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The following comments are submitted on behalf of Travis County Department of Environmental Quality.

TRAVIS COUNTY, TEXAS
COMMENTS SUBMITTED TO THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Edwards Aquifer Protection Program (EAPP)
Public Hearing Comments and Recommendations

Submitted by: Travis County, Texas

Subject: Recommendations for Strengthening Protection of the Edwards Aquifer Contributing and Recharge Zones

I. Introduction and Purpose

Travis County respectfully submits the following comments and recommendations for consideration by the Texas Commission on Environmental Quality (TCEQ) regarding the Edwards Aquifer Protection Program (EAPP).

Central Texas continues to experience substantial population growth and associated land-use changes within the Edwards Aquifer Contributing and Recharge Zones. These changes can affect surface-water drainage, groundwater recharge, pollutant transport, and the long-term protection of drinking-water resources.

The Edwards Aquifer is a highly permeable karst aquifer system that is particularly vulnerable to contamination through fractures, dissolution-enlarged conduits, sinkholes, and other geologic features. Effective protection therefore requires a coordinated approach to wastewater management, stormwater treatment, land-use planning, aquifer recharge, technical standards, and regulatory oversight.

Travis County recommends that TCEQ evaluate the following proposals through a science-based stakeholder process and consider appropriate revisions to EAPP rules, technical guidance, permitting requirements, and implementation practices.

II. Relationship Between the Edwards Aquifer Contributing and Recharge Zones

A. Hydrogeologic Connection and Vulnerability

Much of the growth occurring in Central Texas is located within the EAPP Contributing and Recharge Zones. Urban development alters natural topography, drainage patterns, vegetation, and the movement of water across the landscape. At the same time, wastewater disposal through land application and other methods is becoming increasingly prevalent throughout the Edwards Plateau.

Under the current regulatory framework, wastewater discharges are subject to different requirements depending on their location relative to the Edwards Aquifer

Recharge Zone. However, the hydrologic relationship between the Contributing and Recharge Zones warrants consideration when evaluating potential contamination pathways.

A substantial portion of recharge to the Edwards Aquifer occurs when streams draining the Contributing Zone cross the Recharge Zone and infiltrate through solution-enlarged conduits, sinkholes, and other openings in streambeds (Puente, 1978; Maclay and Land, 1988; Hunt et al., 2019).

The Edwards Aquifer is among the most permeable and productive karst aquifer systems in the United States. Its high porosity and permeability result primarily from the dissolution of limestone by slightly acidic water, while fractures and other geologic features can further facilitate groundwater movement.

The depth of aquifer host rock below ground surface varies throughout the region. Consequently, some areas within the Contributing Zone may be more vulnerable to contamination than others.

Flores et al. (2020) identified potential pathways connecting surface water in Helotes Creek to the Recharge Zone through a quarry. The study indicates that locations near streams within the Contributing Zone may be particularly vulnerable where wastewater land application allows a portion of the pollutant load to enter surface waters.

The study further identifies relatively short particle travel times from Helotes Creek into the Cavernous Glen Rose Formation as an additional reason for concern regarding wastewater disposal near streams.

B. Implications for Aquifer Protection

Surface-water infiltration within the Contributing Zone can contribute to groundwater movement toward the Edwards Aquifer, including through intraformational flow from the Trinity Aquifer. Research indicates that hydraulic communication between the upper Glen Rose Formation, the uppermost unit of the Trinity Aquifer, and the Edwards Aquifer may be greater than previously understood (Flores et al., 2020, p. 83).

These findings suggest that the hydrologic distinction between the Contributing and Recharge Zones may not fully reflect the degree of groundwater connectivity in all locations.

In certain areas, the Contributing Zone may function as an important component of the Edwards Aquifer recharge system. Accordingly, Travis County recommends that

TCEQ evaluate whether existing regulatory distinctions adequately account for localized groundwater vulnerability, particularly in areas near streams, shallow limestone, fractures, conduits, and other sensitive karst features.

III. Stakeholder Collaboration and Review of Current Science

Travis County requests that TCEQ establish a stakeholder process to review current scientific research and evaluate potential modifications to EAPP rules and technical guidance.

A collaborative process would allow regulatory agencies, local governments, water utilities, technical experts, environmental organizations, and other stakeholders to:

- Review current hydrogeologic research and water-quality monitoring data.
- Identify gaps in existing regulatory protections.
- Evaluate the effectiveness of current wastewater and stormwater management practices.
- Coordinate research and implementation efforts to reduce duplication.
- Develop practical, technically supported recommendations for improving aquifer protection.

Travis County believes that a formal stakeholder process would support TCEQ's commitment to science-based decision-making, effective and current regulations, and meaningful public participation.

IV. Source Water Protection and Sole Source Aquifer Programs

A. EPA Source Water Protection Program

In conjunction with the proposed stakeholder process, Travis County recommends that TCEQ evaluate opportunities to use the U.S. Environmental Protection Agency's (EPA) Source Water Protection Program to strengthen protection of the Edwards Aquifer.

Source water protection efforts seek to safeguard drinking-water supplies through pollution prevention, voluntary partnerships, planning tools, and coordinated implementation measures.

Potential initiatives include:

- Riparian-zone restoration to reduce runoff pollution.
- Streambank stabilization to limit erosion and sedimentation.
- Land protection and conservation easements.
- Agricultural and forestry best management practices.
- Stormwater pollution prevention measures.
- Local ordinances addressing activities within source-water or wellhead-protection areas.
- Emergency response planning.
- Education and outreach for industry, businesses, and the public.

B. Evaluation of Sole Source Aquifer Designation

Travis County also recommends that TCEQ evaluate whether pursuing a Sole Source Aquifer (SSA) designation for the Edwards Aquifer, or an appropriate portion of the system, would provide additional protection.

Section 1424(e) of the Safe Drinking Water Act authorizes the EPA Administrator to make a Sole Source Aquifer determination when an aquifer is the sole or principal drinking-water source for an area and contamination would create a significant hazard to public health.

TCEQ could assess the applicability of this designation and coordinate with EPA and other relevant agencies regarding the necessary technical documentation, eligibility criteria, and potential benefits.

The County recommends evaluating whether Source Water Protection and Sole Source Aquifer initiatives could provide additional resources or opportunities to support the protective measures described above.

V. Wastewater Infiltration, Land Application, and Discharge

A. Recommended TLAP/TPDES Requirements Within the Contributing Zone

In the absence of a prohibition on effluent discharge within the EAPP Contributing Zone, Travis County recommends that TCEQ evaluate additional safeguards for proposed Texas Land Application Permits (TLAPs) and Texas Pollutant Discharge Elimination System (TPDES) permits.

One potential safeguard would be to establish a minimum limestone depth of 450 feet within a two-mile radius of a proposed TLAP discharge, in conjunction with adequate soil depth and vegetative coverage. This recommendation is intended to reduce the risk of contamination associated with fractures, conduits, dissolution channels, sinkholes, and other karst features.

Research conducted within the Edwards Plateau supports consideration of the hydrologic connection between certain karst features in the northwestern portions of the Contributing and Recharge Zones (DOI, 2020). In some areas, the depth to aquifer host rock is reported to be less than approximately 300 feet, compared with depths exceeding 600 feet farther east.

Travis County recommends that TCEQ evaluate the relationship between limestone depth, groundwater connectivity, and contamination vulnerability when establishing permit conditions for wastewater disposal within the Contributing Zone.

B. Additional Recommendations for Texas Land Application Permits

Many wastewater treatment facilities in Central Texas use irrigation and land application to dispose of treated wastewater effluent. Travis County recommends strengthening EAPP requirements applicable to wastewater treatment, storage, and irrigation systems through the following measures:

1. Storage capacity: Increase storage requirements for subsurface irrigation systems to levels equivalent to those currently required for surface irrigation systems.

2. Effluent monitoring: Require monitoring of effluent for total nitrogen and total phosphorus.

3. Soil moisture monitoring: Require automatic shutoff systems using tensiometers or equivalent soil moisture monitoring technology to prevent application when soil conditions are unsuitable.

4. Surface-water monitoring: Require baseline water-quality sampling of adjacent creeks and quarterly sampling following rainfall events associated with irrigation activities.

5. Stream buffers: Measure required buffers from the edge of the creek bed rather than the stream centerline to maintain adequate protection as stream channels change due to erosion and development.

6. Lift station standards: Establish more stringent requirements for wastewater lift stations, informed by standards implemented by the City of Austin.

These measures would provide additional safeguards against wastewater runoff, excessive nutrient loading, and the movement of contaminants into surface water and groundwater.

C. Soil-Depth Criteria for Wastewater Dispersal

Travis County recommends that TCEQ evaluate Wisconsin Department of Natural Resources Administrative Code NR 151 as a potential model for establishing soil-depth requirements and wastewater dispersal restrictions in karst environments.

Karst regions frequently contain shallow soils, in some locations less than 36 inches deep. Such soils may provide limited filtration and attenuation of nutrients, pathogens, and other groundwater contaminants before wastewater reaches fractured or permeable bedrock.

The following soil-depth classifications are recommended for consideration:

- Unsuitable conditions: Soil depths of less than 24 inches above limestone should generally be considered unsuitable for conventional wastewater dispersal because of the potential for rapid contaminant transport. Restrictions should be evaluated for wastewater or manure application over shallow, fractured bedrock.

- Provisionally suitable conditions: Soil depths between 24 and 42 inches may be considered only under strict conditions, potentially requiring advanced engineering controls and additional safeguards.

- Minimum regulatory separation: Evaluate a minimum of 36 inches of suitable, unsaturated soil between the bottom of a wastewater distribution system and the top of limestone bedrock.

- Preferred separation: Consider a soil buffer of 10 feet or more in karst areas where site conditions permit, to provide additional opportunity for attenuation of pathogens and nutrients.

Travis County recommends that TCEQ assess these criteria against Texas-specific hydrogeologic conditions before establishing final requirements.

D. Effluent Quality, Treatment, and Beneficial Reuse

Based on studies associated with the Proposition 1 Edwards Aquifer Protection Projects in the urbanized areas of Bexar County, Travis County recommends that TCEQ evaluate more stringent effluent quality standards for facilities affecting the Edwards Aquifer.

The following effluent concentrations are recommended for consideration:

Parameter	Recommended concentration
Biochemical Oxygen Demand (BOD)	5 mg/L
Total Suspended Solids (TSS)	5 mg/L
Ammonia Nitrogen	2 mg/L
Total Phosphorus	0.001 mg/L

The proposed total phosphorus concentration of 0.001 mg/L is intended to reflect the highest natural phosphorus level identified in pristine Texas Hill Country streams without excess algae growth, as described in the cited source material.

Travis County also recommends a "One Water" approach to wastewater management that prioritizes beneficial reuse and reduces the need for surface-water discharge.

Specifically, TCEQ should evaluate the feasibility of requiring 100% beneficial reuse of treated effluent under applicable authorizations, including 30 TAC Chapter 210, where technically and legally feasible. Reuse opportunities may include appropriate nonpotable applications and other authorized uses.

Where complete reuse is not feasible, the remaining effluent could be managed through land application, subject to appropriate permitting, site suitability, and protective controls. This approach may require the responsible entity to acquire sufficient land and obtain the necessary TLAP authorization from TCEQ.

Finally, Travis County recommends that TCEQ evaluate requirements for a licensed Class A wastewater operator to oversee and manage the day-to-day activities of TPDES-permitted facilities located within the Edwards Aquifer Contributing Zone.

VI. Stormwater Management

A. Revisions to EAPP Technical Guidance Manual RG-348

Travis County recommends that TCEQ revise the Edwards Aquifer Protection Program Technical Guidance Manual, RG-348, to better accommodate low-impact development (LID), stormwater quality protection, and groundwater recharge.

A growing body of national research supports the use of LID practices to address the effects of urban development, including flooding, downstream channel erosion, and

habitat degradation. LID seeks to maintain or approximate predevelopment runoff conditions through practices that manage stormwater close to its source, promote evapotranspiration, and, where appropriate, allow infiltration.

Within the Edwards Aquifer region, however, the use of infiltration-based practices can be complicated by existing requirements for impermeable liners in certain best management practices (BMPs).

The EAPP rules do not categorically prohibit stormwater infiltration. Additionally, 30 TAC Chapter 331 provides for authorization of certain improved sinkholes or caves in karst areas that inject stormwater, floodwater, or groundwater.

These provisions raise an important technical question: what stormwater quality standards and treatment conditions are appropriate when infiltration is proposed in a sensitive karst environment?

Natural recharge may involve water moving through soil containing animal waste and other organic material. Accordingly, standards for stormwater infiltration in developed areas should be based on a realistic, science-based evaluation of pollutant risks, treatment performance, and the potential for direct groundwater contamination.

Travis County recommends that TCEQ evaluate the following revisions to permanent BMP requirements.

1. Evaluate Alternative Liner Designs

Evaluate replacing impermeable liners with engineered, permeable or partially permeable liner systems where hydrogeologic conditions demonstrate that infiltration can occur without unacceptable risk to groundwater quality.

Under the proposed approach, the treatment system would incorporate a minimum of 12 inches of biologically active soil with vegetation to support stormwater filtration and pollutant treatment.

Sensitive geologic features that could provide direct pathways to the aquifer should be identified and appropriately addressed before installation. Rocky soil may be acceptable as liner material provided sharp edges do not damage the liner and coarse material greater than 0.5 inches in diameter does not exceed 30% of the soil volume.

Any alternative liner design should be subject to appropriate engineering criteria, site-specific evaluation, and protective measures for sensitive karst features.

2. Incorporate Internal Water Storage

Require underdrain configurations that provide internal water storage (IWS) in sand filters and bioretention systems where appropriate.

Internal water storage can improve treatment performance and support infiltration between storm events. Underdrains may remain necessary at sites with low-permeability soils, but their configuration should be evaluated to maximize water-quality benefits and support recharge where feasible.

3. Revise Bioretention Media Separation Requirements

Evaluate eliminating filter fabric between bioretention filtration media and the gravel underdrain and replacing it with a two-inch choker layer consisting of No. 8 or No. 89 stone.

This configuration may allow plant roots to access underlying soil, potentially improving plant survivability during dry conditions. Any revision should account for filtration performance, clogging potential, and long-term maintenance requirements.

4. Allow Appropriate Roof Runoff Infiltration

Evaluate allowing roof runoff to be used for direct aquifer recharge following sand filtration or biofiltration, provided that the runoff is not mixed with runoff from other portions of the site.

Roof runoff is generally less exposed to pollutants associated with paved surfaces and vehicle activity. Where appropriate treatment and site conditions are demonstrated, capturing and infiltrating roof runoff could increase recharge and help offset groundwater demand associated with new development.

B. Temporary Best Management Practices

Travis County recommends revising temporary construction BMP requirements to promote improved stormwater quality and reduce soil compaction.

Research by Eck et al. (2012), along with operational experience such as that associated with City of Austin Water Treatment Plant 4, indicates that mulch can improve stormwater discharge quality at construction sites.

The County recommends evaluating requirements that would:

1. Require vegetation removed during land-clearing activities to be chipped or shredded on-site and reused as mulch to cover disturbed areas to the extent feasible.

2. Require mulch to be applied at a depth of three-quarters of an inch along pathways traversed by heavy construction equipment before site work begins, where appropriate.

These measures are intended to reduce erosion, improve sediment control, limit soil compaction, and preserve opportunities for stormwater infiltration.

C. Review of Stormwater BMP Performance Standards

Travis County recommends that TCEQ review stormwater BMP performance standards in relation to the stated purpose of 30 TAC § 213.1 and the protection of the Edwards Aquifer.

The review should incorporate current engineering information, hydrogeologic research, and available water-quality data from Edwards Aquifer springs, wells, and hydrologically connected surface waters.

Multiple entities, including the City of Austin, have generated information concerning the performance of structural stormwater controls. In addition, water-quality trend analyses for springs, wells, and connected surface-water resources have identified degradation over time for certain parameters at Barton Springs.

Travis County recommends that TCEQ:

- Compile and evaluate current information on the pollutant-removal performance of structural stormwater controls.
- Compare BMP performance data with observed water-quality conditions in springs, wells, and connected surface waters.
- Evaluate whether existing standards adequately address the pollutants and hydrologic pathways of concern.
- Consider revisions to performance standards based on current engineering and hydrogeologic data.

The existing 80% total suspended solids removal standard remains an important benchmark under the EAPP rules, including for critical infrastructure projects such as State Highway 45 Southwest. However, the County recommends evaluating

whether reliance on this benchmark alone adequately protects aquifer water quality under current development conditions.

D. Water Pollution Abatement Plan Review and Inspection Capacity

Travis County is concerned that Water Pollution Abatement Plans (WPAPs) may not consistently receive proactive field verification and that inspections may occur primarily in response to complaints.

This approach may leave certain development sites without adequate field oversight, particularly greenfield developments that are not readily visible or accessible to the public.

The County recommends that TCEQ evaluate opportunities to strengthen field inspection and compliance verification for WPAPs.

Additionally, Travis County requests that TCEQ provide sufficient funding and staffing for qualified, experienced personnel responsible for EAPP implementation, plan review, inspection, and enforcement.

The County recognizes the importance of timely permit processing. However, the need to process WPAPs within a 60-day period, rather than the 90-day period provided under the EAPP rules, may create challenges for comprehensive technical review.

Travis County recommends that TCEQ evaluate whether the applicable review period and staffing resources adequately support thorough, technically sound reviews while maintaining an efficient permitting process.

Where appropriate and legally authorized, TCEQ should also evaluate opportunities to delegate monitoring and enforcement responsibilities to qualified local agencies with the capacity and geographic familiarity to perform these functions effectively.

E. Optional Water Quality Measures Under RG-348

Travis County recommends that TCEQ reevaluate the Optional Water Quality Measures identified in Appendices A and B of RG-348.

The County is concerned that the existing optional measures may not provide adequate protection for sensitive species and ecological resources associated with the Edwards Aquifer system.

The concerns identified in the source material include:

- Failure to establish impervious-cover limits.

- Reliance on total suspended solids as the sole monitored water-quality parameter.
- Allowance for increases in pollutant loading from developed properties.
- Provisions allowing sensitive recharge features to be sealed rather than prioritizing preservation and appropriate setbacks.

Travis County recommends that TCEQ evaluate stronger requirements for impervious-cover management, pollutant monitoring, protection of sensitive geologic features, and prevention of increases in stormwater pollutant loads.

1. Recommended Impervious-Cover Limits

The County recommends evaluating the following maximum impervious-cover limits:

EAPP zone	Recommended maximum impervious cover
Recharge Zone	10%
Contributing Zone	15%

These proposed limits are intended to reduce runoff-related pollution, preserve natural hydrologic functions, and maintain the long-term water quality of the Edwards Aquifer.

TCEQ should evaluate these limits in light of the applicable scientific evidence, existing regulatory requirements, and potential implementation considerations.

2. Stormwater Management Permitting and Public Participation

Travis County recommends that TCEQ evaluate establishing a permitting process for stormwater management associated with new development within the Edwards Aquifer Contributing and Recharge Zones.

Stormwater runoff and flooding can transport pollutants, alter natural drainage patterns, and affect surface-water and groundwater resources. A formal review process could provide a more consistent framework for evaluating proposed stormwater management plans and their potential environmental impacts.

The County is also concerned that the existing framework may not consistently provide the public with an opportunity to review and comment on stormwater management plans that could substantially affect surface-water or groundwater resources.

A permitting process that includes appropriate public notice and participation would allow interested parties to review proposed stormwater management measures, submit comments, and pursue available administrative remedies where warranted.

Travis County recommends that TCEQ evaluate how such a process could be implemented consistently with existing statutory authority and the objectives of the EAPP.

VII. Summary of Recommendations

Travis County recommends that TCEQ consider the following actions to strengthen protection of the Edwards Aquifer:

1. Convene a stakeholder process to review current scientific research and evaluate potential revisions to EAPP rules and technical guidance.

2. Evaluate hydrogeologic connectivity between the Contributing and Recharge Zones, including the implications of groundwater movement through the Trinity Aquifer and localized karst features.

3. Strengthen wastewater permitting safeguards for land application and discharge within the Contributing Zone, including consideration of limestone depth, soil separation, nutrient monitoring, storage capacity, and stream buffers.

4. Evaluate more stringent effluent standards and promote beneficial reuse of treated wastewater where technically and legally feasible.

5. Revise stormwater BMP guidance to improve pollutant removal, accommodate appropriate low-impact development practices, and support safe groundwater recharge.

6. Strengthen temporary construction controls to reduce erosion, sedimentation, and soil compaction.

7. Review BMP performance standards using current engineering data, hydrogeologic research, and observed water-quality trends.

8. Improve WPAP oversight through adequate staffing, proactive inspections, and evaluation of appropriate local-government participation.

9. Reevaluate optional water-quality measures and consider impervious-cover limits of 10% in the Recharge Zone and 15% in the Contributing Zone.

10. Evaluate stormwater permitting and public participation mechanisms for development affecting the Edwards Aquifer.

11. Explore source-water protection opportunities, including the applicability of EPA Source Water Protection and Sole Source Aquifer programs.

VIII. Conclusion

Travis County recognizes the importance of the Edwards Aquifer as a critical regional water resource and supports continued efforts to ensure that growth and development within the Contributing and Recharge Zones do not compromise long-term water quality.

The County recommends that TCEQ undertake a comprehensive, science-based review of existing EAPP requirements, incorporating current hydrogeologic research, water-quality monitoring data, stormwater BMP performance information, and practical experience from local governments and other stakeholders.

Through collaborative review and appropriate regulatory improvements, TCEQ can strengthen protection of sensitive karst environments, reduce the risk of groundwater contamination, promote responsible wastewater and stormwater management, and support the long-term sustainability of the Edwards Aquifer.

Travis County appreciates TCEQ's consideration of these comments and welcomes continued collaboration in developing effective, technically sound, and implementable measures to protect the Edwards Aquifer for current and future generations.