DEIS offers actual poverty rates for the collection of block groups in the area.
85	58	3.2.1	Extremely vague references to census data that give information on the number and type and wage rate of jobs within the study area. These must be estimates from a dataset known as Local Employment Dynamics that are produced by the Census Bureau--but this should be clearly attributed as such and not confused with the far more solid population data from the decennial census.
86	63	3.2.1	There appears to be a typo or mistake of some sort as the DEIS states that 91% of the housing stock is occupied (this is correct) and that 91% of these units are owner occupied--the actual figure is closer to 80%.
87	63	3.2.1	The DEIS states that the Shady Hollow CDP overlaps some parts of the City of Austin--this is untrue as CDPs by definition are areas of population concentrations outside of incorporated jurisdictions.
88	63	3.2.1	There is additional confusion about the owner occupancy rate...DEIS states Shady Hollow is 98% owner occupied when in fact the true figure is 93.5%.
89	69	3.2.1	Existing travel patterns to primary destinations; The 41% of all through trips captured destined for MO Pac should be an absolute number, i.e. 41% is XX out of XXXXX
90	74	3.2.1	Table 3.2-9 Daily Traffic Volumes do not match source data
91	77	3.2.2	Clarify if the travel time estimates from the 2035 model included improvements to roadways (eg, MoPac) other than the proposed SH45 SW

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92	78	3.2.2	Inconsistent definitions of low income...earlier sections equate low income with below the poverty level whereas in this section it is defined (more accurately) as 50% of the family population with income at or below 80% of county median or a poverty rate of 25%.
93	82	3.2.2	RTG,2014 formulas and calculations should be in Appendix
94	82	3.2.2	Atkins, 2013 survey data and calculations should be in Appendix
95	82	3.2.3	TxDOT, 2014 Traffic Forecasting Methodology Memorandum should be in Appendix
96	82	3.2.2	Potential Users of the Toll Facility; The 2nd paragraph is misleading by saying 61% of drivers traveling north on FM 1626 use Brodie. From source data; 7,746 vehicles were counted going north at site #2, of those vehicles 1,588 were matched at destination locations, 790 of these vehicles passed through site #2A and #6 on Brodie, i.e. 10% of drivers (790 out of 7,746) traveling north on FM 1626 were matched at cameras on Brodie.
97	82	3.2.2	AASHTO guidance suggest that the following be used for documenting cumulative impacts. The DEIS falls shore of following this guidance. <i>Explain the Methodology. Just as important as selecting a reasonable methodology is the importance of clearly explaining why that methodology was selected. The advantages and disadvantages/drawbacks of the methodology should be acknowledged, not ignored. Provide Factual Support. The evaluation of trends and conclusions about environmental consequences should be based on up-to-date factual information. Graphs, tables, and other graphic elements should be incorporated, where appropriate, to aid readability. Use Clear Reasoning. The conclusions of the assessment should be supported by logical analysis and plausible reasoning, and not contain internal inconsistencies or contradictions that put the results into question. It also is important to document the uncertainties involved in the analysis, explain the importance of those uncertainties, and explain how they have been addressed. Legal Sufficiency Criteria. For a more detailed list of factors to consider in assessing the legal sufficiency of indirect effects and cumulative impacts analyses, refer to Appendix 1A (indirect effects) and Appendix 1B (cumulative impacts). These lists also are based on the recommendations in the NCHRP report, Legal Sufficiency Criteria for Adequate Indirect Effects and Cumulative Impacts Analysis as Related to NEPA Documents (2008)</i>
98	92	3.3.1	The DEIS notes that additional karst surveys are underway and results will be included in the final EIS. Because this geologic assessment is incomplete, the actual roadway alignment and BMPs necessary to prevent degradation of aquifer recharge quality and quantity cannot be determined. Inclusion in the final EIS does not provide sufficient opportunity for public and participating agency review and comment. Conclusions of the impacts of the project on the Edwards Aquifer in the DEIS are thus incomplete and not valid because of this missing data.
99	101	3.3.1	The surface catchment area shown for Flint Ridge Cave is not accurate, and does not reflect the most current City of Austin analysis of 58 acres (see Hauwert et al. 2014.)

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100	101	3.3.1	The DEIS does not reflect the importance of sub-surface recharge to specific karst features like Flint Ridge Cave or the importance of upland recharge to the Barton Springs Segment of the Edwards Aquifer as previously documented (see for example the Cowan and Hauwert 2013 reference included in the DEIS). Impacts to Flint Ridge Cave and the Edwards Aquifer cannot be accurately assessed without analysis of the loss of upland recharge from the impervious cover associated with the project or the loss of subsurface recharge to features like Flint Ridge. See: Hauwert and Sharp. 2014. Measuring Autogenic Recharge over a Karst Aquifer Utilizing Eddy Covariance Evapotranspiration. Journal of Water Resource and Protection 6:9
101	101	3.3.1	It appears that many of the citations to karst may not be the current and best available information
102	102	3.3.1	For updated estimates on amount of precipitation that recharges the aquifer, see: Hauwert and Sharp. 2014. Measuring Autogenic Recharge over a Karst Aquifer Utilizing Eddy Covariance Evapotranspiration. Journal of Water Resource and Protection 6:9
103	103	3.3.2	Impacts on geologic resources are not minor if at least 7 karst features are directly impacted. Surface catchment areas to point recharge features will be impacted by construction activities and paved over by the highway (e.g., Flint Ridge). Impacts to subsurface catchment areas to recharge features are not assessed in the DEIS.
104	103	3.3.2	Impacts to sensitive karst invertebrates are not considered, particularly as a result of <i>Solenopsis invicta</i> (fire ant) or tawny crazy ant invasion as a result of the large amount of soil importation that would be required for highway construction.
105	103	3.3.2	What are the proper techniques that will be used to control erosion during construction
106	103	3.3.2	Asserts that construction BMPs will effectively minimize soil loss. There is no design or specification information available in order to support this determination or evaluate its assertion.
107	103	3.3.2	States no hydric soils are present. However, USACE and EPA recently issued an interpretive rule on Waters of the US. This DEIS does not address whether the project involves waters of the USA regarding Bear Creek.
108	103	3.3.2	States that project will directly impact openings of 7 features. Will it impact the extent of the features, recharge value of these features, and/or water quality of these features. The 1990 BSEACD consent decree should be checked to determined how these new features were to be handled.
109	104	3.3.2	If features are permanently backfilled or covered by impervious surfaces, an equivalent amount of recharge should be added as mitigation for loss of recharge. The surface drainage area of multiple features will be negatively impacted by the roadway. Loss of recharge to the Edwards Aquifer would negatively impact and could constitute take of the federally endangered Barton Springs Salamander and Austin Blind Salamander species. Loss of spring recharge from development including alteration of subsurface flow paths and alteration of drainage areas to karst features is identified as a threat to endangered Austin Blind Salamander (see final rule for listing Austin Blind Salamander, FWS-R2-ES-2012-0035).
110	104	3.3.2	Confirm if the highway will allow for transport of hazardous materials across the recharge zone. Hazardous material spills from roadways are identified as having the potential to cause take of federally endangered Austin Blind Salamander (see final rule for listing of Austin Blind Salamander, FWS-R2-ES-2012-0035). Identify the BMPs that will be used to prevent hazardous material spills from entering karst features directly, from infiltrating thru the porous friction pavement or entering the aquifer via subsurface infiltration.
111	104	3.3.2	The list of structural stormwater BMPs does not include bioretention or City of Austin Save Our Springs Ordinance compliant stormwater control measures including retention-reirrigation ponds.

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112	104	3.3.2	This section only address particulate pollutants like TSS and does not analyze dissolved pollutants including metals and hydrocarbons. Dissolved pollutants have been documented to be associated with declines in endangered salamander populations, and increase with increasing impervious cover (see final rule for listing of Austin Blind Salamander, FWS-R2-ES-2012-0035).
113	104	3.3.2	Evaluation of pollutant removal by stormwater structural control measures using a percent removal method is not consistent with the current state of practice. An effluent probability method as advocated by the International BMP Database that utilizes effluent concentration based methods would more accurately evaluate the effectiveness of stormwater BMPs in series. The conclusion that long-term stormwater runoff from the project post-construction would be of higher quality than the current undeveloped condition is patently false and should be removed.
114	104	3.3.2	Quantify the loss of recharge thru direct entry into the affected karst features as well as a result of loss of subsurface infiltration. The claim that there will be no adverse impact to listed species or the aquifer is unsubstantiated.
115	104	3.3.2	Throughout the DEIS there are numerous mentions of importing materials to the site such as ... <i>Examples of structural BMPs that would be used during project construction include mulch logs...</i> , It appears that the DEIS has completely ignored the major threat of introducing invasive species such as the Tawny crazy ant (<i>Nylanderia fulva</i>) via the importation of off site materials
116	104	3.3.2	Although contrary to this section, the proposal to treat runoff and dispose off-site will directly affect recharge.
117	104	3.3.2	This section does not speak to direct or indirect impacts to discrete recharge that occurs through karst that is not visible on the surface. It does not at all address the fact that this site is one of the most karst rich areas in all of Travis and Hays Counties.
118	104	3.3.2	Provides no details on water quality measures. Defers to WPAP comment period and provides no opportunity for public review and comment as part of this DEIS process. Another example of where the DEIS is incomplete.
119	104	3.3.2	The current TCEQ guidance for compliance with the Edwards Aquifer rules notes that pervious concrete is only allowed in the contributing zone, is not appropriate for highways, and requires reduced loads and speeds. The DEIS does not address how the proposed porous pavement will comply with TCEQ regulations and guidance.
120	105	3.4	Replace the statement - <i>"In 2002, the Austin-Round Rock MSA, consisting of Bastrop, Caldwell, Hays, Travis, and Williamson Counties, voluntarily entered into an Early Action Compact (EAC) with the TCEQ and the Environmental Protection Agency (EPA) to proactively address and implement emission reduction strategies before being designated nonattainment upon promulgation of new eight-hour ozone NAAQS. The Austin-San Marcos area participates in the EPA's eight-hour Ozone (O3) Flex Program and the Austin-Round Rock-San Marcos area participates in the EPA's Ozone Advance Program. Participation in these voluntary programs has resulted in the development and implementation of an emission reduction plan to assure attainment of the eight-hour ozone standard by 2007 and maintenance through 2015."</i> to read as "In January 2014 the Austin-Round Rock MSA, consisting of Bastrop, Caldwell, Hays, Travis and Williamson Counties, entered into the Ozone Advance Action Plan with the TCEQ and EPA. The plan builds on the work of previous plans - the One Hour Ozone Flex Plan (2002), the Early Action Compact State Implementation Plan (2004), and the Eight Hour Ozone Flex Plan (2008) - and is intended to keep the region in attainment of the current ozone standard of 75 parts per billion, reduce ozone levels enough to remain in attainment of anticipated future standards, and improve public health, particularly for vulnerable populations. The Ozone Advance Action Plan is in effect until December 31, 2018." source: background section of Ozone Advance Plan http://www.capcog.org/documents/airquality/OzoneAdvanceOutreach/Austin-Round_Rock_MSA_OAP_Action_Plan.pdf

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121	105	3.4	Replace the statement - " Due to the EAC efforts, the Austin-Round Rock area counties were designated in attainment for 8-hour ozone as of July 2012 (TCEQ, 2013). " to read as "Due to the efforts of the Clean Air Coalition under the Eight Hour Ozone Flex Plan the Austin-Round Rock MSA was designated in attainment for 8-hour ozone as of July 2012 (TCEQ, 2013).
122	105	3.3.3	Assertion that because of WQPL, impacts from encroachment are insignificant. The correct interpretation is that because WQPL has removed so much areas from development the impact from encroachment is very significant. Fundamental flaw in DEIS reasoning.
123	106	3.4	Modify this statement - " The AADT projections for the proposed project do not exceed 140,000 vpd; therefore a Traffic Air Quality Analysis was not required. " to read as "The AADT projections for the proposed project do not exceed 140,000 vpd; therefore a Carbon Monoxide (CO) Traffic Air Quality Analysis was not required.
124	107	3.4	Rather than stating that the VMT will be slightly higher under the Build Alternative, please provide a percentage to let the reader know how much higher the VMT is expected to be.
125	108	3.4	Correct " Under the each alternative there may be... " to "Under each alternative there may be..."
126	115	3.5.2	Does not identify values and effects of noise levels on protected undeveloped property and sensitive wildlife.
127	118	3.5.2	Noise impacts to R8 should receive some sort of mitigation. Additional woody vegetation preservation and protection in the SH45SW ROW between the proposed roadway and the noise receiver should be considered at a minimum, but not as the only intervention.
128	133	3.6.1	DEIS states that karst aquifers have unique hydrogeology that results in aquifers that are highly productive but vulnerable to contamination yet does not include the most recent data on karst features within the ROW to help determine potential impacts of the roadway on the karstic Edwards Aquifer.
129	134	3.6.1	Fig 3.6.1 shows water wells within the project AOI but ignores the well known fact that in karst aquifers, like the Edwards, wells can be impacted quickly that are far (miles) downgradient of the project. This is supported by results from dye tracing in the area of the road project that reached wells miles away within hours. Reference is Hauwert 2013, COA SR-13-01.
130	135	3.6.1	Figure 3.6-1 does not depict the USGS NAWQA well on Edwards Crossing, does not depict the windmill well north of the pond on Tabor, does not depict wells on Weisbart and Yates conservation easements and does not identify springs in Bear Creek on Tabor and on Marbridge.
131	137	3.6.1	The well inventory is incomplete. Barton Springs Edwards Aquifer Conservation District records indicate 150 wells in the area of influence. This section should be re-evaluated to consider all affected wells
132	137	3.6.1	Upland recharge has been identified as an important component of recharge to the Edwards Aquifer, and may be 26% of rainfall in upland areas. See: Hauwert and Sharp. 2014. Measuring Autogenic Recharge over a Karst Aquifer Utilizing Eddy Covariance Evapotranspiration. Journal of Water Resource and Protection 6:9; See: Hauwert. 2009. Groundwater Flow and Recharge within the Barton Springs Segment of the Edwards Aquifer, Southern Travis County and Northern Hays Counties, Texas: Ph.D. Diss., University of Texas at Austin
133	137	3.6.1	Discussion on groundwater recharge needs to include recent work by Cowen and Hauwert (2013) that shows recharge to caves through soils and Hauwert and Sharp (2014) that shows a relatively high percent of rainfall can recharge the aquifer through soils.

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134	137	3.6.1	The study area should be enlarged to reflect well documented fact that water can move very rapidly through a karst aquifer and impact wells miles away quickly.
135	137	3.6.1	The time it takes for water from the general project area is not "estimated" but has been well documented to vary from 2-3 days to weeks. Statement is not clear if it applies to only the project area or the aquifer in general.
136	137	3.6.1	Text does not identify NAQWA well on Edwards Crossing
137	137	3.6.1	This section does not speak to WQ monitoring by COA associated with Bradley settlement. Mapping does not depict these wells.
138	138	3.6.2	As noted in the DEIS with the citation of Herrington and Hiers 2010 (incorrectly cited as 2009), water quality in Barton Springs is degrading over time. This is in spite of the existence of the Edwards Rules, and indicates that the Edwards Rules alone are not sufficient to maintain the quality of Barton Springs discharge.
139	138	3.6.1	The closure of Barton Springs Pool after the Statesman article was focused specifically on PAH's in sediment in the pool and not just about "water quality" in general as the DEIS states. The PAH's in the sediment were later traced to a specific nearby source.
140	138	3.6.1	DEIS should clarify that BSP is only closed after storm events that cause the pool to flood. As currently stated, the DEIS implies that BSP is negatively impacted by everyday storm/rain events requiring closure.
141	140	3.6.2	This section only address particulate pollutants like TSS and does not analyze dissolved pollutants including metals and hydrocarbons that could originate from the project and enter the aquifer thru direct or diffuse recharge. Dissolved pollutants have been documented to be associated with declines in endangered salamander populations, and increase with increasing impervious cover (see final rule for listing of Austin Blind Salamander, FWS-R2-ES-2012-0035).
142	140	3.6.2	This section does not address the impact of hazardous material spills on the quality of aquifer recharge or potential impacts to endangered salamanders at Barton Springs. Hazardous material spills from roadways are identified as having the potential to cause take of federally endangered Austin Blind Salamander (see final rule for listing of Austin Blind Salamander, FWS-R2-ES-2012-0035). Identify the BMPs that will be used to prevent hazardous material spills from entering karst features directly, from infiltrating thru the porous friction pavement or entering the aquifer via subsurface infiltration.
143	140	3.6.2	What analyses were conducted to conclude that impacts to aquifer recharge quality and quantity are minimal? No analyses are listed
144	140	3.6.2	Evaluation of pollutant removal by stormwater structural control measures using a percent removal method is no consistent with the current state of practice. An effluent probability method as advocated by the International BMP Database that utilizes effluent concentration based methods would more accurately evaluate the effectiveness of stormwater BMPs in series. The conclusion that long-term stormwater runoff from the project post-construction would be of higher quality than the current undeveloped condition is patently false and should be removed.
145	140	3.6.2	Provide references and calculations for the percent removal of each type of BMP listed to support the claim of achieving 90% TSS removal. Also include removal efficiencies for nutrients and dissolved constituents.
146	140	3.6.2	Describe the void mitigation plan that will be used to address any voids encountered during excavation, trenching, drilling and boring activities.
147	140	3.6.2	TSS in stormwater runoff during construction also has the potential to be a long-term impact as sediment deposited in karst aquifers during low flow periods can be remobilized during subsequent rain events or during periods of high groundwater velocities in the aquifer and migrate to discharge points.

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148	140	3.6.2	DEIS states that the "proposed project would result in negligible impact to the Barton Springs segment of the Edwards Aquifer" without including the most recent karst data to evaluate those impacts or showing data to justify those conclusions.
149	140	3.6.2	Street sweeping is not typically a BMP used for operational highways. Road closures for this purpose would be difficult. The DEIS should provide references and analysis that demonstrate that sweeping is effective for maintaining the water quality function of pervious pavement.
150	140	3.6.2	Is the multiuse trail included in the calculation of impervious cover? It would be very helpful if the DEIS explained how impervious was calculated for the roadway.
151	140	3.6.2	Does not speak to changes in upland groundwater recharge from installations of berm to divert runoff to treatment and Bear Cr, direct impacts to recharge from installation of bentonite cap, and effects from installation of diversion to divert new flows to Flint Ridge Cave that will decrease levels of dilution.
152	141	3.6.2	More details are necessary about the Environmental Compliance Plan. Will the plan manager be independent of the contractor, and have stop work authority? How frequently will BMPs be inspected? What are the water quality guidelines that will be used for assessment?
153	141	3.6.2	Additional construction impacts not considered are the importation of fill material. Will fill material nutrient content match soil nutrient content of existing native soils?
154	141	3.6.2	DEIS should indicate what BMPs were used during the construction of existing SH45 where Barrett et al, 1995b detected increases in some pollutants.
155	141	3.6.2	Since concentrations of pollutants are presented in other sections of the DEIS they should also be presented here during discussions of pollutants in runoff during the construction of the existing SH45.
156	141	3.6.2	A study of pollutants on rooftops adjacent to MoPac north of the Colorado River found significant atmospheric deposition of PAHs, arsenic, chromium, and copper over 300 ft from the road surface (Mahler and Van Metre, 2003). Since 38 acres of the land for the ROW was purchase from blocks of land acquired for water quality protection and adjacent land still has that purpose, the DEIS should address impacts from airborne pollutants from the highway on these lands.
157	141	3.6.2	It is encouraging to see the inclusion of the on-site full-time environmental compliance manager for this project. However, unless this manager is allowed and encouraged to enforce compliance and impose penalties on contractors the ECM will have little, if any, leverage over highway contractors.
158	141	3.6.2	More information is needed to evaluate the drill shafts including, number, location and width.
159	141	3.6.2	The void evaluation criteria referred to in Appendix H does not follow current TCEQ guidelines. Given the sensitivity of this project, measures above and beyond TCEQ guidelines should be conducted, including downhole camera surveys of all shafts and piers.
160	141	3.6.2	Refueling and storage of vehicles is reported to not be done in the 100 year floodplain to avoid contamination through drill holes, however, if this is done over the recharge zone these risks are still present. Leak collection, using liners (and collecting any leaks collected on a regular basis) under parking and refueling areas would help reduce these risks, but additional BMPs should be considered.

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161	141	3.6	<p>Referenced Text: "<i>BMPs would be utilized to prevent, reduce, or capture and treat runoff from the proposed project site in order to minimize impacts to water quality from erosion and sedimentation. TxDOT and the Mobility Authority would utilize appropriate temporary, construction-phase BMPs to treat runoff from the proposed roadway and minimize impacts to water quality. These BMPs would provide for up-gradient overland flow prevention, slope stabilization, and on-site sediment retention.</i>" - Case studies of current highway construction in association with TXDOT in the Austin area demonstrate that the aforementioned approaches are not practiced and that off-site discharge are frequent occurrences (see attached photos). All of the tools and approaches that are catalogued in 3.6.2 and Appendix H (A.2) are and have been available for use by TXDOT on current and past projects, yet they have not been regularly or adequately employed. COA has a catalog of photos from 2013 and 2014 to document current state of practice on TXDOT highway projects. As an agency, TXDOT primarily uses standard details of various erosion and sedimentation (E&S)BMPs in the plan sets (see Appendix H, Attachment 1). There is little to no design layout of the E&S measures on the plan set, nor are there systematic designs for the entire site, including the need for phasing or adaptation to changing conditions. The implementation of highway construction E&S controls is left to the contractor on TXDOT projects. Contractors are not typically certified or educated in appropriate layout of E&S controls. They are also driven to install the minimum controls necessary to save on expenditures and maximize profit. Additionally, TXDOT contract documents do not contain performance specifications (e.g. all controls shall contain runoff from 2-year storm; effluent concentrations shall be xx mg/l from the construction site). TXDOT has limited inspection capabilities to ensure compliance with the E&S plans or with TCEQ/SWPPP requirements. Given the lack of up front design and the lack of any system performance standards, an inspection that occurs does not have a benchmark to determine compliance. Rather, it is left to other agencies to document sediment discharges and failed or inadequate E&S controls, bring this to TXDOT's attention, ask TXDOT to employ more robust controls, then monitor the performance of those controls. This seems to have been the historic model on TXDOT highway projects. The DEIS does not describe a process for design, installation and monitoring of temporary and permanent water quality controls that demonstrates that controls will be adequate for this project and provide results different than current and past TXDOT projects in the area. General references to an Environmental Compliance Management Plan does not provide details necessary to demonstrate this can or will happen. This report should have detailed the process, goals, and components of the referenced Environmental Compliance plan in order for the</p> <p>EIS.</p>
162	142	3.6.2	Simply evaluating voids based on investigation criteria does not guarantee that there will be no impacts.
163	142	3.6.2	Calculations of the TSS in runoff should also include what the loads are as well.
164	142	3.6.2	Page 141 references the Barrett et al 1995d study as being conducted during construction, Table 3.6.2 should clarify if the highways runoff values are during construction or operation of the highway.

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165	143	3.6	Referenced Text: " Table 3.6-3 " - This table demonstrates the increases in pollutants other than TSS for highway runoff. Since TCEQ pond sizing procedures are only geared towards TSS removal, and the stated design goal is to exceed 90% TSS load reduction, it should be quantified how much additional loading will occur for the other pollutants of concern, particularly Total Phosphorus, Total Nitrogen, Oil and Grease, COD, e coli and Zinc or Lead. As noted in Table 5.1-1 and in the City of Austin Environmental Criteria Manual, 1.6.5 C, the removal efficiency of BMPs for constituents other than TSS is significantly lower than TSS removal. And in the case of Nitrites and Nitrates, a local study (Barrett, 2010) showed the pond to export Nitrites and Nitrate. Please quantify the effective loading of all the pollutants shown in Table 5.1-1. At the very least, quantify loading for Total Phosphorus, Total Nitrogen and Lead. Since TCEQ equations were not designed for load removal for pollutants other than TSS, please cite the methodology used to quantify loading, preferably a method that explicitly accounts for actual pond volume, contributing drainage area, orifice size and drawdown time and effluent concentrations on an average annual basis.
166	145	3.6.2	What is the removal mechanism for dissolved pollutants in porous pavement? Dissolved contaminants that infiltrate thru the porous pavement will recharge the aquifer with minimal attenuation by soil.
167	145	3.6.2	The DEIS cites Driscoll et al. 1990 as stating that surrounding land use is the most important general factor influencing highway pollutant loads. No such analysis exists in the cited reference supporting that claim. The report specifically states "The site characteristics used in the evaluation procedure include information on drainage areas, area rainfall characteristics, the concentrations of pollutants in the highway runoff, the fraction of the total pollutant concentration that is in soluble form, and finally, the target receiving water concentration (against which the concentration produced by the highway runoff will be compared)." That citation does include procedures for estimating the impact of highway runoff on water quality. Please follow the procedures outlined in this reference for evaluating the potential impact to groundwater and surface water resources in the study area.
168	145	3.6.2	No quantitative analysis is presented to validate the claim that there will be minimal impacts on the quantity and quality of groundwater recharge from the proposed project. Comparisons of percent impervious cover for the proposed project (which is higher than allowed by City of Austin Save Our Springs Ordinance requirements) to watershed levels of impervious cover are not an appropriate method to evaluate localized impacts to receiving waters and do not evaluate cumulative effects of impervious cover addition. The DEIS specifically states "While the general percentage of impervious cover within a watershed can be helpful in estimating effects of urbanization on the watershed, a more thorough examination of where impervious cover occurs and what other threats to water quality are present is necessary to fully determine effects on aquatic ecosystems (USFWS, 2013)."
169	145	3.6.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>These protected lands are not expected to significantly contribute to pollutants in stormwater runoff.</i>
170	145	3.6.2	The DEIS mentions in several places the high removal rates of PFC pavement, particularly of TSS, but there is no discussion of the effective life of the pavement regarding TSS removal.
171	145	3.6.2	The current TCEQ guidance for compliance with the Edwards Aquifer rules notes that PFC pavement is only allowed in the contributing zone, is not appropriate for highways, and requires reduced loads and speeds. The DEIS does not address how the proposed PFC pavement will comply with TCEQ regulations and guidance.
172	146	3.6.2	Cite the specific percent removal estimates of the proposed project BMPs for each of the pollutants (and concentrations) listed in Table 3.6-3, or otherwise provide references that TSS is a more protective surrogate than any of these pollutants such that only TSS removal needs to be calculated to evaluate impacts.

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173	146	3.6.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. All ten pollutants were observed in runoff from the undeveloped watersheds, and six of these pollutants (including TSS and total organic carbon) were found at concentrations that were not significantly different from concentrations in runoff from developed watersheds. This study demonstrated that there are naturally occurring pollutants that may naturally recharge into the Edwards Aquifer through stormwater.
174	147	3.6.2	The DEIS discusses the proposed project in terms of impervious cover the project would create but compares that value to the impervious cover in entire watersheds. As a rule, the amount of impervious cover for a construction project is a percentage of the land as net site area the project is constructed on. In this case, the only comparison of impervious cover should be the pavement or other impervious surfaces within the state-owned ROW (referenced as around 24%). It is not clear if that percentage includes water quality ponds and other impervious surfaces.
175	151	3.6.2	Are the percent removal efficiencies for the proposed BMPs applicable for both construction and post-construction activities?
176	151	3.6.2	The pollutant removal calculations used for TSS do not consider any bypass flow or bypass load. What is the load of TSS that will be bypassed around the proposed BMPs? What design storm was used to evaluate the percent removal of BMPs?
177	151	3.6.2	"...The proposed roadway would be constructed on fill to limit natural ground disturbance,..." Although fill does not necessarily disturb soil per se, large amounts of fill as proposed can significantly alter natural groundwater and surface hydrology. This is another example of imported materials that have the potential to introduce invasive species. The DEIS should provide a more thorough evaluation of the impacts of fill placement.
178	151	3.6	Referenced Text : "In accordance with the Edwards Aquifer Rules regulating construction over the Recharge Zone, permanent BMPs and measures must be designed, constructed, operated, and maintained to ensure that 80 percent of the incremental increase in the annual mass loading of TSS from the site caused by the proposed project would be removed." - Previous discussions with TXDOT and CTRMA indicated that the agencies would be committed to implementing non-degradation standards for construction and post construction water quality. Previous conversations with the Technical Working Group defined the goal of nondegradation as no net increase in the average annual loading of pollutants as regulated in the City of Austin's Save our Springs Ordinance. The report does not acknowledge this commitment and instead states that Edwards Aquifer Rules are used to demonstrate water quality impacts, but that 90% TSS removal rates would be used instead of 80%. There is no statement of design goals for the control of the other stormwater pollutants that are acknowledge to be generated from this project. Please reconfirm commitment to non-degradation standards.
179	152	3.6.2	Explain what "batch" detention ponds are.
180	153	3.6.2	TCEQ 2012 Guidance for permeable friction course states that the 90% removal of TSS is only applicable when posted speeds are more than 50 mph. What is the posted speed of the roadway?
181	153	3.6.2	TCEQ 2012 Guidance as cited specifies that permeable friction pavement requires "milling and replacement of the overlay at regular intervals, which entails significant expense." What is the planned maintenance program for the permeable friction course, and what is the planned replacement frequency for the proposed permeable friction course to ensure continued removal of pollutants over time? Are there plans for monitoring the performance of the pavement for water quality treatment and defining triggers for maintenance of the pavement?

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182	153	3.6.2	TCEQ 2012 Guidance as cited specifies that sand may not be used for de-icing, but de-icing salts may be used. How will the highway be operated during freezing conditions? Have de-icing salts and other chemicals been evaluated for potential surface water and groundwater impacts from the proposed project?
183	153	3.6.2	Assumptions used for background level TSS on undeveloped WQPL are questionable and should be explained.
184	154	3.6.2	Provide examples of greenfield road projects that have reduced TSS and other pollutant loads over undeveloped existing conditions to validate the claim that the proposed project will improve water quality. Also, it is not clear that the pollutant load analysis includes bypassed stormwater volumes in pollutant discharge analysis. Bypassed volumes are probably the most significant source of pollutant discharges from the project.
185	154	3.6.2	The DEIS discusses that SH45 will have steep cross slopes which it anticipates would allow some stormwater to runoff the PFC surface thus reducing its effectiveness in TSS removal yet the DEIS touts the use of PFC pavement on page 145 without mentioning this limitation. The DEIS should evaluate the decreased effectiveness of cross slopes and adjust project efficiencies accordingly.
186	154	3.6.2	TSS is reported to be captured in pore spaces of the PFC pavement, however, at some point in time all pore spaces MUST be occupied thus rejecting any additional TSS. This means the TSS reduction associated with the PFC pavement has a limited lifespan of effectiveness and TSS will be expected to increase once this occurs. TSS is supposed to be removed for the lifetime of the roadway and this would appear to be in conflict with that requirement.
187	156	3.6.2	Percent removal for constituents other than TSS are frequently lower than 90% as shown in Table 3.6-7. No pollutant load calculations from the project are shown for constituents other than TSS. As such, the statement that "the analyses indicate that the proposed project would have a negligible impact on groundwater quality in the Barton Springs segment of the Edwards Aquifer" is not valid. Calculate loads for all constituents listed in Table 3.6-7 from the proposed project, with and without the proposed BMPs, and compare to aquatic life criteria for the protection of surface water and groundwater biological resources including the Barton Springs Salamander.
188	156	3.6.2	Table 3.6-7 shows pollutant removal estimates lower (less protective) than TSS for many stormwater constituents. As such, use of TSS as a design surrogate is not adequate to support claims that BMPs will mitigate impacts from the proposed project.
189	156	3.6.2	No specifics are provided on how impervious cover is calculated. Does this include: roadway surface, shoulders, WQ ponds and facilities, diversion berms for Flint Ridge Cave, bentonite cap for Flint Ridge Cave?
190	156	3.6.2	The evaluation generalizes impacts in the recharge and transition zones, but fails to identify this site as one of the most karst rich, and therefore, one of the most recharge intense sites in all of the Barton Springs Zone. It fails to factor the relative importance of this site compared to other less significant recharge sites.
191	157	3.6.2	Temporary and permanent loss of recharge will occur as a result of the 4 karst features permanently filled as stated, or with loss of surface drainage area, or with loss of subsurface catchment area as a result of the project. What volume of recharge will be lost a result of the project to ensure that no take of endangered salamander species occurs?
192	157	3.6.2	Comparison of impervious cover from the proposed project to impervious cover of the entire recharge zone is not an appropriate method to validate a lack of impacts. What is the volume of infiltration that will be added as a result of the water quality BMPs as stated? Will water quality ponds be unlined and allow infiltration?
193	157	3.6.2	The TCEQ Edwards Aquifer Rules are not intended to be "non-degradation" and simply following them does not result in non-degradation.

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194	157	3.6.2	Clarify where the 17.2 acres of impervious cover within state-owned ROW are. This value is not consistent with the values presented on page 147 and creates confusion as to what is being referred to.
195	158	3.6.2	No complete and valid assessment of the impact of the project can be completed without a completed karst survey and geological assessment.
196	158	3.6.2	The DEIS should supply data to support the statement that "the retention of stormwater runoff and gradual release form water quality ponds may allow for greater recharge to the Edwards Aquifer" or remove the unsupported statement.
197	158	3.6.2	The DEIS states that BMPs would maintain the flow to naturally occurring sensitive features to the extent practicable but then only mentions that the amount of (surface) water draining to Flint Ridge would be maintained. Since the DEIS does not contain the most recent karst data impacts on surface drainage to other karst features can not be determined. However, COA calculations of the drainage areas cutoff to other karst features indicate a significant reduction in area draining to features such as Hat Sink, Jubilee Sink, F29 and F136.
198	158	3.6.2	In addition, the DEIS does not address the potential loss of recharge from infiltrating rainwater to the karst groundwater system. A COA-funded study is currently underway to help define the subsurface catchment of Flint Ridge Cave.
199	158	3.6.2	The DEIS does not address the fact that a portion of the roadway overlies the Flint Ridge Cave system and what potential impacts that might have.
200	158	3.6.2	States that recharge will still occur after treatment. Previous text describes that runoff in some cases will be treated, then diverted off site to avoid sensitive karst. Will recharge be contributing to the same flow paths as it would be in the no-build alternative?
201	158	3.6.2	States that some recharge will be enhanced because BMPs will slow velocities. Fails to consider whether installation will destroy discrete recharge sites and negatively impact recharge.
202	158	3.6.2	States that stormwater detention will hold more water onsite to increase opportunity for recharge. No data is provided to compare detention volumes to water holding capacity in the 4' deep soil profile that will be negatively impacted by soil compaction, impervious cover, and diversion of flows.
203	159	3.6.2	Encroachment of impervious cover over the subsurface catchment area of karst features like Flint Ridge Cave will decrease recharge to these features and the aquifer. Specify the volume of recharge lost from diffuse infiltration to Flint Ridge Cave as a result of the project.
204	159	3.6.2	The potential loss of recharge due to sealing seven karst features should be addressed in the DEIS and not another document (sent to TCEQ) that the general public will not be able to review.
205	159	3.6.2	COA has conducted a recent analysis of the surface catchment of Flint Ridge Cave surface catchment using 1 ft contour intervals (versus 2 ft used by the TxDOT consultant) and observations from the historic October 2013 rains. That analysis shows the surface catchment to be 57.8 acres versus the 43.8 used in the DEIS.
206	159	3.6.2	The DEIS states that approximately 5.6 acres of the Flint Ridge surface drainage area will be covered with impervious cover but Figure 4.2.1 on page H-29 indicates that 5.6 acres will be removed from the Flint Ridge drainage area but not necessarily covered with impervious cover. Clarification is needed.
207	159	3.6.2	"...The Build Alternative would be located near Flint Ridge Cave and would result in approximately 13 percent (approximately 5.6 out of approximately 43.8 acres) of the surface catchment basin being covered by impervious surfaces..." TXDOT's figure for surface runoff, (43.8 acres) does not match WP's figure of 57.8 based on LIDAR aerial survey and ground truthing immediately after the major flood event of October 31, 2013

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208	159	3.6.2	<i>“The limits of the berm would extend far enough beyond the cave watershed to ensure that roadway runoff would not enter the cave. To prevent the possible infiltration of untreated roadway stormwater runoff through the soil matrix into Flint Ridge Cave, a bentonite (clay) liner would be installed up-gradient from and adjacent to the berm.”</i> Since we do not know where the subsurface catchment area is, it’s hard to say if this would work, and if so, then it would alter the hydrological regime further drying out the cave, thus negatively impacting the cave fauna
209	159	3.6.2	No design or data is provided to verify their calculation of impact to Flint Ridge Cave.
210	159	3.6.2	Is diversion berm counted as impervious cover (2900" X 17'(est) . 1 acre)? Is bentonite Cap (perhaps another acre) counted? Is impervious cover from stormwater ponds and hazardous material pollution traps counted. No data is provided.
211	159	3.6.2	States that impacts to recharge by destruction of karst will be considered as part of geological assessment. This document previously stated that assessment is not part of this DEIS. There will be no opportunity for public review and comment on this data and the conclusions drawn from it.
212	160	3.6.2	No quantitative analysis validating the preservation of aquifer recharge quality or quantity is presented. No consideration of pollutants other than TSS is presented in evaluating impacts to Barton Springs. Thus, the assertion that Barton Springs will be improved by SH45 SW is not supported. What is the volume of stormwater that will be recharged from the proposed project area, since that is qualitatively compared to Barton Springs discharge?
213	160	3.6.2	How is the distance of the project relative to Barton Springs relevant? What are the attenuation of the contaminants listed in Table 3.6-7 inside the Edwards Aquifer that would support this statement?
214	160	3.6.2	States no springs mapped in project area. A significant spring exists upstream of the dam on Bear Creek on WQPL Tabor tract. Also a significant spring on Bear Creek on Marbridge Ranch exists at southern end of study area. These spring sites are apparent on the Signal Hill and Oak Hill USGS 7.5 minute quads.
215	160	3.6.2	Describes relatively small amount of water recharging from the project area. Again fails to recognize that this has been considered one of the most recharge intense sites in all of the BS Zone.
216	161	3.6.2	Use pumping numbers from the BSEACD Habitat Conservation Plan draft.
217	161	3.6.2	Water stored in ponds is subject to evaporation. Evaluate evaporative losses from ponds to validate the conclusion that there will be no loss of recharge to the aquifer.
218	161	3.6.2	The impacts to groundwater wells cannot be evaluated without evaluating all pollutants of concern, not just TSS, as the pollutant removals of other contaminants are not equivalent to TSS as stated in Table 3.6-7. Pollutant removal rates of constituents other than TSS would not be 90% over the recharge zone as stated. Additionally, hazardous material spills will impact groundwater well users.
219	161	3.6.2	The DEIS should present data on how many public water supply wells are downgradient from the project area. Tracing has already shown that water recharging in the general project area can rapidly reach wells miles downgradient of the project area.
220	161	3.6.2	The project should not rely on dilution of water quality impacts from the project.
221	161	3.6.2	The current TCEQ guidance for compliance with the Edwards Aquifer rules notes that pervious concrete is only allowed in the contributing zone, is not appropriate for highways, and requires reduced loads and speeds. The DEIS does not address how the proposed porous pavement will comply with TCEQ regulations and guidance.

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222	179	3.7.1	The Texas Register 1998 is not a valid citation to support the statement that "TSS is a constituent of stormwater that is often measured as an indicator of overall water quality and is a focus of water quality regulations and performance standards in part because of its correlation to other pollutants that occur as particles (it serves as a surrogate in calculating removal efficiencies), the tendency of hydrophobic pollutants to adsorb to clay and silt particles, and the positive effects that TSS removal has on the removal of other constituent pollutants". That citation was a comment made by TxDOT on the proposed rules. Please provide peer-reviewed references to support each of those contentions. Related comments on the same page of the Texas Register state "[TSS] works well for pollutants that adhere to soil particles, it is a poor measure of the effectiveness of controls to remove nutrients."
223	179	3.7.1	What is the calculated nutrient load to surface water as a result of the proposed project? Dry stormwater controls have limited effectiveness at removing nutrients, with total phosphorus and total nitrogen removal estimated to be 13 to 40 and 10 to 35 percent, respectively. (Stanley, D.W. 1996. Pollutant removal by a stormwater dry detention pond. Water Environment Research 68(6):1076-1083)
224	183	3.7.2	Onion Creek and Bear Creek water quality conditions are summarized in these publications, which are not included in the DEIS: http://www.austintexas.gov/watershed_protection/publications/document.cfm?id=203077 http://www.austintexas.gov/watershed_protection/publications/document.cfm?id=186308
225	184	3.7.2	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>Staged construction, limited soil disturbance/preservation of natural vegetation, and robust erosion and sedimentation control BMPs would be in place throughout construction to decrease erosion and ensure that off-site discharge of sediment is avoided or minimized to the greatest extent practicable.</i>
226	184	3.7.2	The text states that "a full-time ECM WOULD ensure strict adherence to environmental commitments..." The text should be reworded to be more affirmative to the commitment of TxDOT and CTRMA to strictly adhere to environmental commitments by rewording to read "a full-time ECM WILL ensure strict adherence...."
227	184	3.7.3	Will the permanent BMPs be installed prior to earthmoving on this project?
228	184	3.7	<i>Referenced Text: "The proposed aquatic resource protection measures would, if fully implemented, result in negligible impacts to surface and groundwater quality during construction. Staged construction, limited soil disturbance and the preservation of natural vegetation would minimize erosion and decrease the likelihood of sediment discharges."</i> - This statement lacks any supporting reference and is contradicted by the current performance of highway construction projects in Austin, Texas. The statements are misleading at best and closer to false. The soil disturbance will not be limited within the LOC, it will be almost complete, and there will most likely be very little if any vegetation preserved in the LOC, therefore resulting in significant erosion and an increased likelihood of sediment discharges. This paragraph should be replaced with a realistic description of the how construction is performed and an acknowledgement that there is a high probability of sediment discharges during construction.

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229	184	3.7	Referenced Text: " These permanent BMPs would be installed as early as practicable during the construction phase of the proposed project to allow for the temporary detention and treatment of on-site stormwater. Ponds similar in design to those proposed have been shown to reduce TSS levels by 91 percent (Middleton et al., 2006). " - The proposed sedimentation filtration ponds' performance of 91% removal does not consider construction phase influent concentrations in the removal. At the Technical Work Group meeting at TXDOT on July 25, Carlos Swonke stated that the >90% TSS removal applies equally to construction phase as well as post construction phase. First, % removal is an inappropriate and outdated methodology to characterize BMP performance. The significant increase in TSS concentration that would flow into a BMP will result in a very high concentration-3000 mg/l ("An evaluation of geotextiles for temporary sediment control. Barrett et al, WERF, 1998)- of TSS into any BMP and subsequent discharge load of TSS even after 90% removal, assuming the filtration media is not clogged. As noted in TCEQ Edwards Aquifer technical guidance, typical influent concentration for stormwater into a BMP after construction is 170 mg/l. Please change the description to characterize BMP performance based upon influent/effluent concentration and describe the dichotomy between influent and effluent concentrations for construction and post construction phases. Please refer to the following reference : "An evaluation of geotextiles for temporary sediment control." Barrett et al., WERF, 1998 page283-290). Second, published removal efficiency of a BMP (whether it is temporary or permanent) is not sufficient demonstration that the removal efficiency will result a certain load being captured. Without preliminary layout of a system of construction phase BMPs, it is not defensible to claim a load reduction or system removal based upon the efficiency of one or more stand alone BMPs. Additionally, the effluent concentration method should be used to characterize load reductions. Please use 500 mg/l TSS (Barrett et al., 1998) as the published effluent concentration for silt fences when performing load reduction calculations. Please provide appropriate reference for effluent concentrations from other BMPs for the load reduction calculations. Please provide quantification for a theoretical Erosion & Sedimentation plan that: a) demonstrates that 90% of the TSS load generated during construction will be captured by the suite of BMPs; and b) based on the loads that will be generated and leave the site during construction, quantify the effluent concentration of TSS from each BMP , quantify the effluent concentration for the runoff that bypasses the BMPs and then quantify the TSS load in lbs. per year that will leave the site and compare to undeveloped conditions.
230	184	3.7	Referenced Text: " Staged construction, limited soil disturbance/preservation of natural vegetation, and robust erosion and sedimentation control BMPs would be in place throughout construction to decrease erosion and ensure that off-site discharge of sediment is avoided or minimized to the greatest extent practicable. " - This language is overly optimistic. Avoiding off-site discharge is highly unlikely and minimizing sediment discharges has not been demonstrated on area TXDOT projects. All case studies of current highway construction in association with TXDOT demonstrate that the aforementioned approaches are not regularly practiced and that off-site discharge usually occurs. COA has a catalog of photos from 2013 and 2014 to document current state of practice on area state roadways.
231	185	3.7.2	"Design goals" are mentioned in this section, but nowhere in the DEIS are all of the "Design Goals" explicitly enumerated. Please list and describe all of the design goals of the project.
232	185	3.7.2	Pollutant loads bypassing goals are not calculated. What pollutant load will bypass each of the series of stormwater BMPs?

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233	186	3.7.2	TSS values for Onion and Bear Creek are concentrations, not loads. Evaluation of TSS monitoring values available from the LCRA water quality website for Onion Creek below Bear Creek indicate that the calculated 12.8 mg/L TSS concentration from the proposed project would be equivalent to the 95.5 percentile of data. Only one of the 13 monitoring points exceeded 4 mg/L. The reported 23 mg/L is an outlier. The statement that the "The expected 12.8 mg/L TSS concentration shown in Table 3.6-6 is well within the typical range of surface water in streams near the state-owned ROW" is not supported by this data and should be removed.
234	186	3.7.2	COA 2006 reports event mean concentrations for stormwater runoff. The statement that "recommended that an average mean concentration of 153.7 mg/L be used to represent the mean watershed TSS concentration regardless of impervious cover or development condition (COA, 2006)." is not accurate. This is reflective of stormwater runoff concentrations of TSS citywide, not watershed mean concentrations. A more robust monitoring data set from the next upstream Onion Creek monitoring site, 12447, yields a median TSS value of 1.6 mg/L and a maximum value of 6.8 mg/L from the LCRA water quality webpage.
235	186	3.7.2	No assessment of nutrient pollutant loads are provided, or estimates of chloride or sulfate loads which are typically dissolved and poorly removed by sedimentation BMPs. As such, the statement "Based on the level of treatment expected for the proposed system of BMPs, water quality would not be degraded to a point that would jeopardize current use classifications as established by TCEQ." is not valid and should be removed since no general use criteria are evaluated and no nutrient, dissolved oxygen or algae growth impacts are evaluated.
236	186	3.7.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>A 2006 study by COA evaluating stormwater runoff quality and quantity from small watersheds in Austin showed no significant trends in TSS levels associated with impervious cover or development condition, and recommended that an average mean concentration of 153.7 mg/L be used to represent the mean watershed TSS concentration regardless of impervious cover or development condition (COA, 2006).</i>
237	187	3.7.2	The City of Austin supports the prohibition on the use of pesticides (including herbicides) along the SH45 ROW. This prohibition should be stated in Appendix H and in the mitigation section (6).
238	187	3.7.2	Relationships between TSS and parameters of concern for endangered salamanders is not justification for use of TSS as the sole design surrogate since pollutant removal of other constituents is less than the stated removal of TSS, as shown in Table 3.6-7
239	187	3.7.2	Use of the word "would" makes it sound like TxDOT and CTRMA are conditional on abstaining from the use of pesticides and herbicides for maintenance. Should be changes to "will."
240	188	3.7.2	The statement "Therefore, possible effects of heavy metal constituents would be reduced by the use of BMPs and further diminished by natural chemical processes." is not supported by the preceding text. The concentrations or loads of toxic metals from the proposed project has not been calculated, and thus cannot be evaluated in terms of potential impacts on aquatic life.
241	188	3.7.2	Sulfate would be contributed by the proposed project to adjacent surface waters, sulfate has direct detrimental impacts to aquatic life, and sulfate is assessed for general use in classified segments including Onion Creek. What is the pollutant load of sulfate from the proposed project to receiving surface waters?

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242	188	3.7.2	This section ignores impacts of changes in hydrology to aquatic life (see for example http://www.austintexas.gov/watershed_protection/publications/document.cfm?id=196444). What are the impacts to the hydrology of the receiving water from the proposed project? Will the project result in any additional excess stream power in Bear Creek or other receiving waters?
243	188	3.7.2	The statement "and the chemical processes that limit the availability of heavy metals, the proposed project would not be expected to have a measureable effect on water quality-dependent sensitive aquatic resources such as the Barton Springs or Austin blind salamanders..." is not valid or supported by the analysis presented. Stating that high hardness precludes aquatic life impacts of heavy metals is not valid. Calculate the pollutant loads from the proposed project for metals and compare to aquatic life criteria, or remove this statement.
244	188	3.7.2	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>Sensitive features may serve as conduits to the aquifer below or may serve as habitat to troglobitic species. In each regard, the quality and quantity of the water that reaches these features would be protected to the greatest extent practicable to ensure that the aquifer's water and the potential habitat are protected.</i>
245	189	3.7.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>The risk of harm to the Barton Springs salamander from potential hazardous material spills associated with the proposed SH 45SW would be reduced to insignificant levels by the capture and detainment capabilities of the proposed HMTs.</i>
246	189	3.7.2	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>The quality and quantity of recharge reaching sensitive features would be preserved to the greatest extent practicable. For example, at Flint Ridge Cave where the proposed alignment would intersect a portion of the cave's surface drainage basin, measures would be taken to prevent the commingling of roadway stormwater and stormwater from undeveloped areas surrounding the cave, which would help preserve the current water quality of the cave's recharge.</i>
247	190	3.7.3	No discussion of revegetation specifications or methods for disturbed areas is presented. All disturbed areas should be revegetated with species native to the area. The City recommends City of Austin standards specification 609s for revegetation or specify the method that will be used
248	190	3.7.3	Describe the maintenance procedures to be used for the BMPs during construction and post-construction operation.
249	190	3.7.3	Describe environmental monitoring programs that would be used to validate the performance of the proposed BMPs and to ensure no adverse impacts occur as a result of the proposed project. Share monitoring results on a regular basis with the City of Austin.
250	190	3.7.2	How will the effectiveness of BMPS for removing TSS be monitored over time? What is the expected maintenance interval for the BMPs proposed for this project? What actions will be taken if effectiveness is less than 90%?
251	191	3.7.3	The TCEQ 2007 Edwards Rules Optional Enhanced Measures state that streams draining more than 640 acres should have buffers of 300 feet from the stream centerline which should remain free from alteration. What stream buffers will be used by the proposed roadway project relative to Edwards Rules guidance?

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252	191	3.7.3	TCEQ 2007 Edwards Rules Optional Enhanced Measures state "Lack of maintenance can be one of the primary causes of BMP failure". Describe the maintenance plans that will be implemented to ensure continued operation of the proposed BMPs as designed to ensure no adverse impacts from long-term operation of the proposed project.
253	191	3.7.3	This statement is not consistent with the research findings of the cited article "Further research into vegetative control measures such as VFS and grassy swales found that VFS can remove up to 99 percent of TSS and up to 97 percent of metals (Barrett, 2004)". The referenced article specifically concluded " The strips were generally less effective at removing dissolved metals and essentially no change in concentration was observed for nitrogen and phosphorus. Concentrations of organic carbon, dissolved solids, and hardness were observed to increase. " Further, the range of TSS removals for VFS reported by Barrett was -450% to 97%, not 99% as reported and with an overall average of only 24%. Please adjust the text to correctly reflect the citation. Please calculate the pollutant loads for the listed constituents predicted to not be removed or predicted to increase based on this report.
254	191	3.7.3	"little adverse impacts would be expected for all but the most sensitive receiving waters". Please evaluate the sensitivity of the receiving waters and the Edwards Aquifer. Onion and Bear creeks by City of Austin monitoring data are of the highest quality in the Austin area, and the Edwards Aquifer has been described by the Texas Groundwater Protection Committee as the most sensitive aquifer to contamination in Texas. As such, they are sensitive water bodies and would be adversely impacted by highway runoff.
255	191	3.7.3	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>Eleven water quality ponds/hazardous material traps are proposed for the treatment of stormwater throughout the SH 45SW corridor. These permanent BMPs would be installed as early as practicable during the construction of the proposed project to allow for the detention and treatment of on-site stormwater. Staged construction, limited soil disturbance/preservation of natural vegetation, and soil stabilization BMPs would be in place through construction to decrease erosion and ensure that off-site discharge of sediment is minimized to the greatest extent practicable.</i>
256	191	3.7.3	Text touts the benefits of TSS removal from PFC pavement yet other parts of the DEIS (page 154) indicate that the relatively steep cross slope of the SH45 pavement will reduce its TSS removal benefits.
257	191	3.7.3	DEIS does not address runoff that will infiltrate soils and recharge the aquifer and potentially enter local caves with karst fauna. Rainfall and runoff are known to infiltrate through soils (Hauwert and Sharp, 2014 and Cowen and Hauwert, 2013).
258	191	3.7.3	Again, DEIS does not acknowledge that Flint Ridge Caves runs under part of the highway ROW.
259	191	3.7.3	Previous comments address difference in Flint Ridge surface catchment in DEIS versus determined by COA.
260	191	3.7.3	Use of bentonite to reduce infiltration of runoff through soils is creative and indirectly acknowledges that runoff does infiltrate through soils. However, it does not address how the bentonite will stay hydrated to prevent cracking which would allow runoff to pass through the bentonite layer and into the vadoze zone.

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261	195	3.7.3	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>The quality and quantity of recharge reaching sensitive features would be preserved to the greatest extent practicable, as would be the case at Flint Ridge Cave where the state-owned ROW intersects part of the cave's approximately 43.8-acre surface catchment basin.</i>
262	195	3.7.3	The re-routing of runoff to Flint Ridge Cave appears to consist of a culvert in coordination with the multi use trail. Can it be relocated further south to allow a bigger area (of non-polluted, natural runoff) to be re-routed to Flint Ridge Cave?
263	197	3.7.3	Figure 3.7-7 shows the surface catchment of Flint Ridge Cave. The area is smaller than that determined by COA and the main difference appears to be in the east side of the basin not impacted by the highway. The boundary on the west and north sides appear to be generally similar.
264	197	3.7.3	The DEIS should also examine restoring surface runoff to other karst features impacted by SH45.
265	199	3.7.4	Use of BMPs would reduce the impact of some constituents, potentially including TSS, but not all constituents including nutrients and dissolved contaminants thus resulting in adverse water quality impacts from the proposed project.
266	215	3.8.1	The DEIS reports no observation of oak wilt in the proposed ROW, but there is at least one very large oak wilt center between proposed SH45SW and the Shady Hollow neighborhood.
267	219	3.8.1	Table 3.8-2 states that the Barton Springs and Austin blind salamander have no potential to occur within the study area. Eurycea spp have been found in nearby springs and caves, and though it's still being debated as to what species they are (E sosorum, E nana, or a new species).
268	227	3.8	Data from ongoing biologic surveys of caves on the ROW is not included in this document and therefore the impact of SH45 construction and operation on cave biota cannot be determined. If included at a later date, the document needs to address how that data will be reviewed by interested parties.
269	227	3.8.1	The description of the karst zones on p. 227 and in figure 3.8-3 shows the remapping of Veni's 1992 karst zone 2 as zone 3 for containing listed invertebrate karst species. However, it does not add that Veni (2007) stated " While Zone 2 in the South Travis County and Northern Hays County Karst Fauna regions have now been downgraded to Zone 3, non-listed rare species have been found in the South Travis Karst Fauna Region, and a high potential for rare species exists in the Northern Hays County Karst Fauna Region. Nineteen caves with rare species occur in the Rare Karst Species Zone 1 area in the South Travis County Karst Faunal Region. The study area is also mapped as Karst Zones 1 & 2 on the BCCP detailed maps and will require mitigation if the project utilizes the Balcones Canyonlands Conservation Plan permit to address potential impacts to threatened and endangered species.
270	229	3.8.1	There is a record of <i>Texella reyesi</i> for Barker Ranch Cave that is thought to be an error in identification, but has not yet been resolved.

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271	230	3.8	The draft EIS presents presence/absence data and habitat surveys conducted by SWCA, and reports that no Golden-cheeked Warblers or habitat were observed within the proposed ROW. However, the draft EIS also presents partial findings of a GCWA habitat model developed by Texas A&M, and states that there are about 2,010 acres (813 hectares) of potential GCWA habitat within the study area based on this model and a review of aerial photography and survey observations. If acreage estimates from the TAMU model are presented, then the location of these patches, along with the predicted occupancy, density, and abundance for each patch, should also be presented. The TAMU model includes a habitat patch within and adjacent to the SH45 ROW that has a predicted occupancy of 0.89 and a predicted density of 0.25 male GCWAs/ha. This would indicate a predicted abundance of about 10 male GCWAs within the ROW, and about 200 male GCWAs within the study area. If this model is to be accepted, then all of the information should be presented. Otherwise, the model should be rejected due to overestimation and poor correlation with GCWA presence/absence and territory data. We have also found that the TAMU model tends to overestimate male GCWA abundance within the Balcones Canyonlands Preserve and Water Quality Protection Lands, particularly in low density areas.
272	233	3.8.1	Table 3.8-3 For Species of Greatest Conservation Need (SGCN) Stygobromus russelli is confirmed for Flintridge cave (quite abundant in the stream passage and pools). Cave Myotis bat (Myotis velifer) is also confirmed for Flintridge cave as well as several other caves within the study area, however, in recent years the #'s of bats have been in a severe decline.
273	238	3.8.1	The section on the BCP should discuss the 62 caves and the protection that is required by the BCCP permit for them. It also mistakenly states that Travis County, COA, and LCRA are the entities responsible for this regional habitat conservation plan. Travis County and the City of Austin hold the permit and there are multiple partners such as LCRA who manage mitigation lands within the Balcones Canyonlands Preserve.
274	239	3.8	Figure 3.8-4 is not current and needs to be updated due to acquisitions of Hudson, Searcy, Spillar golf, and the Ruby Ranch conservation easement. That coverage is available upon request from COA either the Environmental Resources Management Division of Watershed Protection Department or the Wildlands Conservation Division of the Austin Water Utility.
275	241	3.8.1	This statement "Soil studies (Wilding, 1993, 1997) have shown that the Flint Ridge Cave surface drainage basin is relatively impermeable and potential pollutants would be unlikely to impact Barton Springs via surface infiltration..." is not supported by the citations and is invalid. Wilding 1997 is a general review of Brackett soils and is not a site specific evaluation of Flint Ridge Cave or its surface drainage area. Soils around Flint Ridge Cave have been documented to be permeable, and upland recharge through soil infiltration has been documented (see Hauwert and Sharp 2014. Measuring Autogenic Recharge over a Karst Aquifer Utilizing Eddy Covariance Evapotranspiration in Journal of Water Resource and Protection) and Cowen and Hauwert, 2013.
276	241	3.8	There are numerous inaccuracies in the information presented on Flint Ridge Cave: surface drainage presented is smaller than determined by COA, the COA 2012 references is a short summary of activity and did not "delineate" the subsurface basin for Flint Ridge Cave but simply stated it was greater than 100 acres, the DEIS errors in the observations made during a runoff event at the cave in which the runoff from undeveloped ground was so clear that it states "Note how rocks and vegetation are clearly visible below the surface of the runoff."

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277	241	3.8	For a more thorough discussion of soil characteristics, the DEIS should also reference other reports such as Cowen and Hauwert (2013) that indicate the soil is more permeable than reported by Wilding.
278	241	3.8.1	Soil studies by Wilding (1993, 1997) conflict with Hauwert's recharge data in the Flint Ridge Cave basin that demonstrates the majority of water in the basin recharge diffusely, not just through the discrete cave opening.
279	241	3.8.1	The Flint Ridge Cave subsurface contributing basin is reported as over 100 acres in area, but this area has not been mitigated or addressed elsewhere in the DEIS, only the surface drainage basin. If the work by Wilding (1993, 1997) is being used to reject impacts here, this would be in conflict with other science prepared by Hauwert regarding recharge in this area.
280	241	3.8.1	This determination is supported by a study conducted by Paquin and Hardin that suggests that <i>C. cueva</i> , <i>C. bandida</i> , and <i>C. reyesi</i> may all be variants of a single species (Paquin and Hardin, 2005). The study was conducted by Paquin and Hedin, not Hardin.
281	241	3.8.1	The federal permit for the BCCP requires that the surface and subsurface drainage basins for caves used as mitigation are protected. It also requires the preservation of the ecological integrity of the cave. The subsurface drainage basin of Flint Ridge cave is not yet known. Also, the U.S. Fish and Wildlife Service developed karst preserve design criteria in 2012 which should be reviewed and referenced. USFWS 2012. Karst Preserve Design Recommendations. Austin Ecological Services Field Office, Austin, TX. They require protection of the cave cricket foraging area.
282	241	3.8.1	This section indicates that the surface drainage basin for Flint Ridge Cave has been delineated by topographic survey and covers approximately 43.7 acres. This is not correct, the actual acreage is 57.8 acres.
283	241	3.8.1	The DEIS briefly mentions the fact that Flintridge cave has species of concern (species that the permit attempts to adequately protect in an effort to preempt the need for future listing.) The DEIS does not mention the fact that Flintridge cave is one of 62 karst features that the BCCP permit is tasked with protecting. According to the latest FWS Karst preserve Design Recommendations (U.S. Fish and Wildlife Service. 2012. Karst Preserve Design Recommendations. Austin Ecological Services Field Office, Austin, TX.), the surface, subsurface, cave footprint and cave cricket foraging area should be protected. If SH 45 SW is built and the cave environmental integrity is not protected, this may prompt the listing of the species of concern.
284	242	3.8.2	No analysis of the impacts as a result of highway lighting at night are included in this section. Impacts to existing unlit conditions as a result of the proposed project should be included in the assessment of wildlife impacts.
285	242	3.8	Can not locate the Wilding 2007 reference. The Wilding 1997 reference does not support statement in DEIS. Source of the sediment contribution mass can not be verified.
286	244	3.8.2	No discussion of impacts to deer population as a result of vehicle collisions is presented in this section.
287	244	3.8.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>Fish species would not be significantly impacted by the proposed project. Bear Creek, the only water body indicated on published maps as being perennial in the proposed project area (though it has been observed to be intermittent with perennial pools), would be bridged to avoid or minimize impacts to the creek and wildlife species in the creek.</i>

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288	246	3.8.1	Table 3.8-5 states that there is no take for the Barton Springs Salamander Eurycea spp have been found in nearby springs and caves, and though it's still being debated as to what species they are (E sosorum, E nana, or a new species.)
289	246	3.8.2	Table 3.8-5 states that there will be no take of Austin Blind Salamander, however karst and groundwater studies that would be necessary to support this statement are not yet completed.
290	246	3.8.2	Table 3.8-5 states that there will be no take of Barton Springs Salamander, however karst and groundwater studies that would be necessary to verify this are not yet completed.
291	249	3.8	Table 3.8-5 - The table states that no take of GCWAs will occur from the proposed SH45. The draft EIS presents presence/absence data and habitat surveys conducted by SWCA, and reports that no Golden-cheeked Warblers or habitat were observed within the proposed ROW. However, the draft EIS also presents partial findings of a GCWA habitat model developed by Texas A&M, and states that there are about 2,010 acres (813 hectares) of potential GCWA habitat within the study area based on this model and a review of aerial photography and survey observations. If acreage estimates from the TAMU model are presented, then the location of these patches, along with the predicted occupancy, density, and abundance for each patch, should also be presented. The TAMU model includes a habitat patch within and adjacent to the SH45 ROW that has a predicted occupancy of 0.89 and a predicted density of 0.25 male GCWAs/ha. This would indicate a predicted abundance of about 10 male GCWAs within the ROW, and about 200 male GCWAs within the study area. If this model is to be accepted, then all of the information should be presented. Otherwise, the model should be rejected due to overestimation and poor correlation with GCWA presence/absence and territory data. We have also found that the TAMU model tends to overestimate male GCWA abundance within the Balcones Canyonlands Preserve and Water Quality Protection Lands, particularly in low density areas. Also, indirect effects could occur to GCWAs adjacent to the ROW.
292	249	3.8.2	Table 3.8-5 states that there will be no take of listed endangered karst invertebrates however karst investigations are still underway.
293	249	3.8.2	Table 3.8-5 states that there is no suitable habitat within the ROW and no take of the golden-cheeked warbler based on SWCA 2014. However previous studies by SWCA and others have documented suitable habitat and golden-cheeked warblers within 300 feet of the ROW and this information was provided to TXDOT. The ROW and portions of the study area are also mapped as Zones 1 and 2 on the BCCP golden-cheeked warbler habitat maps. These areas require mitigation for take of habitat even if golden-cheeked warblers have not been documented.
294	251	3.8.2	Impacts to the quantity of water recharging the Edwards Aquifer would constitute take of endangered salamanders. The proposed project will reduce diffuse recharge as a result of increased impervious cover, reduce diffuse recharge thru subsurface connections to known karst features, and will directly impact the surface catchment areas of known karst features. Comparison of the total impervious cover of the proposed project to the impervious cover for the entirety of the recharge zone is not a valid method to conclude no take of the effected species unless documentation of previous similar actions by the US Fish and Wildlife Service can be referenced. As defined by the endangered species act, an action that directly or indirectly impacts endangered species or their habitat constitutes take and requires consultation and approval from the US Fish and Wildlife Service.
295	251	3.8.2	Observations of Texella reyesi has not been dismissed, the work looking into this question is ongoing

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296	251	3.8	The draft EIS states that SWCA observed GCWA habitat within the ROW and GCWAs adjacent to the ROW in 2013. Acreage estimates and number of GCWAs observed prior to 2014 should be presented, along with a map of the locations. The draft then states that the same consulting firm did not observe habitat or GCWAs in 2014. The change in habitat conditions from 2013 to 2014 should be explained. The draft EIS presents presence/absence data and habitat surveys conducted by SWCA, and reports that no Golden-cheeked Warblers or habitat were observed within the proposed ROW. However, the draft EIS also presents partial findings of a GCWA habitat model developed by Texas A&M, and states that there are about 2,010 acres (813 hectares) of potential GCWA habitat within the study area based on this model and a review of aerial photography and survey observations. If acreage estimates from the TAMU model are presented, then the location of these patches, along with the predicted occupancy, density, and abundance for each patch, should also be presented. The TAMU model includes a habitat patch within and adjacent to the SH45 ROW that has a predicted occupancy of 0.89 and a predicted density of 0.25 male GCWAs/ha. This would indicate a predicted abundance of about 10 male GCWAs within the ROW, and about 200 male GCWAs within the study area. If this model is to be accepted, then all of the information should be presented. Otherwise, the model should be rejected due to overestimation and poor correlation with GCWA presence/absence and territory data. We have also found that the TAMU model tends to overestimate male GCWA abundance within the Balcones Canyonlands Preserve and Water Quality Protection Lands, particularly in low density areas.
297	251	3.8.2	It is stated here that SWCA documented habitat sharing the basic characteristics of golden-cheeked warbler habitat in 2013 and that GCWA's have been observed immediately adjacent to the ROW, but goes on to state that there is no take. This is inaccurate.
298	254	3.8.2	The COA 2011 reference does not appear to address the statement in the DEIS. The statement in the DEIS appears to be another misstatement from the COA 2012 summary report that actually states that the runoff into the cave was clear enough to see rocks and other debris on the ground through the runoff.
299	254	3.8.2	How will the maintenance of the 2900 ft berm and bentonite liner routing roadway runoff away from Flint Ridge Cave be managed over the lifetime of the project?
300	254	3.8.1	Regarding impacts to the hydrology of Flint Ridge Cave, this only addresses the surface drainage issues, does not touch impacts to the subsurface drainage basin
301	254	3.8.2	States that rare karst invertebrates are not expected to occur within the state-owned ROW. This is inaccurate.
302	254	3.8.2	This section briefly discusses potential impacts on Flint Ridge Cave related to water quantity and quality, but does not address impacts related to the cave cricket foraging area, vegetation and nutrient impacts, introduction of invasive species and changes in the cave microclimate.

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303	255	3.8	Several recent peer-reviewed studies with large sample sizes of color-banded GCWAs and GCWA nest monitoring clearly show negative effects of edge on GCWA density and reproductive success, including Peak and Thompson 2013 (not included in the citations), Peak 2007, and Reidy et al. 2009. The draft EIS cites other studies "reportedly showing no significant effects from edge habitat." Coldren 1998 is one of the studies cited; however, Coldren's dissertation found "positive relationships of patch size with pairing success and reproductive success.... Reproductive success was greatest in territories farther than 100 m from edge....Territorial placement within a patch appeared to be influenced by adjacent land uses, with warblers selecting agriculture and grasslands as the nearest land use, and selecting against commercial development, entertainment, forested non-warbler habitat, and high-density transportation...Distance to the edge and territory size were greatest for territories closest to land uses with the highest levels of human disturbance." The draft EIS also cites Kroll 1980 as finding no significant effects from edge. According to the 1992 GCWA recovery plan (not included in the citations), the number of GCWAs on Kroll's study site were reduced from 24-28 territories to 5 territories in 1991 following extensive cutting of the oak-juniper woodlands into narrow strips. This information suggests Kroll's study site did experience negative effects from edge and is consistent with the findings of Peak 2007, Reidy et al. 2009, and Peak and Thompson 2013. Citations: U.S. Fish and Wildlife Service. 1992. Golden-cheeked Warbler Recovery Plan. Albuquerque, New Mexico. 88 pp.; Peak, R. and F.R. Thompson. 2013. Amount and type of forest cover and edge are important predictors of Golden-cheeked Warbler density. The Condor 115(3):659-668.
304	255	3.8	We were unable to find a copy of the Horne and Anders 2001 annual report for Fort Hood. The draft EIS should rely on peer-reviewed scientific literature; if grey literature is cited, it should be readily available to the public. We do have a copy of an annual report by Horne in 2000, which found that "openings as narrow as 10-20 m may result in loss of breeding habitat for golden-cheeked warblers." This would appear to contradict the findings of no significant effects of edge as reported in the draft EIS. Further, the peer-reviewed findings of Peak 2007 and Peak and Thompson 2013 should supersede the earlier findings presented in annual reports for Fort Hood.
305	255	3.8	The draft EIS seems to suggest that the LCRA utility easement provides a sufficient buffer against indirect effects of the proposed SH45. This appears to assume that all edges have the same effects. However, Coldren 1998 found that GCWAs select agriculture and grassland edges and against high-density transportation and other edges with high levels of human disturbance. Sperry 2007 also found that GCWAs were detected with greatest frequency along a utility easement compared with a housing development and woodland meadows. Based on the best available information, the proposed SH45 can be expected to have greater impacts on the GCWA and its habitat than the existing LCRA utility easement.
306	255	3.8	The draft EIS states that " predation does not appear to be a major process affecting the presence of warblers or the relationship between nearby land uses and patch size " based on a report by Arnold et al. 1996. This study used artificial nests, which are not necessarily representative of actual nest predation. In contrast, Peak 2007 and Reidy et al. 2009 are peer-reviewed publications based on relatively large sample sizes of GCWA nests and color-banded individuals, so are more appropriate to cite in the draft EIS.

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307	255	3.8	The draft EIS cites studies that appear to show little to no effect of road construction and road noise on GCWA densities or reproductive success. However, Benson 1995 and Lackey et al. 2011 were not based on monitoring of color-banded individuals or GCWA nests, which would provide more compelling conclusions. Further, the Vickery method used to determine reproductive success in Lackey et al. 2011 is a reproductive index based on behavioral observations rather than nest fate and was developed for grassland birds. Morgan et al. 2012 found that although the Vickery method "may function as a coarse indicator of habitat suitability (e.g., documenting production in potential ecological traps), in our study the index exhibited neither internal consistency nor the ability to predict nest fate at the plot or territory level and functioned poorly as a substitute for nest searching and monitoring." The reliability of the Vickery method also needs to be field tested on woodland birds such as the GCWA. Based on preliminary data from the Balcones Canyonlands Preserve, we have found that the Vickery method does not provide reliable productivity data compared with color-banding and nest monitoring. Color-banded individuals would also provide more accurate data on territory size and placement, as well as age structure and population turnover. GCWAs tend to exhibit high site fidelity, so it would be helpful to know whether this holds true for areas along the roadway corridors as well. Citation: Morgan, M. R., C. Norment, and M. C. Runge. 2012. Evaluation of a reproductive index for estimating productivity of grassland breeding birds. Auk 127:86–93.
308	256	3.8.3	No suitable habitat for GCWA is reported to be within 300ft of the proposed project, but this is in conflict with the SWCA (2013) report on GCWA habitat on the WQPL which shows habitat for this species within 300 ft. This document was provided to TXDOT and is in the references section (Section 8) on page 343 of the DEIS.
309	256	3.8	We were unable to find a copy of the Pruet et al. 2014 annual report for Texas A&M. The draft EIS should rely on peer-reviewed scientific literature; if grey literature is cited, it should be readily available to the public. We were able to find a 2013 report by Pruet et al., which appears to have a similar study design as Lackey et al. 2011, but includes a small number of color-banded individuals and GCWA nests. Preliminary findings suggest higher density in the control site, and the map of GCWA territories and nests suggest avoidance of the roadways.
310	256	3.8	The draft EIS states that there is no suitable GCWA habitat within 300 feet of the ROW. Also, the majority of the proposed SH45 ROW is within Travis County, and over half of the ROW falls within the Balcones Canyonlands Conservation Plan's Zone 2 GCWA habitat. The draft EIS presents presence/absence data and habitat surveys conducted by SWCA, and reports that no Golden-cheeked Warblers or habitat were observed within the proposed ROW. However, the draft EIS also presents partial findings of a GCWA habitat model developed by Texas A&M, and states that there are about 2,010 acres (813 hectares) of potential GCWA habitat within the study area based on this model and a review of aerial photography and survey observations. If acreage estimates from the TAMU model are presented, then the location of these patches, along with the predicted occupancy, density, and abundance for each patch, should also be presented. The TAMU model includes a habitat patch within and adjacent to the SH45 ROW that has a predicted occupancy of 0.89 and a predicted density of 0.25 male GCWAs/ha. This would indicate a predicted abundance of about 10 male GCWAs within the ROW, and about 200 male GCWAs within the study area. If this model is to be accepted, then all of the information should be presented. Otherwise, the model should be rejected due to overestimation and poor correlation with GCWA presence/absence and territory data. We have also found that the TAMU model tends to overestimate male GCWA abundance within the Balcones Canyonlands Preserve and Water Quality Protection Lands, particularly in low density areas.

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311	256	3.8.2	States that encroachment-alteration effects on karst species will be determined based on results of the ongoing karst surveys. The impacts cannot be assessed if the surveys are not yet complete.
312	258	3.90	One site that was worthy of SAL designation was exhausted of research potential, but was the site also salvaged?
313	279	3.11.1	A windmill or well associated with historic sites 41TV1049 or 41TV1051 may be present. No wells were shown on the well map (Figure 3.11-3) in the vicinity of these sites.
314	292	3.12.2	No analysis of the aesthetics impacts as a result of highway lighting at night are included in this section. Impacts to existing unlit conditions as a result of the proposed project should be included in the assessment of visual and aesthetic impacts.
315	292	3.12.2	The Lady Bird Johnson Wildflower Center has a look out tower that was not used as a viewpoint in the study, but perhaps is the most frequently visited sited with established views of the proposed project. Although it is just outside of the study area, this would have been the appropriate site to analyze view impacts and it should be used based on current usage and impacts to those users.
316	301	4.1	Based on the amount of developable land available in the AOI; does this analysis characterize WQPL as developable? It is not.
317	302	4.1	Please identify the local planning experts that "maintain that much of the planned development in the area will occur regardless of whether or not the proposed project is constructed" and provide their justification for that statement.
318	302	4.1	"Based on the amount of developable land available in the AOI"; does this analysis characterize WQPL as developable? It is not.
319	303	4.1	Pollutant removal for parameters other than TSS has not been quantified, and stated pollutant removals for other constituents of concern in Section 3.6 are lower than those for TSS. Thus, the statement that the project is "predicted to improve the existing quality of recharge entering the aquifer..." is not supported and not valid.
320	303	4.1	Not all of the area of influence are within the areas regulated by the City of Austin under the Save Our Springs Ordinance, and the Balcones Canyonland Permit only applies within Travis County and the City of Austin. The assertion that these regulating tools will result in no additional water quality impacts from induced development within the area of influence (which includes area in Hays County) is thus not supported and not valid.
321	303	4.1	As identified in the referenced Herrington and Hiers 2010 (see Groundwater Impacts section), the water quality of Barton Springs is degrading over time. This indicates that the existing regulations including TCEQ Edwards Rules are not sufficient to preclude impacts to sensitive aquatic resources including the Edwards Aquifer. The proposed project would have direct and indirect impacts to the Edwards Aquifer and would exacerbate on-going water quality degradation of endangered species habitat and thus constitute unpermitted take of endangered species.
322	305	4.2	The proposed project includes addition of a level of impervious cover that does not comply with the City of Austin's development regulations over the Edwards Aquifer, which are the only non-degradation development ordinance in effect over the Edwards Aquifer. Additionally, area within the AOI is not regulated by the City of Austin. Thus, assertions that the proposed project would not contribute directly to substantial cumulative impacts is not supported. Additionally, the proposed project impact assessment does include the potential impacts of the other planned roadway projects over the Edwards Aquifer, and thus the DEIS is not a complete analysis.
323	305	4.2	The statement "These regulations and plans would apply to all other developments occurring within the AOI, providing regulatory means by which significant environmental impacts caused by development would be minimized." is not valid. Only the City of Austin has a non-degradation development ordinance in place, which does not cover the entire area of influence for the project.

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324	305	4.2	The DEIS correctly identifies that the proposed project would contribute to cumulative impacts. Because of the lack of quantification of impacts for constituents of concern other than TSS, the statement that the project will not contribute to significant cumulative impacts is not supported and invalid.
325	305	4.2	The DEIS notes that incremental impacts will occur to endangered species. Any impacts constitute take of endangered species and are subject to regulation under the federal Endangered Species Act.
326	305	4.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>These regulations and plans would apply to all other developments occurring within the AOI, providing regulatory means by which significant environmental impacts caused by development would be minimized.</i>
327	305	4.2	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>Based on the analysis in the Cumulative Impacts Technical Report, the proposed project, in conjunction with other past, present, and reasonably foreseeable future projects, may contribute to cumulative impacts but is not likely to cause significant cumulative impacts. Incremental impacts to the Austin blind salamanders, Barton Springs salamanders, Goldencheeked Warblers, and surface and groundwater resources would be negligible in the context of the overall cumulative impacts of the past, present, and reasonably foreseeable projects. This determination is supported by several factors, including: limited direct impacts that would be caused by the proposed limited access project with extensive BMPs for before, during, and after construction; the incremental contribution the proposed roadway would make toward induced development in the AOI; and the continuing trends of land use development and conservation initiatives underway within the RSAs.</i>
328	307	5.0	The preferred alternative does not meet the non-degradation goal stated by TXDOT staff during meetings with the City of Austin and early technical work groups and expressed as a critical requirement by the City of Austin and other stakeholders.
329	307	5.0	The preferred alternative does not minimize the impacts to water quality protection lands and karst features to the maximum extent practicable. Significant karst features will be directly impacted by the project. The project will contribute to degradation of water quality and quantity in the Edwards Aquifer and thus constitutes unpermitted take of endangered Barton Springs and Austin Blind salamander species.
330	307	5.0	Impacts to water quality protection lands and surrounding neighborhoods are not mitigated by placement of the road within existing right-of-way. Visual and noise impacts extend beyond the right-of-way.
331	309	6.3	This section needs to include information about how long the construction process may take and the air emissions from construction equipment operation, specifically NO2.
332	310	6.40	Noise impacts to R8 should receive some sort of mitigation <\$25,000 in value.
333	311	6.5.1	No details are provided on the type or frequency of water quality monitoring that would be included in the Environmental Compliance Management plan. Please provide details of what monitoring will occur and how monitoring data will be used to validate or adaptively manage construction activities to eliminate impacts to water quality.
334	311	6.5.1	What authority will the independent compliance manager have to stop or modify work? What are the goals of the Environmental Compliance Management program?

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335	311	6.5.1	Void mitigation protocols used for the proposed project should follow those in the Optional Enhanced Measures for complying with the Edwards Rules (RG-348a) to be protective of sensitive karst features.
336	311	6.5.1	No discussion of the type of vegetation that will be used in the vegetative filter strips or in disturbed areas requiring revegetation is presented. The City recommends all areas be revegetated with native species and recommends the City of Austin standards specification 609s for revegetation or specify the method and type of native vegetation that will be utilized.
337	311	6.5.1	Inconsistent specifications for pesticide use appear in the document. In some sections, it is stated that no pesticides will be used but in other sections state application is limited. Please clarify. Please prohibit the application of any pesticides and fertilizers within the project area.
338	312	6.5.1	This bullet statement is confusing and appears to be contradictory: "Mowing schedule according to native and non-preferred vegetation seed propagation"
339	313	6.6.1	Maximum Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered Construction staging would be scheduled to avoid impacts to active nests of migratory birds or migratory bird breeding seasons to the maximum extent practicable
340	313	6.6.1	"In addition, the contractor would be prepared to prevent migratory birds from building nests between February 15 and October 1, per the plan sheets." How would they prevent birds from building nest? This might constitute harassment of a listed species which is prohibited by the Endangered Species Act.
341	314	6.6.2	The project as stated in the DEIS impacts the quality and quantity of water recharging the Edwards Aquifer and thus impacts the endangered Barton Springs Salamander and the endangered Austin Blind Salamander species. This could constitute take of federally protected species.
342	314	6.6.2	Because of the lack of quantification of impacts for constituents of concern other than TSS, the statement that the project will improve the quality of water recharging the Edwards Aquifer is not supported and invalid.
343	314	6.6.2	The stated void inspection procedures do not include mitigation procedures, and are not compliant with the TCEQ Optional Enhanced Measures for the Edwards Aquifer (RG-348a)
344	314	6.6.2	The draft EIS states that there is no suitable GCWA habitat within the ROW, based on the 2014 surveys. The draft EIS presents presence/absence data and habitat surveys conducted by SWCA, and reports that no Golden-cheeked Warblers or habitat were observed within the proposed ROW. However, the draft EIS also presents partial findings of a GCWA habitat model developed by Texas A&M, and states that there are about 2,010 acres (813 hectares) of potential GCWA habitat within the study area based on this model and a review of aerial photography and survey observations. If acreage estimates from the TAMU model are presented, then the location of these patches, along with the predicted occupancy, density, and abundance for each patch, should also be presented. The TAMU model includes a habitat patch within and adjacent to the SH45 ROW that has a predicted occupancy of 0.89 and a predicted density of 0.25 male GCWAs/ha. This would indicate a predicted abundance of about 10 male GCWAs within the ROW, and about 200 male GCWAs within the study area. If this model is to be accepted, then all of the information should be presented. Otherwise, the model should be rejected due to overestimation and poor correlation with GCWA presence/absence and territory data. We have also found that the TAMU model tends to overestimate male GCWA abundance within the Balcones Canyonlands Preserve and Water Quality Protection Lands, particularly in low density areas.

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345	314	6.6.2	Section 6.6.2 does not address mitigation of impacts to golden-cheeked warbler habitat and BCCP karst zones 1 and 2.
346	314	6.6.2	States that no habitat ranges for listed karst species overlap with the project area. There is currently a collection of <i>Texelis reyesii</i> from Barker Ranch Bat cave within the evaluation area.
347	315	6.6.8	No mention of the contractor providing hazardous materials "awareness training" for all staff performing grading and/or excavation on how to identify and manage suspected contaminated soil or groundwater that might be encountered. Only a small reference is made to training under Hazardous Materials Spill Protocols (App. H 4.1.5 Spill and Hazardous Materials Management)
348	316	6.9	The project would be constructed on fill and thus elevated, which would result in visual and aesthetic impacts to surrounding areas which were not evaluated by the DEIS.
349	316	6.9	Maximum Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered <i>Impacts to visual and aesthetic resources would be minimized to the maximum extent practicable during the final design of the proposed project.</i>
350	316	6.90	Priority viewpoints do not include a frequently used viewpoint at the Lady Bird Johnson Wildflower Center.
351	B-1	1.0	There is no typical section for the segment(s) that will include the diversion berm and bentonite soil cap near Flint Ridge Cave.
352	C-5	5.0	Sheet 5 depicts diversion berm with a breach for wildlife /pedestrian crossing within Flint Ridge Cave basin and ~ 500' from Flint Ridge Cave opening. How will this effectively divert polluted roadway runoff away from Flint Ridge Cave?
353	D-10	1.0	AASHTO guidance suggest that the following be used for documenting indirect impacts. The DEIS falls short of following this guidance. <i>Explain the Methodology. Just as important as selecting a reasonable methodology is the importance of clearly explaining why that methodology was selected. The advantages and disadvantages/drawbacks of the methodology should be acknowledged, not ignored.</i> <i>Provide Factual Support. The evaluation of trends and conclusions about environmental consequences should be based on up-to-date factual information. Graphs, tables, and other graphic elements should be incorporated, where appropriate, to aid readability.</i> <i>Use Clear Reasoning. The conclusions of the assessment should be supported by logical analysis and plausible reasoning, and not contain internal inconsistencies or contradictions that put the results into question. It also is important to document the uncertainties involved in the analysis, explain the importance of those uncertainties, and explain how they have been addressed. Legal Sufficiency Criteria. For a more detailed list of factors to consider in assessing the legal sufficiency of indirect effects and cumulative impacts analyses, refer to Appendix 1A (indirect effects) and Appendix 1B (cumulative impacts). These lists also are based on the recommendations in the NCHRP report, Legal Sufficiency Criteria for Adequate Indirect Effects and Cumulative Impacts Analysis as Related to NEPA Documents (2008).</i>

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354	D-10	4.0	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. Table 4-2 EJ groups are comprised of vulnerable populations, including minorities and low income persons. TxDOT follows principles in E.O. 12898 and Title VI to provide protections for EJ populations. Project-induced growth is not anticipated to have a significant effect on neighborhoods, including those in EJ communities. Displacements from project induced growth are not anticipated.
355	D-11	4.0	The proposed project would directly impact the subsurface catchment area for Flint Ridge Cave and thus directly impact the species of concern that live in Flint Ridge Cave. Additional karst features would be directly impacted by the project, thus indirectly impacting Barton Springs. Expand the Area of Influence to include Barton Springs and evaluate the impacts on that valued and unique environmental resource.
356	D-11	4.0	The proposed project would indirectly impact the Barton Springs and Austin Blind salamander species by decreasing recharge to the aquifer and by increasing pollutant loading to the aquifer.
357	D-12	4.0	Table 4-2 Does not consider cumulative impacts with respect to other TxDOT/CTRMA projects including Mopac intersections, Mopac South, and Oak Hill Parkway because the AOI is inadequately defined. Nor does it address changes to runoff and recharge in connection with other development in the AOI or provide a robust AOI. Instead it seems to described effects as diminimus because of other development.
358	D-14	6.3	Include a statement about air quality impacts resulting from construction equipment - PM and NO2.
359	D-15	4.0	Obtain more updated well locations from the Barton Springs Edwards Aquifer Conservation District
360	D-15	4.0	Figure 4.1 Spring data is incomplete. Springs on Marbridge and on WQPL Tabor tract are not depicted.
361	D-22	5.0	The DEIS cites Imagine Austin and City of Austin water quality regulations, but the proposed project does not conform to those regulations. Explicitly note that the proposed project does not conform to the City of Austin comprehensive plan or Land Development Code.
362	D-23	5.0	The DEIS cites the City of Austin Habitat Conservation Plan for the Operation and Maintenance of Barton Springs Pool, and identifies a goal of that plan is to reduce anthropogenic pollutants impacts to salamanders and their habitat. The proposed project does not comply with this goal as it will reduce the quantity and quality of recharge to the aquifer, and this should be identified in the DEIS.
363	D-24	5.1	Maximum Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered Maintain or restore natural ecosystem characteristics of Barton Springs and the Austin blind salamanders habitat to the maximum extent practicable
364	D-24	5.1	Maximum Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered Restore and maintain natural flow regimes in Barton Springs Pool, Eliza Spring, Old Mill Spring, and Upper Barton Spring to the maximum extent practicable
365	D-28	5.1	Section on BCCP does not describe permit commitment to protect 62 caves, including Flint Ridge.
366	D-28	5.1	Documents BCP efforts to protect 30,428 ac of bird habitat but fails to address BCCP goal of protecting 62 caves and karst feature that provide habitat for 6 listed Karst invertebrates and 26 karst species of concern.

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367	D-33	6.0	Include impacts to karst features resulting in loss of recharge quantity as an impact causing activity
368	D-33	6.0	Include visual impacts from elevation of the roadway because construction will occur on substantial amounts of fill material as an impact causing activity
369	D-34	6.0	Sand cannot be used as a de-icing material on permeable friction course without adverse impacts to pollutant removal efficiencies.
370	D-37	7.2	Figure 7.1 inaccurately depicts WQPL. Does not include 500 +/- acre acquisition from Avana.
371	D-4	3.2	The Area of Influence defined for the project is not adequate. The project directly and indirectly affects the Barton Springs Segment of the Edwards Aquifer as stated in the DEIS. AOI boundaries should be expanded to include all of the Edwards Aquifer recharge zone from the project area north to Barton Springs and the Colorado River (Lady Bird Lake). Adjust the AOI accordingly, and reevaluate the indirect impacts.
372	D-40	7.3.1	Table 7.2. Describes Obar ranch as 1500 ac of potential development. Does not acknowledge that this tract is encumbered with a conservation easement that limits impervious cover to 1.7% gross area and only allows it to be subdivided into 15 parcels.
373	D-41	7.3.2	This section does not address loss of recharge due to directly impacted karst features and loss of subsurface catchment area. Loss of recharge to the aquifer constitutes take of endangered salamander species.
374	D-41	7.3.2	Klenzendorf et al. 2011 is a powerpoint presentation, and should not be cited as a technical reference.
375	D-41	7.3.2	Klenzendorf et al. 2011 shows less than 96% removal rates for permeable friction course for some metals, and shows export of nitrate from permeable friction course which is not addressed by the DEIS. This suggests that TSS alone is not an appropriate surrogate for all runoff constituents of concern
376	D-41	7.3.2	"Recent study data indicate that up to 96 percent of TSS (Klenzendorf et al., 2011) and up to 90 percent of heavy metals (Barrett and Standard, 2008) can be removed from highway runoff as it passes through these permeable road layers" . What is the fate of these contaminants once they are removed by PFC. At what point does PFC become "saturated" with filtered contaminants? Does PFC ever discharge filtered contaminants. Is TxDOT assuming that PFC will continuously and perpetually accumulate contaminants without reaching capacity? When maintenance is done to the road surface what are the plans to capture and retain contaminants held in the PFC so that it is not discharged as a slug of accumulated pollutants at one time? These issues should be addressed before assuming the long term benefits of PFC.
377	D-42	7.3.2	That conclusion that no adverse impacts to Barton Springs will occur is not supported. The distance of the project from Barton Springs is not relevant as City of Austin dye studies indicate rapid travel times from the project to Barton Springs and little to no subsurface attenuation of contaminants. Additionally, analysis only of TSS and not of other pollutants or loss of recharge was conducted in the DEIS to support this conclusion.
378	D-42	7.3.2	The DEIS correctly identifies that some pollutants including metals would not be removed by the proposed BMPs. The DEIS incorrectly concludes that these will have no adverse impacts because of the hardness of Barton Springs water. Only a quantitative analysis of the pollutant concentrations relative to the TCEQ aquatic life criteria for toxic substances can be used to make such an assertion.
379	D-42	7.3.2	"Because of the engineered BMPs that would allow for a TSS removal rate of at least 90 percent, the distance from the proposed project to Barton Springs, and the relatively small amount of stormwater that would recharge from the project area to the Edwards Aquifer, no adverse impact to springs would be expected with the proposed project." Where are the calculations/estimates on recharge occurring relative to project. Because this area has a very high concentration of karst, its relative contribution to recharge is likely higher than the assumptions used to generate this statement.

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380	D-43	7.3.2	No subsurface catchment area impacts for Flint Ridge Cave are assessed by the DEIS.
381	D-43	7.3.2	The project is not compliant with the City of Austin Save Our Springs Ordinance and does not achieve non-degradation standards.
382	D-43	7.3.2	No evaluation of the dilution of pollutants in the aquifer was conducted in the DEIS. The conclusion that minimal amounts of pollutants would enter the aquifer is not specific and should be quantified. What are acceptable amounts of pollutants that can enter the aquifer?
383	D-43	7.3.2	The goal of the Edwards Rules is non-degradation of existing groundwater quality (30 TAC 213.1). The project does not comply with this goal as existing groundwater quality will be degraded by the proposed project.
384	D-43	7.3.2	"The limits of the berm would extend far enough beyond the cave watershed to ensure there is no chance for untreated runoff to enter the cave. In addition, since the Build Alternative would remove a portion of its watershed, surface flow from an equivalent area would be re-routed to the Flint Ridge Cave drainage area to mitigate for the area being removed." there has been no discussion of the indirect effect of covering the surface and disrupting very discrete recharge that is not attributable to visible features and openings.
385	D-43	7.3.2	"Chances of contaminated water from a spill reaching Barton Springs are unlikely due in part to the implementation of hazardous material traps and filtration ponds, the distance between Barton Springs and the proposed project, and the vast volume of water in the aquifer (TxDOT, 2014)." This appears to assume that natural process in the karst aquifer will serve to remove pollutants for water recharged from the surface. This assumption is not substantiated by research and modeling included in the City of Austin's Barton Springs Catastrophic Spill Plan which was accepted by the U.S. Fish and Wildlife Service. It also assumes dilutions will mitigate contamination. Since BSS and ABS are very sensitive receptors this assumption should be substantiated by calculations and data.
386	D-43	7.3.2	"There are several relevant points with regard to dilution of pollutants in the groundwater: The COA "has enacted policies and made significant investments in the protection of water quality in the Barton Springs Zone of the Edwards Aquifer." So is TxDOT assuming that since COA does this elsewhere they are not obligated to?
387	D-43	7.3.2	"The use of PFC overlays has proven to yield water quality benefits. Recent study data indicate that up to 96 percent of TSS (Klenzendorf et al., 2011) and up to 90 percent of heavy metals (Barrett and Stanard, 2008) can be removed from highway runoff as it passes through these permeable road layers." The current TCEQ guidance for compliance with the Edwards Aquifer rules notes that pervious concrete is only allowed in the contributing zone, is not appropriate for highways, and requires reduced loads and speeds. The DEIS does not address how the proposed porous pavement will comply with TCEQ regulations and guidance.
388	D-44	7.3.2	"Texas' application to administer NPDES. EPA states:" - This section discusses increased monitoring and improved standards expected from the state but does not reveal whether those changes have ever been used successfully to achieve the level of protection proposed. This assumption by TxDOT is not backed by data.
389	D-45	7.3.2	This section inadequately describes indirect effects on golden-cheeked warblers. It does not address indirect effects on habitat adjacent to the ROW, habitat fragmentation, introduction of predators and other invasive species, and noise impacts.
390	D-45	7.3.2	"Golden-cheeked Warbler habitat within the AOI, approximately 13,223 acres of which fall outside of the proposed project ROW and thus have the potential to be indirectly impacted. However, 4,363 acres of this habitat, or 33 percent of it, fall within COA WQPLs and are therefore protected." There are portions of the SH45 alignment that are within 100M of occupied habitat. USFWS regulations consider this indirect effects on GCWA.

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391	D-46	7.3.2	" potential effects to groundwater resources include short-term potential for pollutants in stormwater runoff... " - Is this transient impact quantified anywhere?
392	D-46	7.3.2	" indirect impacts to surface water resources are not expected to be substantial. " - This is not substantiated anywhere and no attempt is made to quantify indirect impacts.
393	D-49	7.3.3	" ...constraining the amount of growth possible in the area... " If development potential is constrained by land preservation and lack of infrastructure how are population growth projections discussed previously justified?
394	D-50	7.3.3	" There are several ongoing or planned roadway projects in the AOI (FM 1626, Frate Barker Road, Manchaca Road, Old San Antonio Road bridge, proposed Escarpment Blvd extension into Hays County) " - are these considered as part of cumulative effects assessment?
395	D-53	7.3.3	" Hill Country Conservancy (HCC) is considering purchasing certain parcels for conservation, " - do they have funding to accomplish this. Does this in anyway contribute to the analysis of the DEIS
396	D-55	8.1.1	" The BCCP was a plan written by COA and Travis County in order to obtain an incidental take permit for Golden-cheeked Warblers, Black-capped Vireos, and six species of federally-endangered karst invertebrates under section 10(a)(1)(B) of the ESA. The take covered by the permit would include take associated with... " - This section seems to infer that this project and/or new development induced by the project are mitigated by BCCP. at this point in time none are, and they are not required to participate in BCCP by any regulation. This assumption is inaccurate.
397	D-56	8.1.2	Insufficient analysis is presented in the DEIS to support the conclusion of no take of endangered salamanders. The project would reduce the quantity of recharge to the aquifer. Only TSS load reduction was quantitatively evaluated, despite citing references that show pollutant removal for nutrient and metal constituents to be less than TSS removal. The actions could constitute take of salamanders
398	D-56	8.1.2	Water Quality Protection Lands purchased by the City of Austin are not for mitigation of the proposed project impacts.
399	D-56	8.1.2	" ...land set aside for the BCCP protects groundwater quality in the Barton Springs segment of the Edwards Aquifer " There is no land set aside for BCCP in the current delineation of the AOI. There is no analysis that shows that the BCCP is all that is needed to protect groundwater quality in the BSEA.
400	D-57	8.2	The DEIS does not specify if the proposed project will comply with the two Optional Enhanced Measures guidance documents for complying with the Edwards Rules as cited in this section. The DEIS does not specify a goal of achieving non-degradation of the Edwards Aquifer.
401	D-57	8.2	The most recent City of Austin watershed protection ordinance was passed in October 2013.
402	D-57	8.2	The proposed project does not comply with City of Austin development regulations.
403	D-57	8.2	The proposed project is not consistent with the Balcones Canyonlands Conservation Plan as it directly impacts Flint Ridge Cave without providing mitigation.
404	D-58	8.2	Although TCEQ has a goal that groundwater not be degraded in 30TAC213, "non-degradation" is not found in the regulation nor a definition thereof. As mentioned earlier, Chapter 26.401(b) states what nondegradation is not (no increase in pollutant discharge), but not what it is. TxDOT should propose a definition or rely on COA application of the SOS ordinance.E34

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405	D-58	8.2	"The Balcones Canyonlands Conservation Plan (BCCP), a regional Habitat Conservation Plan administered by the City of Austin and Travis County, protects over 28,000 acres in Travis County as the Balcones Canyonlands Preserve. The BCCP includes requirements to protect caves and other karst features where endangered species or species of concern have been found (COA-Travis County 1996)." - - Flint Ridge Cave is one of those caves. It is not clear how the DEIS considers it protected in light of this project. The DEIS states we are required to protect and it is not stated what action the preparers are implying the BCP permittees should take.
406	D-60	8.2	State if the proposed project will follow the City of Austin void mitigation procedures referenced.
407	D-60	8.2	The correct web address for the City of Austin codes and criteria is no longer AMLEGAL but is now: https://www.municode.com/library/tx/austin
408	D-63	9.0	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. Based on the amount of developable land available in the AOI, the pace of development being documented in Hays and Travis Counties, and the responses of local planning experts, the proposed project is not anticipated to generate significant induced development.
409	D-64	9.0	Indirect effects of the proposed project directly conflict with the City of Austin Imagine Austin comprehensive plan and are not consistent with City of Austin Land Development regulations.
410	D-64	9.0	The indirect effects of the proposed project would substantially worsen the condition of a sensitive resource, specifically the Edwards Aquifer and Barton Springs and habitat for endangered species, and thus additional mitigation is necessary.
411	D-7	4.0	More than 19% of the study area is undeveloped and developable land as stated in section 3. This is inconsistent with the statement that "there is limited development potential nearby"
412	D-7	4.0	Table 4-1: Questions 3 and 7 are answered "yes", yet they are posed as "and/or", not yes or no.
413	D-9	4.0	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. Planning experts from the jurisdictions within the AOI do not expect significant development to occur as a result of the proposed SH 45SW project. Experts contacted in Buda and Hays County asserted that the developments currently planned for the area would be constructed regardless of whether the proposed project were built or not. While experts with the City of Austin and Travis County acknowledged that they expect the roadway to affect the amount and rate of development in the AOI, both also pointed to the minimal effect the proposed project would have on development in the region, given the area's high rate of growth overall. Therefore, impacts to neighborhoods resulting from induced growth associated with the Build Alternative are not anticipated to be substantial.
414	H-1	1.0	On the water quality monitoring, it would be helpful to provide references to the various reports pertinent to the project including those specifically on SH45SW and Barton Springs water quality.
415	H-1	1.0	All of the available water quality data and trends published do not seem to be used in the report as stated.
416	H-2	1.0	Repeating request for clarity of "minimal negative impacts".
417	H-10	A.5	The international BMP database is referenced here, yet calculation methods proposed in it are not used for BMPs in series, monitoring methods proposed by it are not used, and pollutants besides TSS that are addressed in it are not considered. The TCEQ methods are used as the fallback again, which are inadequate for this application.

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418	H-11	3.0	A fundamentally flawed assumption is that all of these regulations will result in adequate protection of the sensitive resources involved. Most are state or nationwide and are the lowest common denominator for environmental protection. Some are better than others, but minimum regulatory controls are not enough for the impacts from SH45SW.
419	H-11	3.0	Regulatory measures are presented without much commitment to go beyond the lowest common denominator with the exception of the Edwards Aquifer rule TSS removal requirements. First, the stated use of only TSS as a parameter for BMP design does not result in adequate protection. Second, meeting the minimum threshold for both analysis and protection is not consistent with the stated TxDOT goal of making this roadway the most environmentally suitable sensitive built in the state as discussed at numerous meetings on the project.
420	H-11	3.1.1	Several places such as the discussion of 404 requirements are merely to document why the regulation doesn't apply and a lesser regulatory standard is made. The point being here that even though a NWP applies and a PCN is not required, the standard of protection for the most stringent permitting classification (individual 404) and associated standards could be used to bolster the commitment to non-degradation rather than the minimum required by regulations. The individual permit and associated regulations and guidance is an example.
421	H-12	3.1.1	The mention of the City's Land Development Code and SOS ordinance, and ECM is made, but no commitment is made here on whether the project will meet these standards for BMPs, impervious cover, and Critical Environmental Feature Protection. Critical to this commitment is a non-degradation standard (rather than goal) for this sensitive area.
422	H-12	3.1.2	Groundwater section doesn't mention BSEA as sole source aquifer and what protections this affords it that can be used. Re: lawsuit document that says because no federal funds were involved (1992), SSA regulations and review don't apply. As with other regulations, this could be used as an above and beyond for TxDOT to consider if there is additional to benefit water quality/quantity protection. It fits the definition of SSA regardless of federal funds involved.
423	H-12	3.1.2	Source water protection measures in the Safe Drinking Water act for sole source aquifers are not just for wellhead protection and other activities on a regional or supplier basis. These measures can be used to some degree at a project level such as the SH45SW project. The examples of such projects could be used as models of what would be necessary to prevent contamination of the BSEA. MOU between EPA and state highway administrations on sole source aquifer protection are common. This potential should be investigated further to meet superior environmental goals for the project.
424	H-12	3.1.2	Texas Water Code 26.401(b) states what nondegradation is not without stating what it is. Clean water act definition of degradation of surface waters is a negative change in water quality parameters that are significant from that present at the time the CWA was promulgated in 1974 as compared to today. It is an ambient water quality data driven determination. TCEQ definition of degradation is vague and useless in evaluating projects such as SH45SW. Therefore TxDOT should either propose a measurable definition of degradation and nondegradation or adopt that in the COA SOS ordinance.
425	H-12	3.1.2	"Any project located within the Barton Springs segment of the Edwards Aquifer would be required to follow all applicable regulations" This does not provide assurances that the regulations are adequate or that TxDOT is willing to go beyond the inadequate regulations currently in place at the state level or in other jurisdictions.
426	H-12	3.1.1	It is disingenuous to include local ordinances that protect water quality when the state does not follow them. If the state would choose to follow the City of Austin's' SOS Ordinance it would greatly reduce operational water quality impacts. An acknowledgment of the regulation does not constitute a commitment to comply with it.

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427	H-13	3.1.2	Since the regulations of the Barton Springs Edwards Aquifer Conservation District don't apply to state highway projects this paragraph should be replaced by one that discusses the application of the Consent Decree between the BSEACD and TxDOT to this proposed project.
428	H-14	3.2	The selection method for BMPs by decision tree does not replace an examination of what will work, what has worked, documented examples of what worked, or support of any kind for construction and operation of a highway in a sensitive karst aquifer watershed with implications for recreation, water supply, endangered species. Due diligence demands such in-depth analysis and effort beyond the status quo.
429	H-15	3.2	Rather than adopting a method for BMP selection from South Carolina, wouldn't it be simpler to just adopt the local City of Austin Environmental Criteria Manual.
430	H-17	3.2	Equations identify that efficiency is "(not in percent)" but not the units required
431	H-18	3.2	The list of non-structural BMPs are presented without any indication of commitments to use any of them on this project.
432	H-18	3.2	Why mention proprietary methods if they were "generally not successful", or else identify how they have been successful when incorporated into a project with other BMPs.
433	H-19	4.0	Please define the Engineering Work Group with approval authority over modifications to DEIS commitments. It appears that no independent review will be made for these modifications.
434	H-19	4.1	"This begins with a commitment to carry out all appropriate and permitted resource investigations and to adhere to subsequent commitments and recommendations" is mentioned here in relation to construction phase controls; however, the "resource investigation" of subsurface catchments of Flint Ridge Cave and the other significant features identified in the ongoing geological assessment have not been carried out. The DEIS should go no further without completion and use of these investigations.
435	H-19	4.1	Statements of measures to avoid impacts to groundwater quality and aquatic salamander habitat during drilling would appear to be reasonable methods applied anywhere and not driven by the sensitivity of the project. Methods of protection above and beyond the lowest common denominator should be listed in the DEIS, as these normal methods are assumed.
436	H-19	4.1.1	Site preparation "done in a way to minimize the amount of natural vegetation disturbed at any given time" should be included beyond staging and fencing. This would be part of a superior environmentally protective project. It should be posed as a chance for innovation to the E&S design group and documented here.
437	H-2	1.0	Mitigating effects of structural BMPs would appear to indicate a direct linkage between controls and aquatic life. Only control of TSS load was presented. No way to determine if this is enough to protect aquatic life and cannot be counted on to work alone. Avoidance should be considered first.
438	H-2	1.0	Please provide a definition for "minimal negative impacts".
439	H-20	4.1.1	Much of the section on SWP3 compliance could be referenced to the COA Environmental Criteria Manual rather than itemized here
440	H-20	4.1.1	Although mentioned in other sections, the intent to comply with all parts of the Optional Enhanced Measures should be listed under WPAP completion.
441	H-20	4.1.1	Natural buffers that are not to be disturbed should be protected by fences installed prior to initiation of any ground disturbance.
442	H-20	4.1.1	Referenced Text: "An Environmental Compliance Management Plan (ECMP) would be developed with water quality specific guidelines and trained personnel to ensure its success." - Please provide an outline of the proposed plan. Environmental Impact can not be determined from the intention to develop a plan.

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443	H-21	4.1.2	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>If dikes are found to induce off-site erosion, flow control measures (e.g. silt fences, rock berms) and sediment control measures (e.g. catchment basins, sandbag berms) would be installed to reduce erosion and prevent sediment from leaving the state-owned ROW to the greatest extent practicable.</i>
444	H-21	4.1.2	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>If swales are found to induce off-site erosion, flow control measures (e.g. silt fences, rock berms) and sediment control measures (e.g. catchment basins, sandbag berms) would be installed to reduce erosion and prevent sediment from leaving the state-owned ROW to the greatest extent practicable.</i>
445	H-21	4.1.2	"If dikes are found to induce off-site erosion..." and "If swales are found to induce off-site erosion....". Does this happen much with TxDOT designs of these features. If so, it gives little confidence that dikes and swales proposed for this project will be adequately designed and implemented commensurate with the sensitivity of the project area.
446	H-23	4.1.4	Construction of permanent controls "as early as practicable" is not a comforting commitment. Analogies to WTP4 by the COA would encourage TxDOT to make the commitment that permanent controls WILL be in place during construction phase or some other statement stronger than "early as practicable"
447	H-24	4.1.5	Spill and Haz. Materials Management sections fails to specifically reference (Use and Management of Containers,40 CFR 264.175 - 274.176) Small/Portable Secondary Containment. Although this may be covered in the Hazardous Materials Spill Protocols there is no way to verify with a broad reference.
448	H-24	4.1.4	For erosion controls, COA has had some success with coir logs. These might be useful around karst buffers.
449	H-24	4.1.5	Some separation of what is required versus what is proposed as a superior protection for the sensitivity of the project area should be attempted. The Spill and Hazardous Materials Management and Good Housekeeping "would be used" indicates the business as usual protocols and methods and not what would be above and beyond.
450	H-25	4.2	As in many projects in the BSEA, the geological features of significance are open to interpretation. Typically, geologists from the City identify a number of features conservatively and others that require additional investigation. The applicants geologists then evaluate features that are under dispute and some settlement is reached that is often less than adequately protective of recharge water quality and quantity than what is proposed by the City to begin with. Although the collaboration on surveys in this project is encouraging, superiority of the project would warrant an assumption of significance for recharge features where doubt remains, or further investigation is not scheduled..
451	H-25	4.2	COA has conducted a recent analysis of the surface catchment of Flint Ridge Cave surface catchment using 1 ft contour intervals (versus 2 ft used by the TxDOT consultant) and observations from the historic October 2013 rains. That analysis shows the surface catchment to be 57.8 acres versus the 43.8 used in the EIS.
452	H-25	4.2	This portion of the DEIS does not address the fact that a portion of the roadway ROW overlies the Flint Ridge Cave system and what potential impacts that might have.
453	H-25	4.2	Says 5.6 acres of Flint Ridge surface catchment will be covered by impervious surfaces but does not note how many acres of the catchment will be disturbed or diverted by the east side berm.

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454	H-25	4.2	The DEIS states that BMPs would maintain the flow to naturally occurring sensitive features to the extent practicable but then only mentions that the amount of (surface) water draining to Flint Ridge would be maintained. Since the DEIS does not contain the most recent karst data impacts on surface drainage to other karst features can not be determined. However, COA calculations of the drainage areas cutoff to other karst features indicate a significant reduction in area draining to features such as Hat Sink, Jubilee Sink, F29 and F136.
455	H-25	4.2	To prevent the possible infiltration of untreated roadway stormwater runoff through the soil matrix into Flint Ridge Cave, a bentonite (clay) liner would be installed up gradient from and adjacent to the berm. This would entail excavating approximately six inches of soil below the topsoil level, placing and compacting the bentonite liner, and covering with adequate topsoil to support revegetation. Since we do not know where the subsurface catchment area is, it's hard to say if this would work, and if so, then it would alter the hydrological regime further drying out the cave, thus negatively impacting the cave fauna.
456	H-26	4.2	A good example of a berm with bentonite liner should be provided to ascertain if this method will be successful or not. Since so much depends on it's operation to divert stormwater, an untried design with doubt as to long term viability should be approached with all due caution.
457	H-26	4.2	Use of bentonite to reduce infiltration of runoff through soils is creative and indirectly acknowledges that runoff does infiltrate through soils. However, the DEIS does not address how the bentonite will stay hydrated to prevent cracking which would allow runoff to pass through the bentonite layer and into the vadoze zone or how this BMP will be inspected
458	H-27	4.2	The Geological Assessment of the WPAP requirements is stated to identify other features within the SH45SW "footprint". This limited area, even smaller than the ROW would seem to be and inadequate boundary for the assessment. At least the ROW and hopefully extending to surface and subsurface drainage extents boundaries should be used for the assessment regardless of the TCEQ lowest common denominator.
459	H-27	4.2	This appears to be the only specific mention of the drip tests ongoing by the COA. This is the method of hydrogeological investigation endorsed by USFWS for use in showing adequate protection for BCP caves such as Flint Ridge and at minimum merits a discussion in the DEIS of how that data will be incorporated during design of the project.
460	H-27	4.2.1	<i>"The cave is currently gated, and bi-annual cave faunal surveys and cricket counts are being conducted."</i> WPD staff have recently bumped up surveys to quarterly, plus additional surveys 2 weeks after any dye injections. The DEIS does not address potential impacts to Flintridge cave and other nearby caves from introduced invasive species such as tawny crazy ants nor does it address site disturbance/ reduction in canopy cover thus improving conditions and densities or red imported fire ants.
461	H-31	4.2	It is somewhat alarming that the use of a vault over the Flint Ridge cave opening is being considered without an in-depth hydrological and hydraulic evaluation as part of the DEIS. However, leaving such decisions for the design phase are just as disturbing because no public review will be possible at that point.
462	H-31	4.2	COA has recently estimated the surface catchment to several karst features within the SH45 ROW and will provide them to TxDOT/CTRMA for use in the DEIS.
463	H-32	4.2.1	2nd bullet, states If features or their catchments cannot be avoided, the area may be bridged. If a bridge option is implemented, cave entrances must be protected as outlined below Why not construct a bridge over Flintridge cave, thus reducing impacts on the surface, subsurface, and cave footprint?

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464	H-33	4.2.2	Closure or mitigation of recharge features due to not practicable changes in alignment are referenced for the planning phase of the project. Given the final design contract is being decided during the review of the DEIS, it would seem that the planning phase is right now. However, the geological surveys are not complete and proposals for closure or mitigation of each feature have not been made.
465	H-33	4.2.2	TxDOT and CTRMA should be proactive and commit to protect all the natural buffers to all karst features that will remain within the ROW.
466	H-33	4.2.2	Karst features and undisturbed natural buffers should be fenced prior to any ground disturbance and the fencing can be used to help support the erosion/sedimentation controls for the feature.
467	H-33	4.2.2	The DEIS should commit to restoring natural runoff to all karst features in the project area that are cutoff or reduced as a result of the project similar to that proposed for Flint Ridge.
468	H-34	4.2.3	The protocol should add an item to have a U.S. Fish and Wildlife Service karst surveyor (biologist) inspect a void for potential karst invertebrate species or habitat. This protocol is described on page 3.8 of Appendix B of TCEQ Guidance Manual (RG-348) entitled "Complying with the Edwards Aquifer Rules: Technical Guidance Manual on Best Management Practices" - " <i>Optional Measures for the Protection of Water Quality in the Edwards Aquifer and Related Karst Features that May Be Habitat for Karst Dwelling Invertebrates.</i> "
469	H-34	4.2.4	Please change the reference of (30 TAC 213 A (14)) to (30 TAC §213 (14))
470	H-34	4.2.4	All voids encountered should be reported to TCEQ. Please add "and reported to TCEQ." after "inspected by a qualified geologist" in the first paragraph.
471	H-34	4.2.4	At the end of the first paragraph, add a statement that the protocols of 2.2 of RG-348A, "Optional Measures for the Protection of Water Quality in the Edwards Aquifer (Revised)" (Sept. 2007) will be followed. RG-348A is Appendix A of RG-348.
472	H-34	4.2.4	Bullet one should add "(less than 1 cubic foot)" after "small" and "located above a utility pipe embedment" after biological activity.
473	H-34	4.2.4	Bullet two should be revised by replacing the word "covered" with "sealed" and to add the phrase "along the trench floor or wall" after (18 inch minimum thickness).
474	H-34	4.2.4	Suggest adding a third bullet that reads: "Encase utility pipes for the distance of the void plus 5 feet on either end and ensure that a minimum of 6 inches of concrete surrounds the pipe."
475	H-34	4.2.4	Suggest adding a fourth bullet that reads: "Voids that intersect the plane of the trench floor that exceed 4 feet in any direction require a specific engineered solution to address environmental and structural integrity."
476	H-34	4.2.4	It does not address what to do if a void is encountered with "biological activity".
477	H-35	4.2.4	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. <i>In cases of voids with water flow, flow would be maintained to the greatest extent practicable,, the walls would be stabilized if necessary with planks or sandbags, concrete would be poured over the pipe, sealing the void.</i>
478	H-35	4.2.4	Change first bullet to eliminate all of the sentence after the comma and replace with the following text "with pipes or trench modifications to isolate and preserve flow paths." This would be in line with the requirements of 30 TAC §213.5(b)(4)(B)(iv) to provide pollution prevention and flow preservation.

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479	H-35	4.2.4	Add a second bullet that states "Mitigation will not occur until TCEQ has provided written authorization for the proposed method for a specific void."
480	H-35	4.3.1	"Permeable/Porous Friction Course (PFC) Pavement. PFC would be applied to the majority of SH 45SW road surfaces (exceptions being the bridge structures and the SUP). PFC has been shown to reduce up to 96 percent of TSS loads and 90 percent of heavy metal loads in stormwater runoff." The current TCEQ guidance for compliance with the Edwards Aquifer rules notes that pervious concrete is only allowed in the contributing zone, is not appropriate for highways, and requires reduced loads and speeds. The DEIS does not address how the proposed porous pavement will comply with TCEQ regulations and guidance.
481	H-39	4.4	Testing of permanent BMPs is mentioned over the life of the project and the goal of using this for restoring intended function if not working as designed. This is an admirable commitment and one that should be outlined in more detail in the DEIS. Where else would it be outlined if not in the DEIS since final design is the next stage. Structures for flow and water quality monitoring of both ambient surface and groundwater quality as well as BMPs need to be planned and included in the design, not as an afterthought.
482	H-41	5.1	Greatest Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should be referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered. Staged construction, limited soil disturbance/preservation of natural vegetation, and robust erosion and sedimentation control BMPs would be in place throughout construction to decrease erosion and ensure that off-site discharge of sediment is avoided or minimized to the greatest extent practicable.

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483	H-44	5.1	<p>Referenced text: "Current annual TSS loading over the Recharge Zone within the proposed project area is approximately 9,702 pounds TSS/year (see Table 5.1-3). Impervious surfaces associated with the proposed project would be expected to generate an annual TSS load of approximately 86,834 pounds/year. Currently proposed BMP configurations would exceed an 80 percent removal rate over the entire project. The Edwards Aquifer Rules (30 TAC 213) require the treatment of stormwater runoff from projects over the Edwards Aquifer Recharge Zone such that 80 percent of the incremental increase in TSS load generated is removed before the water is released. The portions of the proposed project over the Recharge Zone would be expected to generate a TSS load of 75,942 pounds/year. Design goals include configuring permanent, post-construction BMPs to achieve a TSS load reduction of at least 90 percent over the Edwards Aquifer Recharge Zone. Proposed BMP configurations over the Recharge Zone would exceed this goal and remove approximately 92.1 percent of the TSS load, thus leaving an annual load of 6,030 pounds of TSS. Although stormwater treatment is not required by over the Transition Zone (30 TAC 213), current design proposals would include stormwater treatment in these areas as well. Treatment of stormwater runoff would thus allow for a net decrease in annual TSS loading (an improvement over the No Build). Based on the net load calculated for the proposed project and rainfall data for the area (56.1 acres of impervious surface over the Recharge Zone and a 32 inch/year average rainfall), [(6,030 lbs. TSS/yr.) / (173.6 acre-feet of rainfall / year)], average TSS concentrations of stormwater runoff from the proposed project would average approximately 12.8 milligrams/liter (mg/L)." - This analysis relies upon TCEQ Edwards Aquifer Technical Guidance (EA TG) for sizing BMPs to compare pre-development and post-development loads. This analysis does not explicitly account for the actual size of the ponds, the contributing drainage area or the drawdown time as it relates to runoff capture efficiency. The TCEQ methodology does not explicitly account for loads that bypass the BMPS. The methodology uses several implicit assumptions to make the calculations simple, but less accurate. Additionally, Removal Efficiency is not a recommended procedure for measuring pollutant removal ("Use of Percent Removal to Evaluate BMP Performance." International BMP Database FAQ, 2007). The City of Austin has updated the Environmental Criteria Manual to reflect the state of the science in calculating pollutant removal in BMP performance (ECM 1.6.9). It is recommended that this project adopt current methods to evaluate stormwater load impacts to characterize environmental impacts. Additional examples of TCEQ deficiencies in allowable calculations include the treatment train equation. The EA TG Manual does not have a reference for this treatment train efficiency calculation. It appears that the TCEQ referenced the City of Austin's old Environmental Criteria Manual as a source for treatment train efficiency. Please provide reference that demonstrates the validity of the treatment train efficiency. The City of Austin no longer recognizes it as a valid method for calculating controls in series. Finally, the use of TCEQ rules is deficient in that it only considers TSS as a pollutant of concern. The proposed ponds have 80-90% removal efficiency for TSS, however, City of Austin Environmental Criteria Manual section 1.6.5 demonstrates significantly lower removal for pollutants of concern like Total Phosphorus (61%) and Total Nitrogen (31%). In conclusion, statements claiming that TSS loading after construction will be less than undeveloped conditions is optimistic and should be checked with a more robust method.</p>
484	H-46	5.1	<p>Greatest Extent Practicable is a term under much debate and a discuss of it's meaning in light of EPA guidance and case law is necessary at some point. The example does not cover all the measures that would define GEP. The quality and quantity of recharge reaching sensitive features would be preserved to the greatest extent practicable. For example, at Flint Ridge Cave where the proposed alignment would intersect a portion of the cave's surface drainage basin, measures would be taken to prevent the commingling of roadway stormwater and stormwater from undeveloped areas surrounding the cave, which would help preserve the current water quality of the cave's recharge.</p>

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485	H-47	5.1	HMTs consistent with the OEM are listed as a commitment here; however the statement that "The risk of harm to the Barton Springs salamander from hazardous material spills associated with the proposed SH 45SW would be reduced to insignificant levels by the capture and detainment capabilities of the proposed HMTs" would seem to be an overstatement. Spill risk assessment modeling would be necessary to substantiate this statement. Based on modeling done by the City of Austin and published in the Barton Springs Catastrophic Spill Plan, fuel spills in this area have the potential to quickly reach Barton Springs. A more detailed consideration of this potential should be assessed in the DEIS.
486	H-49	5.3	Again, both practicable and no effect are not substantiated by any objective definition or analyses. <i>There would be no direct effects to the Barton Springs or Austin blind salamanders resulting from construction and operation of the proposed project. The project would use BMPs that would allow for a TSS removal rate of at least 90 percent. During construction, the BMPs would include erosion controls and sediment controls. The completed project would include facilities to collect and treat runoff prior to discharging it offsite. These treatment structures would be installed as early as practicable in the construction phase to allow for the treatment of construction phase runoff. The project would comply with TCEQ's Edwards Aquifer Rules and TPDES standards. In addition, the project is more than nine miles from Barton Springs. Given all of these facts, the TSS load on the aquifer and Barton Springs would be less than the No- Build alternative. This shows that the project would have no effect on the species or their habitat. These controls limit the potential for cumulative effects, as discussed in the Cumulative Impacts Technical Report</i>
487	H-57	A.1	Evaluation on BMP alternatives on the basis of "general acceptance by TCEQ and in central Texas as an approved BMP on the proposed project site" does not constitute a verifiable analysis of BMP adequacy. No documentation can be made as to "approvals" and no statements of applicability to the proposed project site can be traced to TCEQ or central Texas.
488	H-64	A.2.1	Referenced Text: Table A.2.1 " <i>Efficiency of hay bale dikes and mulch socks is cited as 95% from COA 2012a</i> " - This information was taken from a powerpoint presentation that was on the City's website. It was authored by a private entity, not the city of Austin. The City of Austin refutes the claim that hay bale and mulch sock efficiency is 95%. Please provide peer reviewed journal article or other published data to support claims of efficiency. Please remove COA, 2012a as a reference.
489	H-65	A.3	This section starts a laundry list of BMPs, descriptions, and schematics that are better left as references than appendix-fodder if possible. In most cases, reference to the COA Environmental Criteria Manual would be better used as a primary source of this information without need to repeat it here.
490	H-65	A.4	As with A.3, this section is a laundry list of BMPs, descriptions, and schematics that are better left as references than appendix-fodder if possible. In most cases, reference to the COA Environmental Criteria Manual would be better used as a primary source of this information without need to repeat it here.
491	H-66	A.3.1	Maximum Extent Practicable is a term under much debate and a discussion of it's meaning in light of EPA guidance and case law is necessary at some point and should referenced here. At a minimum, it belongs in a glossary using some objective definition should be considered <i>Natural vegetative buffers should be maintained to the maximum extent practicable (COA, 2013; TCEQ, 2007b)</i>

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492	H-66	A.3.1.1	Referenced Text: " <i>Efficacy of silt fence is highly dependent upon the material, load and proper installation and maintenance of the fencing. Data collected during filtering tests on silt fence material indicated silt fence fabric can retain between 71 and 85 percent TSS depending on the fabric size selected and the sediment size distribution (Holloway, 2010). Silt fences cause runoff to pond, allowing heavier solids to settle out. Silt fences are most effective when used as retention BMPs and not relied upon to filter runoff. Proper installation is crucial to effectiveness and inspection should occur frequently, especially after rain events. Silt fences would be carried forward for use in the proposed SH 45SW project, and would be used in situations with flow disruption and water ponding the primary focus of their use as opposed to reliance on their filtering capabilities. A schematic illustration of a silt fence taken from TCEQ, (2005) is shown in Figure A.3-1.</i> " - Since it is acknowledged that silt fence performs as a retention BMP, not filtration, please remove reference from Table A.1-2 that provides filter efficiency from the Holloway, 2010 report. Please refer to "An evaluation of geotextiles for temporary sediment control", Barrett et al, 1998 and note that typical TSS concentration from silt fence controls is approximately 500 mg/l. This number should be used in all loading calculations that attempt to quantify to 90% reduction in loadings from construction phase.
493	H-8	3.1.1	A study of pollutants on rooftops adjacent to MoPac north of the Colorado River found significant atmospheric deposition of PAHs, arsenic, chromium, and copper over 300 ft from the road surface (Mahler and Van Metre, 2003). Since 38 acres of the land for the ROW was purchase from blocks of land acquired for water quality protection and adjacent land still has that purpose, the DEIS should address impacts from airborne pollutants from the highway on these lands and how that will be mitigated.
494	I-10	6.3	Replace the statement - " <i>In the Travis/Hays County area, air quality is managed regionally by the Capital Area Metropolitan Planning Organization in coordination with TxDOT and TCEQ.</i> " to read as "In the Travis/Hays County area, air quality is managed regionally by the Capital Area Council of Governments in coordination with EPA and TCEQ."
495	I-26	5.1.2	The extent of the population range of the Austin blind salamander, which is a subterranean cryptic species, is not fully known. The species identification of the Eurycea salamander located west of the project is in question, and may not be Eurycea sosorum.
496	I-27	5.1.2	There is no Bendik and Turner 2000 report. Bendik and Turner 2011 analyses did indicate potential density dependent growth of Barton Springs salamander populations, but it is not accurate to state that this is inconsistent with "populations that are close to extinction." By definition as an endangered species, the populations are on a trend towards extinction.
497	I-27	5.1.2	The statement that there have been no significant increases or decreases in populations of Eurycea at Barton Springs is not accurate. Population changes occur in response to hydrologic conditions, as well as in response to habitat modification and restoration.
498	I-27	5.1.2	The City of Austin did not modify survey protocols in 1998 to look for Austin blind salamanders
499	I-29	5.1.2	Provide a source for the listed impervious cover calculations for 2012.
500	I-29	5.1.2	Cite more recent City of Austin temporal trend analysis for Barton Springs water quality (Herrington and Hiers 2010), which did identify degrading temporal trends in Barton Springs including for nitrogen.
501	I-30	5.1.2	Conclusions on Barton Springs salamander life history referenced from Gillespie 2011 are not accurate. That is one possible life history, and information from Barton Springs salamanders does not directly support that conclusion. Barton Springs salamanders do not have high fecundity, and the statement relating to the possibility that the Barton Springs salamander can rebound from few remaining individuals ignores the genetic bottleneck created by that life history and is not supported by monitoring data.
502	I-31	5.1.2	This section only addresses water quality impacts and does not include water quantity impacts to the endangered salamanders.

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503	I-37	5.2	More than 750,000 people visit Barton Springs annually
504	I-38	5.2	Please check references against the bibliography. Herrington and Hiers was published in 2010.
505	I-50	5.3	The City of Austin collects data from Bear Creek and Slaughter Creek through the Environmental Integrity Index (EII). EII data is available online as well at http://austintexas.gov/department/environmental-integrity-index and at https://data.austintexas.gov/Environmental/Water-Quality-Sampling-Data/5tye-7ray Please note that the Onion Creek data shown from LCRA's website was collected by the City of Austin and provided to LCRA and TCEQ thru the Clean Rivers Program QAPP.
506	I-50	5.3	Graphs show an apparent degrading trend over time for some constituents including dissolved oxygen. Perform a trend analysis and provide equations and r2 values with trend lines shown on graphs.
507	I-50	5.3	Provide a reference to support the statement that "conductance in surface water increases naturally as contact time with soil and stream bed increases..."
508	I-55	5.3	The most recent City of Austin watershed protection ordinance was passed in October 2013.
509	I-55	5.3	Additional bond money for water quality protection lands were approved in 2012.
510	I-55	5.3	The data shown was collected by the City of Austin. Provide statistical analysis to support the claim that these water quality parameters are stable. Dissolved oxygen appears to be decreasing over time from the graphs shown.
511	I-59	5.3	Flow graph should be on log scale to show prevalence of base flow conditions.
512	I-60	5.3	Provide citations and statistical analysis that supports the conclusions that water quality within the RSA is stable, and is influenced by increasing regulatory protection measures.
513	I-61	6.1.2	Because of the loss of quality and quantity of recharge to the aquifer, there are indirect impacts to federally listed endangered species as a result of the proposed project. Any impacts to endangered species constitute take and are significant.
514	I-62	6.1.2	The DEIS only analyzes load reductions for TSS, and thus conclusions that the BMPs will maintain water quality are not supported. Removal rates have only been calculated for TSS, and this should be explicitly stated.
515	I-62	6.2	There are not "potential" reductions in recharge if karst features are directly impacted. These are direct impacts to recharge quantity.
516	I-62	6.2	No quantification of the loss of recharge was provided, and thus the statement that impervious cover as a result of the proposed project would "slightly" reduce recharge is not supported and invalid.
517	I-68	7.0	Were the projects identified in Table 7.3 included in the traffic impact analysis? Please identify which, if any, were included in traffic modeling.
518	I-75	8.3	Any indirect impacts to endangered species are significant. The proposed project will reduce the quality and quantity of recharge to the Edwards Aquifer, and thus could constitute a taking of listed species and require a permit from the US Fish and Wildlife Service

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519	I-75	8.3	Significant is also a term of much debate in EIS development and other similar regulations. In TxDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>There would be no direct effects to the Barton Springs and Austin blind salamanders from the proposed project. Through the use of BMPs, adherence to Edwards Aquifer rules through the preparation of a WPAP, and adherence to TPDES through the preparation of a SW3P, significant indirect impacts to the Barton Springs and Austin blind salamanders are not expected as a result of the project. Reasonably foreseeable projects undertaken within the RSA would be subject to regulation under the ESA if it is anticipated that they would impact either the Barton Springs salamander or the Austin Blind salamander or their habitat.</i>
520	I-76	8.3	Any indirect impacts to endangered species are significant. The proposed project will reduce the quality and quantity of recharge to the Edwards Aquifer, and thus could constitute a taking of listed species and require a permit from the US Fish and Wildlife Service
521	I-76	8.4	Water quality degradation over time at Barton Springs demonstrates that Edwards Rules are not sufficient to preclude impacts to endangered species and maintain the quality of water in the Edwards Aquifer.
522	I-8	4.0	The project will negatively impact the quantity and quality of water recharging the Edwards Aquifer by increasing impervious cover, increasing the probability of occurrence of hazardous material spills, directly impacting surface drainage areas of karst features and directly impacting subsurface drainage area of karst features. This has a direct impact on endangered salamanders at Barton Springs, and should be included in the analyses of direct impacts. Additionally, the DEIS does not address any subsurface drainage area impacts to affected karst features.
523	I-8	4.0	The DEIS references reports in other sections (see Herrington and Hiers 2010) that document declining water quality in Barton Springs over time that is not included in this table.
524	I-86	9.1.2	This section does not address the loss of recharge through affected karst features and addition of impervious cover over the recharge zone.
525	I-86	9.1.2	Pollutant removal rates were only calculated for TSS, and not for other constituents with lower removal rates that would adversely impact the quality of water recharging the aquifer.
526	I-86	9.2	This section does not address the loss of recharge through affected karst features and addition of impervious cover over the recharge zone.
527	I-87	9.2	Will the project comply with the requirements of both of the cited Optional Enhanced Measures of the Edwards Rules?
528	I-88	9.2	How does impervious cover added by the project within the TXDOT right-of-way (percent of impervious cover within the land owned by TXDOT) in the project area compare to the listed City of Austin regulatory limits?
529	I-88	9.2	The most recent City of Austin watershed protection ordinance was passed in October 2013.
530	I-9	4.0	The DEIS analyzes only TSS removal, and does not quantify impacts for any other constituents even though the DEIS includes tables showing removal efficiencies for some constituents of concern to be lower than the reported TSS removal values.
531	I-9	4.0	Water quality declines have been documented in the Edwards Aquifer. No references are provided in the DEIS stating the Edwards Aquifer water quality is not declining over time. Thus, the statement "The resource is considered by some to be threatened..." is not supported unless references stating that water quality is not declining are provided.
532	I-90	9.3.2	Removal rates for constituents other than TSS are not presented in the DEIS.

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533	I-93	10.0	Due to the lack of quantitative analyses presented in Appendix I as stated in previous comments, the Cumulative Impacts assessment is incomplete and the conclusions stating that impacts will be limited is wholly unsupported. Additionally, there was no consideration of the cumulative impacts of the other planned roadway projects currently underway by TXDOT over the recharge zone of the Edwards Aquifer.
534	I-93	10.0	Significant is also a term of much debate in EIS development and other similar regulations. In TXDOT guidance, this term is defined and the analysis listed below does not provide adequate support for the conclusion of insignificance. <i>Based on this analysis, given the limited direct impacts that would be caused by the proposed limited access project with extensive BMPs for before, during, and after construction, and the incremental contribution the proposed roadway would make toward induced development in the AOI, in the context of the continuing trends of land use development and conservation initiatives underway within the RSAs, the proposed project, in conjunction with other past, present, and reasonably foreseeable future projects, may contribute to cumulative impacts but is not likely to cause significant cumulative impacts.</i>

Attachment
Photos of TxDOT Erosion and Sedimentation BMP Failures
US290 W at ACC Pinnacle 10/13/13

