SOAH DOCKET NO. 582-22-1222
TCEQ DOCKET NO. 2021-0999-MWD

APPLICATION BY CITY OF LIBERTY HILL FOR RENEWAL OF TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT NO. WQ0014477001	**§**	**BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS**

CITY OF LIBERTY HILL'S EXCEPTIONS TO THE PROPOSAL FOR DECISION AND PROPOSED ORDER

TO THE HONORABLE JUDGES FARHADI AND ROBLES:

City of Liberty Hill ("City") files these Exceptions to the Proposal for Decision ("PFD") issued on October 24, 2022 by the Judges in this case. City excepts to the ALJs' recommended action, proposed Findings of Fact, proposed Conclusions of Law, and proposed Ordering Provisions concerning the recommendation that the draft permit's total phosphorous ("TP") limit be revised downward to 0.05 mg/L, and any recommendation relying on standards that have not been adopted in any TCEQ rule or policy, such imposing trophic boundaries to interpret TSWQS. These recommendations are based either on acceptance of hearsay statements presented during the administrative hearing and therefore lacks a sufficient evidentiary basis, or an improper application of interpretation of applicable law, agency rules, written policies, or prior administrative decisions.

The City respectfully requests that the ALJ's recommend issuance of the permit with inclusion of these exceptions.

I. EXCEPTIONS

A. The Proposal for Decision's recommendation that the permit's TP limit be set at 0.05 mg/L is not reasonably supported by substantial evidence.

1. The Proposal for Decision does not consider evidence sufficient to conclude that the permit's TP limit should be set at 0.05 mg/L.

The PFD erroneously concludes that sufficient evidence was presented that a CLEARAS-provided guarantee constitutes RAT and could bring the TP discharge at the outflow below 0.05 mg/L. PFD at 30–32, 34–37. In support of that conclusion, the PFD recites (1) CLEARAS's own representation that it could guarantee an effluent concentration of 0.05 mg/L TP, and (2) Dr. Ross's testimony that an EPA report about other plants that could achieve a 0.02 mg/L TP, and (3) Dr. Ross's testimony that the City's own pilot project with CLEARAS demonstrated that it could achieve 0.02 mg/L TP, which was avowedly based on a CLEARAS-authored report entitled EcoRecover Mobile Pilot; Summary of Results: Liberty Hill Wastewater Treatment Plant. PFD at 31–32, 36–37. Each constitutes, in one form or another, a repackaging of hearsay statements by individuals or entities whose premises and reasoning were not subject to examination by the parties or tribunal.

In relying on the first category, the PFD essentially concludes that RAT can be deduced from a private company's market representations—uncorroborated by any underlying science to backup those representations. *Id.* In fact, Dr. Ross accurately summarized the significance of CLEARAS's 0.05 mg/L TP guarantee: "My understanding is that CLEARAS is willing to write a contract with the City of Liberty Hill that guarantees that they will achieve an effluent standard of 0.05 milligrams per liter total phosphorus." Tr. at 264–65. But legal practitioners are well aware that contractual guarantees are not the same as empirical evidence. RAT standards must be

determined on the basis of a more rigorous, scientific analysis than secondhand representations made by market participants.

In relying on the second category, the PFD merely points to an April 2007 "EPA report describing other plants that have achieved" 0.02 mg/L TP provided by Dr. Ross to conclude that the 0.05 mg/L TP purportedly guaranteed by CLEARAS represents RAT. PFD at 31–32, 36–37. But neither the PFD nor Dr. Ross analyzed the particularities of those waterways, the wastewater-treatment technologies deployed on them, or the interactions between those variables. Nor did either compare those datapoints to the waterway at issue here, the wastewater-treatment technologies reasonably available to the City of Liberty Hill, or the interaction between those sets of variables. Instead, the PFD (and Dr. Ross) threadbarely conclude that because 0.02 mg/L TP was achieved in other parts of the country—by some technologies that were reasonably available to the individuals, entities, or municipalities tasked with building wastewater-treatment facilities on those waterways—then surely 0.05 mg/L TP is RAT in the circumstances present here. Devoid of any analytical rigor, this line of reasoning is, at best, plainly specious, demonstrating the risks inherent in premising a RAT analysis on hearsay statements.

And in relying on the third category, the PFD points to Dr. Ross's testimony that the City's pilot project with CLEARAS demonstrated that 0.02 mg/L TP was reasonably achievable. *Id.* But by her own admission, Dr. Ross bases that testimony merely on conclusions included in a CLEARAS-authored report that Dr. Ross included with her prefiled testimony. SM-Ross at 20; Ex. SM-Ross-9. Despite accepting these CLEARAS-authored statements as true (without anything approximating a searching analytical review of their premises), Dr. Ross maintained that she did not support installation of the CLEARAS product at the wastewater-treatment facility at issue here. Instead, she said that given CLEARAS's representation that it could achieve 0.05 mg/L TP, other

technologies *must* be reasonably available to Liberty Hill that could achieve that same limit. Hence, Dr. Ross's testimony was based on hearsay statements authored by CLEARAS, and even if one assumes the validity of those statements, her conclusions do not logically follow.

In sum, the PFD concludes that RAT at the wastewater-treatment facility would allow for a TP discharge at the outflow below 0.05 mg/L. But the only evidence it cites in support of that conclusion are hearsay statements authored by entities that did not appear before the tribunal, repackaged through an expert who conducted no analysis of the premises that may or may not underlie those hearsay statements. Such evidence is legally insufficient to reach any conclusions about RAT for the City of Liberty Hill's wastewater-treatment facility and cannot justify a proposal to shift the draft permit's TP limit to 0.05 mg/L.

2. *The CLEARAS product cannot constitute RAT because implementation would violate other permit limitations.*

Under the draft permit, ammonia-nitrogen limitations are set at 2 mg/L per day. Draft Permit at 2. During cross-examination, Dr. Ross admitted that the CLEARAS-authored report on which she relied "did not demonstrate effluent concentrations that would be compliant with the ammonia standards in the current draft permit." Tr. at 268. So even if the PFD could permissibly accept at face value the hearsay statements in the CLEARAS-authored report, doing so demonstrates that the product provided by CLEARAS is not RAT. At least not unless the PFD also recommends lifting the ammonia-nitrate limits set by the draft permit. But such a change would

need to be corroborated by substantial evidence in the record, and no party has advocated lifting the ammonia-nitrogen limitations set by the draft permit.

A technology simply cannot be considered *reasonably* available to achieve one set of discharge limitations when it would violate another set of discharge limitations built into the same permit.

Accordingly, the City further excepts to and recommends rejection of proposed Finding of Fact 92 and Ordering Provision 1, bullet 1, which would implement the ALJs' analysis. Findings of Fact 92 and the relevant portion of Ordering Provision 1 are copied below:

> 92. An effluent limit of 0.05 mg/L TP has been demonstrated as a reasonably achievable technology in this case.
>
> 1. The Application by the City of Liberty Hill for Texas Pollutant Discharge Elimination System Permit No. WQ0014477001 is approved and the attached permit is issued with the following modifications:
>
> - a TP effluent limit of 0.05 mg/L for all phases;

The City recommends that Finding of Fact 92 and Ordering Provision 1, bullet 1, be deleted.

B. The PFD misapplies applicable law, agency rules, written policies or prior administrative decisions.

TCEQ's rules or policies are applicable to this proceeding. Through Tex. Gov't Code §§ 2001.058, 2003.047(n), the Legislature mandates that for TCEQ contested cases the ALJs "consider applicable agency rules or policies in conducting the hearing." The ALJs have improperly reached outside of the TCEQ regulatory framework by considering and adopting trophic boundaries as a Texas Surface Water Quality Standards (TSWQS). As explained in the PFD, the TCEQ rules do not incorporate any oligotrophic, mesotrophoc, or eutropic standards when evaluating nutrient impacts to a receiving stream. Although Dr. Ross has lost on this issue

just recently, the ALJs have relied on her suggestion that TCEQ must issue permits based on an oligotrophic, eutrophic, and mesotrophic scale.

Furthermore, a prior agency decision does not support applying oligotrophic, eutrophic, and mesotrophic standard to discharge permits. The August 29, 2022 TCEQ Order granting TPDES discharge permit to Kendall West Utility, LLC (attached as **Exhibit A**) expressly concluded that the oligotrophic/mesotrophic/eutrophic criteria have no role in informing the TCEQ's application of the TSWQS. Conclusion of Law 24 of the August 29, 2022 TCEQ Order reads:

> 24. The Standards do not contain any water-quality criteria addressed specifically to concentrations of phosphorus or nitrogen in the receiving waters, nor any criteria that are framed in terms of an oligotrophic/mesotrophic/eutrophic continuum or categories. 30 Tex. Admin. Code §§ 307.4, .7.

As such, the ALJs' reliance on the oligotrophic/mesotrophic/eutrophic continuum in the PFD and the Proposed Order violates state law requiring that they only consider TCEQ rules and policies, and is inconsistent with prior TCEQ administrative decisions.

Accordingly, the City further excepts to and recommends rejection of proposed Findings of Fact 80 and 90, which would implement the ALJs' analysis. Findings of Fact 80 and 90 are copied below:

> 80. Based on a maximum effluent discharge of 1.2 MGD at 0.1 mg/L TP, the WASP model concluded that the River will be eutrophic below the outfall, and that nuisance benthic algae levels are predicted to occur most of the time.
>
> 90. The best available information indicates that a TP limit of no more than 0.02 mg/L would be necessary to maintain oligotrophic conditions.

The City recommends that Findings of Fact 80 and 90 be deleted.

Furthermore, the ALJs recommend a condition that the City undergo a nutrient and algal growth study under Ordering Provision 1, bullet 3. The City excepts to this condition as it has already completed this study and recently submitted it to the TCEQ on November 10, 2022

pursuant to a TCEQ Agreed Order. See Nutrient Study attached as **Exhibit B**. This study was not completed during the pendency of this case due to the weather requirements in TCEQ's approved sampling plan. Had it been available, the City would have submitted it into the record. Forcing the City now to repeat this exercise when it has already assessed the river and provided the information to the TCEQ related to this permit would be overly burdensome, inconsistent with any known prior administrative orders, and unnecessary as the Draft Permit already requires effluent sampling and monitoring.

Accordingly, the City further excepts to and recommends rejection of proposed Ordering Provision 1, bullet 3, which would implement the ALJs' analysis. Ordering Provision 1 is copied below:

> 1. The Application by the City of Liberty Hill for Texas Pollutant Discharge Elimination System Permit No. WQ0014477001 is approved and the attached permit is issued with the following modifications:
>
> • a modification of the study outlined in "Other Requirements" Item No. 9, to include a nutrient sampling plan that mirrors language in the 2004 permit, which requires the permittee to conduct a study of nutrients and algal growth in the receiving stream prior to discharge, and for at least two years after discharge; and

The City recommends that Ordering Provision 1, bullet 3 be deleted.

C. The PFD erroneously infers that the draft permit will not afford greater protection from algae blooms than the current permit.

The PFD concludes that the draft permit will not be more protective against excessive algae growth because algae continued to overtake the waterway between December 2021 and March 2022, when Liberty Hill's daily average discharge was 0.07 mg/L TP. PFD at 48. This is specious reasoning. A four-month reduction in TP will not force existing algae to disappear: For example, if a lawn is fertilized, it will grow. But if fertilizer is reduced or eliminated, the grass will not disappear—its growth will merely be reduced. Similarly, if a river is scoured during a large flood

and all the algae is washed away, an effluent containing 0.15 mg/L will result in less algae growing back than the previous permit's 0.5 mg/L allowance.

Furthermore, the ALJs erroneously state throughout the PFD and Proposed Order that the algae downstream of the outfall extends for miles. No party proved with any evidence that the algal growth miles downstream was caused by the City's discharge. In fact, the City's biologist with over 40 years of experience in identifying algae species rebutted any claim that the City was the cause of algal growth at any far reaches because the species of algae at the outfall is different than what is found downstream. Buzan prefiled at 13:21-25. Lay evidence of the protestants holding algae in the river does not disprove a biologists educated testimony, especially considering the same biologist entered evidence confirming that algae in the river from the discharge clears before Ronald Reagan Blvd – over a mile upstream of the Bunnell Protestants' property. *Id* at 13:16. The ALJs have no basis for any findings or conclusions that tie algal growth to any distances downstream of the outfall.

Furthermore, no one disputed the City's claim that other contributing sources add nutrients to the river and can contribute to algae growth. Without any limits on the ALJs' findings that the City causes algae growth anywhere "downstream," these findings are factually wrong.

Accordingly, the City further excepts to and recommends rejection of proposed Findings of Fact 59, 60, 63, 64, 86, 87, 88, 89, and 115, which would implement the ALJs' analysis. These Findings of Fact are copied below:

> 59. Algae is a type of aquatic vegetation. Significant algae grows at the outfall and persists at least 3.83 miles downstream of the outfall.
>
> 60. The City's effluent discharge from the Facility is the predominant cause of the algae found at and downstream of the outfall.

63. The quantity and geographical extent of the algae growth causes the river to be aesthetically unattractive for several miles.

64. The algal bloom downstream of the outfall is related to the outfall and not the other potential sources.

86. Effluent discharge pursuant to the limitations of the Draft Permit will cause algae to continue to grow in similar quantities and to persist for a similar distance downstream as is present today and under Applicant's current permit.

87. The algae that will grow under the Draft Permit will be excessive and will impair existing, designated, and attainable uses, including recreational uses and high aquatic life use, in the South Fork San Gabriel River for multiple miles.

88. The algae under the Draft Permit will cause the river to be aesthetically unattractive at and downstream of the outfall, for multiple miles.

89. The effluent limit of 0.15 mg/L TP in the Draft Permit will not prevent the excessive growth and accumulation of aquatic vegetation in the South Fork San Gabriel River, nor will it maintain the aesthetic parameters of the South Fork San Gabriel River.

115. Videos, photographs, and eye-witness testimonies in the record establish that the operation of the City's wastewater plant has badly degraded the River for at least several miles downstream of the plant's outfall.

The City recommends that Findings of Fact 59, 60, 63, 64, 86, 87, 88, 89, and 115 be deleted.

D. The PFD's erroneous recommendation of 0.05 mg/L TP will cause immediate non-compliance.

The immediate reduction to 0.05 mg/L when the permit is issued will be impossible to comply with. Any reduction if one is implemented needs to be phased down over at least two years. If the reduction is immediate, and the plant is physically unable to operate within the effluent limits without a runway, the plant will exceed effluent limits each month and incur violations. A court order should not be the cause of any regulated entity being in non-compliance.

Accordingly, the City further excepts to and recommends rejection of proposed Finding of Fact 92, which would implement the ALJs' analysis. Finding of Fact 92 is copied below:

> 92. An effluent limit of 0.05 mg/L TP has been demonstrated as a reasonably achievable technology in this case.

The City recommends that Finding of Fact 92 be deleted.

Likewise, the City further excepts to and recommends rejection of proposed Conclusions of Law 12–14, 16, which would implement the ALJs' analysis. Conclusions of Law 12–14, and 16, are copied below:

> 12. The Draft Permit will not be protective of water quality and will not protect uses of the receiving waters under the TSWQS because it would allow significant increases in nutrient pollutants to be discharged into River, leading to reduced DO, algae blooms, and an impairment of the designated uses.
>
> 13. The Draft Permit does not include appropriate provisions to protect against excessive growth of algae and comply with the aesthetic parameters and requirements of 30 Texas Administrative Code § 307.4, including aquatic nutrient limitations.
>
> 14. The Draft Permit does not comply with the TCEQ's antidegradation requirements. 30 Tex. Admin. Code § 307.5.

The City recommends that Conclusions of Law 12–14, and 16 be deleted.

E. Corrections to the PFD.

The PFD incorrectly states that the City failed to meet its burden on all issues on page 100 of the PFD. This is contrary to the ALJs' analysis that the City met its burden on Issue A (the portion covering groundwater), Issue B (health and safety), Issue C (nuisance), and Issue F (need). The City recommends correction of this error at page 100 and that the ALJs include specific findings, like Finding of Fact 93, that Protestants failed to rebut the prima facie demonstrations on those issues.

II. CONCLUSION

City of Liberty Hill excepts to the PFD's recommendations on the basis that they are not supported by substantial evidence, the ALJs misapply applicable law, the PFD erroneously

concludes that the draft permit will not afford greater protection from algae blooms than the current permit, and the PFD would erroneously cause immediate non-compliance upon issuance. Most notably, the PFD recommends that the draft permit be revised to provide a TP limit of 0.05 mg/L. But such a determination cannot be based on the unreliable speculation and conjecture that is the hallmark of hearsay evidence. The City of Liberty Hills excepts to the PFD's recommendation on that basis, as well as because the PFD insufficiently considers that implementation of the CLEARAS technology would result in violation of the draft permit's ammonia-nitrate limit and the longtail impact of reducing TP to the limit set by the draft permit.

For the reasons stated in this brief, the City respectfully requests that the ALJs grant these exceptions and recommend the PFD with the changes requested. The City requests any other relief to which he is entitled.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of City of Liberty Hill's Reply Brief has been forwarded via electronic mail or U.S. Mail to the persons on the attached Service List on this the 14th day of November 2022.

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EXHIBIT A

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

AN ORDER GRANTING THE APPLICATION BY KENDALL WEST UTILITY, LLC FOR TPDES PERMIT NO. WQ0015787001 IN KENDALL COUNTY, TEXAS; SOAH DOCKET NO. 582-22-0489; TCEQ DOCKET NO. 2021-0755-MWD

On August 24, 2022, the Texas Commission on Environmental Quality (TCEQ or Commission) considered the application of Kendall West Utility, LLC (Applicant), for a new Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0015787001 in Kendall County, Texas. A Proposal for Decision (PFD) was presented by Robert Pemberton, Administrative Law Judge (ALJ) with the State Office of Administrative Hearings (SOAH), who conducted an evidentiary hearing concerning the application on February 24 and 25, 2022, in Austin, Texas via Zoom videoconferencing.

After considering the PFD, the Commission makes the following findings of fact and conclusions of law.

I. FINDINGS OF FACT

Application

1 Applicant filed its application (Application) for a new TPDES permit with the TCEQ on April 17, 2019.

2 The Application requested authorization to discharge treated domestic wastewater from a proposed plant site, the Tapatio Wastewater Treatment Facility (Facility), SIC Code 4952, to be located approximately 500 feet north of Eagle Drive, 1,375 feet east-southeast of the intersection of Eagle Drive and Tapatio Drive East, in Kendall County, Texas 78006. The treated effluent will be discharged via Outfall 001 to an unnamed tributary, thence to Masters Lake, thence to Frederick Creek, thence to Lake Oz, thence to Frederick Creek, thence to Upper Cibolo Creek in Segment 1908 of the San Antonio River Basin; and via Outfall 002 to an unnamed tributary, thence to Smith Investment Co. Lake No. 1, thence to Smith Investment Co. Lake No. 3, thence to Masters Lake, thence to Frederick Creek, thence to Lake Oz, thence to Frederick Creek, thence to Upper Cibolo Creek in Segment 1908 of the San Antonio River Basin.

3 The Application requests authorization to discharge treated domestic wastewater from the proposed Facility at a daily average flow not to exceed 0.167 million gallons per day (MGD) in the Interim Phase I, 0.333 MGD in Interim Phase II, and 0.49 MGD in the Final Phase.

4 The Facility will be an activated sludge process plant with membrane bioreactors (MBRs). Treatment units in the Interim I phase will include one bar screen, one equalization tank, one pre-aeration basin, one chemical feed system, one anoxic basin, one MBR basin, one process basin, one chlorine contact chamber, one sludge holding tank and one sludge filter press. Treatment units in the Interim II phase will include one bar screen, one equalization tank, two pre-aeration basins, one chemical feed system, two anoxic basins, two MBR basins, two process basins, one chlorine contact chamber, one sludge holding tank and one sludge filter press. Treatment units in the Final phase will include one bar screen, one equalization tank, three pre-aeration basins, one chemical feed system, three anoxic basins, three MBR basins, three process basins, two chlorine contact chambers, one sludge holding tank and one sludge filter press.

5 The Executive Director (ED) declared the Application administratively complete on May 22, 2019.

6 The ED completed the technical review of the Application on October 24, 2019, prepared a draft permit (Draft Permit), and made it available for public review and comment.

The Draft Permit

Effluent limits in the Draft Permit, based on a thirty-day average, are summarized below:

Phase	Five-Day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$)	Total Suspended Solids	Ammonia Nitrogen	Total Phosphorus	*E. coli*	Dissolved Oxygen
Interim I	10 milligrams per liter (mg/L)	15 mg/L	2 mg/L	0.5 mg/L	126 colony- forming units (CFU) or most probable number (MPN) per 100 milliliters (mL)	4 mg/L (min)
Interim II	7 mg/L	15 mg/L	2 mg/L	0.5 mg/L	126 CFU or MPN per 100 mL	4 mg/L (min)
Final	5 mg/L	5 mg/L	1.9 mg/L	0.5 mg/L	126 CFU or MPN per 100 mL	6 mg/L (min)

7 For all phases, the pH must be in the range of 6 to 9 standard units, and the effluent shall contain a chlorine residual of at least 1.0 mg/L and not exceed a chlorine residual of 4.0 mg/L after a detention time of at least 20 minutes, based on peak flow.

Notice and Jurisdiction

8. The combined Notice of Public Meeting and Notice of Receipt of Application and Intent to Obtain Water Quality Permit and Notice of Application and Preliminary Decision was published on August 21, 2020, in the *Boerne Star*.

9. A public meeting was held on September 21, 2020, and the public comment period closed on that same date.

10. Willis Jay Harpole, Michael Dillinger, Clint McNew, and Heather McNew timely filed formal Public Comments and Requests for Contested Case Hearing.

11. The ED filed its Response to Public Comment on April 23, 2021, and the Chief Clerk mailed notice of the same on April 30, 2021.

12. During its open meeting on September 8, 2021, the Commission considered hearing requests and requests for reconsideration. The Commission determined that Mr. Harpole, Mr. Dillinger, Mr. McNew, and Ms. McNew was each an affected person and granted their requests for hearing. At that same meeting, the Commission denied requests for reconsideration.

13. Also during its September 8, 2021 open meeting, the Commission considered the issues to be referred to SOAH. The Commission issued an Interim Order dated September 13, 2021, directing that the following twelve issues be referred to SOAH (Referred Issues):

Issue A. Whether the Draft Permit is protective of groundwater.

Issue B. Whether the Draft Permit adequately addresses nuisance odor in accordance with 30 Texas Administrative Code § 309.13(e).

Issue C. Whether the Draft Permit includes adequate provisions to protect the health of the requesters and aquatic and terrestrial wildlife.

Issue D. Whether the Draft Permit is protective of water quality and the existing uses of the receiving waters in accordance with applicable Texas Surface Water Quality Standards.

Issue E. Whether the Draft Permit complies with applicable antidegradation requirements.

Issue F. Whether the Draft Permit includes adequate provisions to protect the requestors' use and enjoyment of their property.

Issue G. Whether the Facility complies with the siting requirements of 30 Texas Administrative Code Chapter 309, Subchapter B, including the required buffer zones for private water wells and potable water- storage tanks.

Issue H. Whether the permit application is substantially complete and contains accurate information.

Issue I. Whether the Applicant adequately demonstrated a need for the proposed facility, as required by Texas Water Code § 26.0282, Consideration of Need and Regional Treatment Options.

Issue J. Whether the Draft Permit includes sufficient monitoring and reporting requirements, including necessary operational requirements.

Issue K. Whether the Draft Permit was provided to the U.S. Environmental Protection Agency (EPA) for review as required.

Issue L. Whether the Applicant substantially complied with all applicable notice requirements.

14. The Interim Order also set the maximum duration of the hearing at 180 days from the date of the preliminary hearing until the date the PFD is issued by SOAH. Because the 180-day deadline would have fallen during the Memorial Day weekend, the parties agreed to extend the PFD deadline to the following Tuesday, May 31, 2022.

15. On October 29, 2021, notice of the preliminary hearing was published in the *Boerne Star*. The notice included the time, date, and place of the hearing, as well as the matters asserted, in accordance with the applicable statutes and rules.

Proceedings at SOAH

16. The preliminary hearing was held on November 29, 2021, via videoconference, before SOAH ALJ Robert Pemberton. Mr. Harpole, Mr. Dillinger, Mr. McNew, Ms. McNew, and also Tom Tucker (collectively, Protestants) appeared through their representative, as did the Applicant, the ED, and the Office of Public Interest Counsel (OPIC). Each were admitted as parties.

17. During the preliminary hearing, the Applicant offered Exhibits AR-1 through AR-5 to establish the administrative record (Administrative Record), and also Exhibits APP-A through APP-L as evidence of notice and jurisdiction. All of these exhibits were admitted without objection, and jurisdiction was noted by the ALJ.

18. On November 30, 2021, ALJ Pemberton issued SOAH Order No. 2 memorializing the preliminary hearing, adopting a procedural schedule, and setting the hearing on the merits.

19. On February 22, 2022, ALJ Pemberton convened a prehearing conference via videoconference to hear argument on motions and objections filed by the parties. All parties appeared through their respective representatives. On February 23, 2022, the ALJ issued SOAH Order No. 6 with rulings on the motions.

20. The hearing on the merits was held via videoconference on February 24, 2022, and concluded on February 25, 2022, with ALJ Pemberton presiding. All parties appeared through their respective representatives. The record closed on April 14, 2022, the date on which the last post-hearing arguments from the parties were filed.

Issue A: Whether the Draft Permit is protective of groundwater.

21. The Draft Permit is protective of surface water quality, as found below, so it is also protective of groundwater quality.

Issue B: Whether the Draft Permit adequately addresses nuisance odor in accordance with 30 TAC § 309.13(e).

22 The Facility's wastewater-treatment plant units will be located at least 150 feet from the nearest property line.

23 The Facility will not have lagoons with zones of anaerobic activity that would trigger a 500-foot buffer-zone requirement.

24 Protestants did not present evidence demonstrating that the Facility will violate 30 Texas Administrative Code § 309.13(e).

25 The Draft Permit adequately addresses nuisance odor in accordance with 30 Texas Administrative Code § 309.13(e).

Issue C: Whether the Draft Permit includes adequate provisions to protect the health of the requesters and aquatic and terrestrial wildlife.

26. Protestants did not present evidence demonstrating that the Draft Permit will adversely affect human health, including the health of requestors.

27. Protestants did not present evidence demonstrating that the Draft Permit will adversely impact aquatic or terrestrial wildlife.

28 The Draft Permit includes adequate provisions to protect the health of requesters and aquatic and terrestrial wildlife.

Issue D: Whether the Draft Permit is protective of water quality and the existing uses of the receiving waters in accordance with applicable Texas Surface Water Quality Standards.

29 The substance of Protestants' evidence and arguments implicate three of the water-quality criteria contained in the Texas Surface Water Quality Standards (Standards): (1) the requirement that specified minimum concentrations of dissolved oxygen (DO) must be maintained in the receiving waters so as to support aquatic-life uses; (2) that "[n]utrients from permitted discharges or other controllable sources must not cause excessive growth of aquatic vegetation that impairs an existing, designated, presumed, or attainable use"; and (3) that "[s]urface waters must be maintained in an aesthetically attractive condition."

30. The unnamed tributary below Outfall 002 is an intermittent stream having a corresponding dissolved oxygen (DO) criterion of 2.0 mg/L.

31 The unnamed tributary below Outfall 001 is an intermittent stream with perennial pools, and having a corresponding DO criterion of 3.0 mg/L.

32. Frederick Creek and the ponds along it, including Smith Investment Co. Lakes Nos. 1 and 3 and Masters Lake, are perennial streams and water bodies having a corresponding DO criterion of 5.0 mg/L.

33. The effluent limits in the Draft Permit will maintain the required DO levels in the respective receiving waters, and in turn the waters' respective aquatic life uses.

34. Protestants did not present evidence demonstrating that that the effluent limits in the Draft Permit will allow nutrients that will cause "excessive growth of aquatic vegetation" that will impair an existing, designated, presumed, or attainable use, nor that the limits will fail to maintain receiving waters "in an aesthetically attractive condition."

35. The effluent limits in the Draft Permit will not cause "excessive growth of aquatic vegetation" that will impair an existing, designated, presumed, or attainable use, nor will they fail to maintain receiving waters "in an aesthetically attractive condition."

36. The Draft Permit is protective of water quality and the existing uses of the receiving waters in accordance with the applicable Standards.

Issue E: Whether the Draft Permit complies with applicable antidegradation requirements.

37. The existing water-quality uses of the receiving waters will not be impaired by the Draft Permit as long as Applicant complies with it, satisfying the Tier 1 antidegradation requirement.

38. The Draft Permit will not cause a lowering of water quality by more than a de minimis extent in Frederick Creek, Masters Lake, or Smith Investment Co. Lakes Nos. 1 and 3 as long as Applicant complies with the Draft Permit, satisfying the antidegradation Tier 2 requirement.

39. The Draft Permit complies with applicable antidegradation requirements.

Issue F: Whether the Draft Permit includes adequate protections to protect the requestors' use and enjoyment of their property.

40. Protestants did not present evidence demonstrating that the Draft Permit will adversely impact Protestants' use and enjoyment of their property.

41. The Draft Permit includes adequate protections to protect the requestors' use and enjoyment of their property.

Issue G: Whether the facility complies with the siting requirements of 30 Texas Administrative Code Chapter 309, Subchapter B, including the required buffer zones for private water wells and potable water-storage tanks.

42 As relating to Referred Issue G, Protestants presented evidence that there were 14 water wells in the general area of the Facility that were not referenced in the Application. However, they did not present evidence that any of these was either a public water well located within 500 feet of a wastewater treatment plant unit nor a private water well located within 250 feet.

43 The Facility will not have a wastewater treatment facility surface impoundment that would trigger the requirement of leak-prevention protections under 30 Texas Administrative Code § 309.13(d).

44 Protestants did not present evidence demonstrating that the Facility will violate any siting requirements of 30 Texas Administrative Code Chapter 309, Subchapter B.

45. The Facility complies with the siting requirements of 30 Texas Administrative Code Chapter 309, Subchapter B, including the required buffer zones for private water wells and potable water-storage tanks.

Issue H: Whether the permit application is substantially complete and contains accurate information.

46. As relating to Referred Issue H, Protestants contend that their evidence of 14 additional water wells not referenced in the Application demonstrates that the Application is not substantially complete and contains inaccurate information. However, Applicant was not required to identify the additional wells when making the Application.

47 Protestants did not present evidence demonstrating that the Application, by virtue of violating any specifically applicable state or federal requirement, is not substantially complete or contains inaccurate information.

48. The Application is substantially complete and contains accurate information.

Issue I: Whether the Applicant adequately demonstrated a need for the proposed facility, as required by Texas Water Code § 26.0282, Consideration of Need and Regional Treatment Options.

49. Applicant presented forecasts to TCEQ reflecting that demand in its service territory will increase to 0.452 MGD by 2027, and to approximately 0.632 MGD by 2030.

50. The wastewater-treatment facility that Applicant has heretofore used to provide service (the Current Facility) has a capacity of only 0.150 MGD.

51. The Current Facility was constructed in the 1980s and would require significant upgrades and expansion to be a viable means of meeting the forecasted increased demand.

52. The Current Facility is owned by Potranco Holdings, Ltd., an entity owned and controlled by one of the Protestants, Mr. Harpole. Applicant has leased the Current Facility from Potranco and Mr. Harpole.

53. In its Application, Applicant explained that it intended to replace its reliance on the Current Facility with the newly constructed Facility for which it is seeking TPDES Permit WQ0015787001. Other Requirement No. 9 of the Draft Permit would require Applicant to submit a "Clean Closure Plan" and initiate the process for cancelling the Current Facility's permit (a TLAP permit) within 30 days after the Facility becomes operational and the collection system necessary for transfer of flows is completed.

54 Applicant also provided documentation showing that the operator of the only other wastewater-treatment facility within three miles of the Facility site, the Lerin Hills Municipal Utility District, declined to provide service, explaining that its facility was not designed nor permitted to accept wastewater from outside the subdivision it serves.

55 Protestants did not present evidence demonstrating that the Facility would violate Texas Water Code § 26.0282.

56. The preponderant evidence demonstrates that the Facility would advance the policy of regionalization as contemplated in Texas Water Code § 26.0282.

57. Applicant adequately demonstrated a need for the proposed Facility, as required by Texas Water Code § 26.0282.

Issue J: Whether the Draft Permit includes sufficient monitoring and reporting requirements, including necessary operational requirements.

58 As relating to Referred Issue J, Protestants contested only whether the Draft Permit includes "necessary operational requirements" of requiring adequate education and training for Facility's operator.

59. Protestants did not present evidence that the Draft Permit violates any specifically applicable state or federal requirement relating to the education and training required of the Facility's operator.

60. On the contrary, Other Requirement No. 1 in the Draft Permit affirmatively demonstrates compliance with the applicable requirements prescribed in 30 Texas Administrative Code Subchapter J.

61 The Draft Permit includes sufficient monitoring and reporting requirements, including necessary operational requirements.

Issue K: Whether the Draft Permit was provided to the U.S. EPA for review as required.

62. TCEQ provided the Draft Permit to the U.S. EPA on July 13, 2020.

63. EPA reviewed the Draft Permit and, on August 25, 2020, gave TCEQ permission to issue it.

64. Protestants did not present evidence demonstrating that the manner or timing of giving notice to the EPA *vis a vis* public notice of the Draft Permit violated any specifically applicable state or federal legal requirement.

65. The Draft Permit was provided to the U.S. EPA as required.

Issue L: Whether the Applicant substantially complied with all applicable notice requirements.

66. Protestants challenge notice based on the contention that Kendall West is no longer the Applicant because that entity and/or its assets were acquired by another entity between the preliminary hearing and the hearing on the merits.

67. Kendall West remains the Applicant for purposes of this proceeding.

68. Protestants did not present evidence demonstrating that Applicant failed to substantially comply with all applicable notice requirements.

69. The Applicant substantially complied with all applicable notice requirements.

Transcription Costs

70. No party requested an allocation of transcription costs.

71. Applicant and Protestants should each bear any transcription costs they have incurred.

II. CONCLUSIONS OF LAW

1. TCEQ has jurisdiction over this matter. Tex. Water Code chs. 5 and 26.

2. SOAH has jurisdiction to conduct a hearing and to prepare a PFD in contested cases referred by the Commission under Texas Government Code § 2003.047.

3. Notice was provided in accordance with Texas Water Code §§ 5.115 and 26.028; Texas Government Code §§ 2001.051 and .052; and 30 Texas Administrative Code §§ 39.405 and .551.

4. The Application is subject to the requirements in Senate Bill 709, effective September 1, 2015. Tex. Gov't Code § 2003.047(i-1) through (i-3).

5. Applicant's filing of the Administrative Record established a prima facie demonstration that: (1) the Draft Permit meets all state and federal legal and technical requirements; and (2) a permit, if issued consistent with the Draft Permit, would protect human health and safety, the environment, and physical property. Tex. Gov't Code § 2003.047(i-1); 30 Tex. Admin. Code §§ 80.17(c)(1), .117(c)(1), .127(h).

6. Applicant has the burden of proof on the issues referred by the Commission. 30 Tex. Admin. Code § 80.17(a). However, the admission of the Administrative Record into evidence met Applicant's burden of proof, subject to rebuttal. 30 Tex. Admin. Code § 80.117(b).

7. To rebut the prima facie demonstration established by the Administrative Record, a party must present evidence that (1) relates to one of the Referred Issues; and (2) demonstrates, as compared to the Administrative Record, that one or more provisions in the Draft Permit

violates a specifically applicable state or federal requirement. *See* Tex. Gov't Code § 2003.047(i-2); 30 Tex. Admin. Code §§ 80.17(c)(2), .117(c)(3).

8. Even if the prima facie demonstration established by the Administrative Record is rebutted, the Applicant or ED may present additional evidence to be considered in determining whether Applicant met its burden of proof. *See* Tex. Gov't Code § 2003.047(i-3); 30 Tex. Admin. Code §§ 80.17(c)(3), .117(c)(3).

9. The standard of proof is by a preponderance of the evidence. *Granek v. Texas St. Bd. of Med. Examn'rs*, 172 S.W.3d 761, 777 (Tex. App.—Austin 2005, no pet.); *Southwestern Pub. Servs. Co. v. Pub. Util. Comm'n of Tex.*, 962 S.W.2d 207, 213-14 (Tex. App.—Austin 1998, pet. denied). 30 Texas Admin. Code § 80.17(a).

10. The Draft Permit is protective of groundwater.

11. Prior to construction of the Facility, Applicant must satisfy one of three alternative compliance requirements to abate and control a nuisance of odor. 30 Texas Admin. Code § 309.13(e)

12. The alternative means of complying with 30 Texas Administrative Code § 309.13(e) include satisfying a buffer-zone requirement. Lagoons with zones of anaerobic activity may not be located closer than 500 feet to the nearest property line, and all other wastewater treatment plant units may not be located more than 150 feet to the nearest property line. 30 Texas Admin. Code § 309.13(e)(1).

13. The Draft Permit adequately addresses nuisance odor in accordance with 30 Texas Administrative Code § 309.13(e).

14. The Draft Permit includes adequate protections to protect the health of requestors and aquatic and terrestrial wildlife.

15. TCEQ has adopted water-quality standards applicable to wastewater discharges (the Standards) in accordance with the Clean Water Act and the Texas Water Code. 33 U.S.C. § 1313; Tex. Water Code § 26.023; 30 Tex. Admin. Code ch. 307.

16. Texas Water Code § 26.023 directs TCEQ by rule to set water quality standards (Standards) for the water in this state and provides that it has the sole and exclusive authority to do so. Tex. Water Code § 26.023; *see also id.* § 26.011 (Commission "shall administer the provisions of this chapter and shall establish the level of quality to be maintained in, and shall control the quality of, the water in this state, as provided by this chapter").

17. The Standards define "water quality" in terms of certain criteria or attributes, some expressed numerically, others as narrative descriptions. 30 Tex. Admin. Code §§ 307.4, .7, .10.

18. The numerical water-quality criteria prescribed in the Standards include minimum DO concentrations that must be maintained in receiving waters in order to support existing, designated, presumed, and attainable aquatic life uses. 30 Tex. Admin. Code § 307.4(h).

19. Perennial streams and water bodies are presumed to have a high aquatic life use and a corresponding DO criterion of 5.0 mg/L. Intermittent streams are presumed to have minimal

aquatic life use and a corresponding DO criterion of 2.0 mg/L. Intermittent streams with perennial pools are presumed to have a limited aquatic life use and corresponding DO criterion of 3.0 mg/L. 30 Tex. Admin. Code §§ 307.4(h), .7(a), (b)(3) & Figure 30 TAC § 307.7(b)(3)(A)(i).

20. The effluent limits in the Draft Permit will maintain the required DO levels in the receiving waters, and in turn the waters' respective aquatic life uses.

21. The narrative water-quality criteria in the Standards include "[n]utrients from permitted discharges or other controllable sources must not cause excessive growth of aquatic vegetation that impairs an existing, designated, presumed, or attainable use" and "[s]urface waters must be maintained in an aesthetically attractive condition." 30 Tex. Admin. Code §§ 307.4(b)(4), (e).

22. The effluent limits in the Draft Permit will prevent nutrients from causing "excessive growth of aquatic vegetation" that will impair an existing, designated, presumed, or attainable use. 30 Tex. Admin. Code § 307.4(e).

23. The effluent limits in the Draft Permit will maintain surface waters in an "aesthetically attractive condition." 30 Tex. Admin. Code § 307.4(b)(4).

24. The Standards do not contain any water-quality criteria addressed specifically to concentrations of phosphorus or nitrogen in the receiving waters, nor any criteria that are framed in terms of an oligotrophic/mesotrophic/eutrophic continuum or categories. 30 Tex. Admin. Code §§ 307.4, .7.

25. The Draft Permit is protective of water quality and the existing uses of the receiving waters in accordance with the applicable Standards.

26. Tier 1 of the Commission's antidegradation policy requires that existing uses and water quality sufficient to protect those existing uses must be maintained. 30 Tex. Admin. Code § 307.5(b)(1).

27. The Draft Permit, if complied with, will maintain existing uses and water quality sufficient to protect those existing uses. 30 Tex. Admin. Code § 307.5(b)(1).

28. Tier 2 of the Commission's antidegradation policy requires that the Draft Permit not cause, in waters that exceed fishable/swimmable quality, a lowering of water quality that is by more than a de minimis extent, unless there is a showing that such lowering is necessary for important economic or social development. 30 Tex. Admin. Code § 307.5(b)(2).

29. The Draft Permit, if complied with, will not cause a lowering of water quality by more than a de minimis extent in Frederick Creek, Masters Lake, or Smith Investment Co. Lake Nos. 1 and 3. 30 Tex. Admin. Code § 307.5(b)(2).

30. The Draft Permit complies with applicable antidegradation requirements.

31. To ensure adequate protections to potable water sources and supplies, a wastewater treatment plant unit may not be located closer than 500 feet from a public water well, nor 250 feet from

a private water well. 30 Tex. Admin. Code § 309.13(c). Further, a wastewater treatment facility surface impoundment may not be located in areas overlying the recharge zones of certain aquifers absent specified measures to prevent leaking into the aquifer. 30 Tex. Admin. Code § 309.13(d).

32. The Facility complies with the siting requirements of 30 Texas Administrative Code Chapter 309, Subchapter B, including the required buffer zones for private water wells and potable water storage tanks.

33. The Application is substantially complete and contains accurate information.

34. In considering the issuance of a permit to discharge waste, the Commission may deny or alter the proposed permit's terms and conditions based on consideration of need, including the expected volume and quality of the influent and the availability of existing or proposed areawide or regional waste collection, treatment, and disposal systems not designated as such by Commission order. Tex. Water Code § 26.0282.

35. Texas Water Code § 26.0282 does not require the Commission to deny a permit under any particular circumstances or prescribe any specific means of advancing the goal of regionalization. Rather, it affords the Commission discretion it may exercise in a given permit case to encourage and promote regionalization based on the evidence presented concerning the need for the permit and other systems, existing and proposed, in the geographical area.

36. TCEQ has not adopted any formal rules requiring regionalization pursuant to Texas Water Code § 26.0282.

37. Applicant adequately demonstrated a need for the Facility, as required by Texas Water Code § 26.0282, Consideration of Need and Regional Treatment Options.

38. The Commission should not deny or alter the terms and conditions of the Draft Permit based on consideration of need and the policy to promote regional or area-wide systems. Tex. Water Code § 26.0282.

39. A domestic wastewater-treatment facility with an activated sludge treatment system other than extended aeration and having a permitted average daily flow greater than 0.050 MGD and up to 1.0 MGD, must be operated by a wastewater-treatment-facility operator holding at least a Class C license. 30 Tex. Admin. Code § 30.350(e) & Figure 30 TAC § 30.350(e).

40. The Draft Permit includes sufficient monitoring and reporting requirements, including necessary operational requirements.

41. There is no indication that the provisions of the Memorandum of Agreement between TCEQ and EPA regarding provision of draft permits to EPA creates enforceable rights in external, private parties.

42. The Draft Permit was provided to the U.S. EPA for review as required.

43. Applicant substantially complied with all applicable notice requirements.

44. Upon the timely filed motion of a party or upon its own motion, the Commission may assess reporting and transcription costs to one or more of the parties participating in the proceeding, excluding the ED and OPIC, considering the factors listed in 30 Texas Administrative Code § 80.23(d)(1).

45. The Commission should not assess reporting and transcription costs in this case.

III. EXPLANATION OF CHANGES

1. The Commission modified Finding of Fact Nos. 11 and 31 and Conclusion of Law Nos. 3, 9, 21, 23, and 39, consistent with the Executive Director's Exceptions. By letter dated June 28, 2022, the ALJ stated that he agreed with the Executive Director's Exceptions and recommended that they be adopted by the Commission. Therefore, the Commission adopted those corrections agreed to by the ALJ at the August 24, 2022 Agenda, and those Exceptions have been incorporated into this Order.

2. The Commission modified Ordering Provision No. 1 to state that the draft permit is issued. This change was made to clarify this Order, consistent with the evidence in the record and the ALJ's recommendation to grant the application.

NOW, THEREFORE, BE IT ORDERED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY, IN ACCORDANCE WITH THESE FINDINGS OF FACT AND CONCLUSIONS OF LAW, THAT:

1. Applicant's Application for Texas Pollutant Discharge Elimination System Permit No. WQ0015787001 is granted, and the draft permit is issued.

2. The Commission adopts the ED's Response to Public Comment in accordance with 30 Texas Administrative Code § 50.117.

3. All other motions, requests for entry of specific Findings of Fact or Conclusions of Law, and any other requests for general or specific relief, if not expressly granted herein, are hereby denied.

4. The effective date of this Order is the date the Order is final, as provided by Texas Government Code § 2001.144 and 30 Texas Administrative Code § 80.273.

5. TCEQ's Chief Clerk shall forward a copy of this Order to all parties.

6. If any provision, sentence, clause, or phrase of this Order is for any reason held to be invalid, the invalidity of any provision shall not affect the validity of the remaining portions of this Order.

THE STATE OF TEXAS
COUNTY OF TRAVIS

SEP 02 2022

OF THE COMMISSION GIVEN UNDER MY HAND AND THE

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

TEXAS COMMISSION ON
ENVIRONMENTAL QUALITY

Jon Niermann, Chairman

8/29/22
Date Signed

TPDES PERMIT NO. WQ0015787001
[For TCEQ office use only - EPA I.D. No. TX0139246]

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
P.O. Box 13087
Austin, Texas 78711-3087

PERMIT TO DISCHARGE WASTES
under provisions of
Section 402 of the Clean Water Act
and Chapter 26 of the Texas Water Code

Kendall West Utility, LLC

whose mailing address is

P.O. Box 1335
Boerne, Texas 78006

is authorized to treat and discharge wastes from the Tapatio Wastewater Treatment Facility, SIC Code 4952

located approximately 500 feet north of Eagle Drive, 1,375 feet east-southeast of the intersection of Eagle Drive and Tapatio Drive East, in Kendall County, Texas 78006

via Outfall 001 to an unnamed tributary, thence to Masters Lake, thence to Frederick Creek, thence to Lake Oz, thence to Frederick Creek, thence to Upper Cibolo Creek in Segment 1908 of the San Antonio River Basin

via Outfall 002 to an unnamed tributary, thence to Smith Investment Co. Lake No. 1, thence to Smith Investment Co. Lake No. 3, thence to Masters Lake, thence to Frederick Creek, thence to Lake Oz, thence to Frederick Creek, thence to Upper Cibolo Creek in Segment No. 1908 of the San Antonio River Basin

only according to effluent limitations, monitoring requirements, and other conditions set forth in this permit, as well as the rules of the Texas Commission on Environmental Quality (TCEQ), the laws of the State of Texas, and other orders of the TCEQ. The issuance of this permit does not grant to the permittee the right to use private or public property for conveyance of wastewater along the discharge route described in this permit. This includes, but is not limited to, property belonging to any individual, partnership, corporation, or other entity. Neither does this permit authorize any invasion of personal rights nor any violation of federal, state, or local laws or regulations. It is the responsibility of the permittee to acquire property rights as may be necessary to use the discharge route.

This permit shall expire at midnight, **five years from the date of issuance**.

ISSUED DATE: August 29, 2022

For the Commission

INTERIM I EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Numbers 001 and 002

1. During the period beginning upon the date of issuance and lasting through the completion of expansion to the 0.333 million gallons per day (MGD) facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.167 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 464 gallons per minute.

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg	7-day Avg	Daily Max	Single Grab	Report Daily Avg. & Max. Single Grab	
	mg/l (lbs/day)	mg/l	mg/l	mg/l	Measurement Frequency	Sample Type
Flow, MGD*	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	10 (14)	15	25	35	One/week	Grab
Total Suspended Solids	15 (21)	25	40	60	One/week	Grab
Ammonia Nitrogen	2 (2.8)	5	10	15	One/week	Grab
Total Phosphorus	0.5 (0.7)	1	2	3	One/week	Grab
E. coli, CFU or MPN per 100 ml	126	N/A	N/A	399	One/month	Grab

   * The combined discharge from Outfalls 001 and 002 shall not exceed a daily average flow of 0.167 MGD.

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.
3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.
5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.
6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

INTERIM II EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Numbers 001 and 002

1. During the period beginning upon the ompletion of expansion to the 0.333 million gallons per day (MGD) facilityand lasting through the completion of expansion to the 0.49 MGD facility, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.333 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 925 gallons per minute.

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg	7-day Avg	Daily Max	Single Grab	Report Daily Avg. & Max. Single Grab	
	mg/l (lbs/day)	mg/l	mg/l	mg/l	Measurement Frequency	Sample Type
Flow, MGD*	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	7 (19)	15	25	35	One/week	Grab
Total Suspended Solids	15 (42)	25	40	60	One/week	Grab
Ammonia Nitrogen	2 (5.6)	5	10	15	One/week	Grab
Total Phosphorus	0.5 (1.4)	1	2	3	One/week	Grab
E. coli, CFU or MPN per 100 ml	126	N/A	N/A	399	One/month	Grab

   * The combined discharge from Outfalls 001 and 002 shall not exceed a daily average flow of 0.333 MGD.

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.
3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored once per month by grab sample.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.
5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.
6. The effluent shall contain a minimum dissolved oxygen of 4.0 mg/l and shall be monitored once per week by grab sample.

FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS Outfall Numbers 001 and 002

1. During the period beginning upon the completion of expansion to the 0.49 million gallons per day (MGD) facility and lasting through the date of expiration, the permittee is authorized to discharge subject to the following effluent limitations:

   The daily average flow of effluent shall not exceed 0.49 MGD, nor shall the average discharge during any two-hour period (2-hour peak) exceed 1,361 gallons per minute.

Effluent Characteristic	Discharge Limitations				Min. Self-Monitoring Requirements	
	Daily Avg	7-day Avg	Daily Max	Single Grab	Report Daily Avg. & Daily Max.	
	mg/l (lbs/day)	mg/l	mg/l	mg/l	Measurement Frequency	Sample Type
Flow, MGD*	Report	N/A	Report	N/A	Continuous	Totalizing Meter
Carbonaceous Biochemical Oxygen Demand (5-day)	5 (20)	10	20	30	One/week	Grab
Total Suspended Solids	5 (20)	10	20	30	One/week	Grab
Ammonia Nitrogen	1.9 (7.8)	5	10	15	One/week	Grab
Total Phosphorus	0.5 (2.0)	1	2	3	One/week	Grab
E. coli, CFU or MPN per 100 ml	126	N/A	399	N/A	One/month	Grab

   * The combined discharge from Outfalls 001 and 002 shall not exceed a daily average flow of 0.49 MGD.

2. The effluent shall contain a chlorine residual of at least 1.0 mg/l and shall not exceed a chlorine residual of 4.0 mg/l after a detention time of at least 20 minutes (based on peak flow), and shall be monitored five times per week by grab sample at each chlorine contact chamber. An equivalent method of disinfection may be substituted only with prior approval of the Executive Director.
3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored twice per month by grab sample.
4. There shall be no discharge of floating solids or visible foam in other than trace amounts and no discharge of visible oil.
5. Effluent monitoring samples shall be taken at the following location(s): Following the final treatment unit.
6. The effluent shall contain a minimum dissolved oxygen of 6.0 mg/l and shall be monitored once per week by grab sample.

DEFINITIONS AND STANDARD PERMIT CONDITIONS

As required by Title 30 Texas Administrative Code (TAC) Chapter 305, certain regulations appear as standard conditions in waste discharge permits. 30 TAC § 305.121 - 305.129 (relating to Permit Characteristics and Conditions) as promulgated under the Texas Water Code (TWC) §§ 5.103 and 5.105, and the Texas Health and Safety Code (THSC) §§ 361.017 and 361.024(a), establish the characteristics and standards for waste discharge permits, including sewage sludge, and those sections of 40 Code of Federal Regulations (CFR) Part 122 adopted by reference by the Commission. The following text includes these conditions and incorporates them into this permit. All definitions in TWC § 26.001 and 30 TAC Chapter 305 shall apply to this permit and are incorporated by reference. Some specific definitions of words or phrases used in this permit are as follows:

1. Flow Measurements

    a. Annual average flow - the arithmetic average of all daily flow determinations taken within the preceding 12 consecutive calendar months. The annual average flow determination shall consist of daily flow volume determinations made by a totalizing meter, charted on a chart recorder and limited to major domestic wastewater discharge facilities with one million gallons per day or greater permitted flow.

    b. Daily average flow - the arithmetic average of all determinations of the daily flow within a period of one calendar month. The daily average flow determination shall consist of determinations made on at least four separate days. If instantaneous measurements are used to determine the daily flow, the determination shall be the arithmetic average of all instantaneous measurements taken during that month. Daily average flow determination for intermittent discharges shall consist of a minimum of three flow determinations on days of discharge.

    c. Daily maximum flow - the highest total flow for any 24-hour period in a calendar month.

    d. Instantaneous flow - the measured flow during the minimum time required to interpret the flow measuring device.

    e. 2-hour peak flow (domestic wastewater treatment plants) - the maximum flow sustained for a two-hour period during the period of daily discharge. The average of multiple measurements of instantaneous maximum flow within a two-hour period may be used to calculate the 2-hour peak flow.

    f. Maximum 2-hour peak flow (domestic wastewater treatment plants) - the highest 2-hour peak flow for any 24-hour period in a calendar month.

2. Concentration Measurements

    a. Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar month, consisting of at least four separate representative measurements.

        i. For domestic wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values in the previous four consecutive month period consisting of at least four measurements shall be utilized as the daily average concentration.

ii. For all other wastewater treatment plants - When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

b. 7-day average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit, within a period of one calendar week, Sunday through Saturday.

c. Daily maximum concentration - the maximum concentration measured on a single day, by the sample type specified in the permit, within a period of one calendar month.

d. Daily discharge - the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in terms of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the sampling day. For pollutants with limitations expressed in other units of measurement, the daily discharge is calculated as the average measurement of the pollutant over the sampling day.

The daily discharge determination of concentration made using a composite sample shall be the concentration of the composite sample. When grab samples are used, the daily discharge determination of concentration shall be the arithmetic average (weighted by flow value) of all samples collected during that day.

e. Bacteria concentration (*E. coli* or Enterococci) - Colony Forming Units (CFU) or Most Probable Number (MPN) of bacteria per 100 milliliters effluent. The daily average bacteria concentration is a geometric mean of the values for the effluent samples collected in a calendar month. The geometric mean shall be determined by calculating the nth root of the product of all measurements made in a calendar month, where n equals the number of measurements made; or, computed as the antilogarithm of the arithmetic mean of the logarithms of all measurements made in a calendar month. For any measurement of bacteria equaling zero, a substituted value of one shall be made for input into either computation method. If specified, the 7-day average for bacteria is the geometric mean of the values for all effluent samples collected during a calendar week.

f. Daily average loading (lbs/day) - the arithmetic average of all daily discharge loading calculations during a period of one calendar month. These calculations must be made for each day of the month that a parameter is analyzed. The daily discharge, in terms of mass (lbs/day), is calculated as (Flow, MGD x Concentration, mg/l x 8.34).

g. Daily maximum loading (lbs/day) - the highest daily discharge, in terms of mass (lbs/day), within a period of one calendar month.

3. Sample Type

a. Composite sample - For domestic wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (a). For industrial wastewater, a composite sample is a sample made up of a minimum of three effluent portions collected in a continuous 24-hour period or during the period of daily discharge if less than 24 hours, and combined in volumes proportional to flow, and collected at the intervals required by 30 TAC § 319.9 (b).

b. Grab sample - an individual sample collected in less than 15 minutes.

4. Treatment Facility (facility) - wastewater facilities used in the conveyance, storage, treatment, recycling, reclamation and/or disposal of domestic sewage, industrial wastes, agricultural wastes, recreational wastes, or other wastes including sludge handling or disposal facilities under the jurisdiction of the Commission.

5. The term "sewage sludge" is defined as solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in 30 TAC Chapter 312. This includes the solids that have not been classified as hazardous waste separated from wastewater by unit processes.

6. Bypass - the intentional diversion of a waste stream from any portion of a treatment facility.

MONITORING AND REPORTING REQUIREMENTS

1. Self-Reporting

Monitoring results shall be provided at the intervals specified in the permit. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall conduct effluent sampling and reporting in accordance with 30 TAC §§ 319.4 - 319.12. Unless otherwise specified, effluent monitoring data shall be submitted each month, to the Compliance Monitoring Team of the Enforcement Division (MC 224), by the 20th day of the following month for each discharge which is described by this permit whether or not a discharge is made for that month. Monitoring results must be submitted online using the NetDMR reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. Monitoring results must be signed and certified as required by Monitoring and Reporting Requirements No. 10.

As provided by state law, the permittee is subject to administrative, civil and criminal penalties, as applicable, for negligently or knowingly violating the Clean Water Act (CWA); TWC §§ 26, 27, and 28; and THSC § 361, including but not limited to knowingly making any false statement, representation, or certification on any report, record, or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance, or falsifying, tampering with or knowingly rendering inaccurate any monitoring device or method required by this permit or violating any other requirement imposed by state or federal regulations.

2. Test Procedures

a. Unless otherwise specified in this permit, test procedures for the analysis of pollutants shall comply with procedures specified in 30 TAC §§ 319.11 - 319.12. Measurements, tests, and calculations shall be accurately accomplished in a representative manner.

b. All laboratory tests submitted to demonstrate compliance with this permit must meet the requirements of 30 TAC § 25, Environmental Testing Laboratory Accreditation and Certification.

3. Records of Results

a. Monitoring samples and measurements shall be taken at times and in a manner so as to be representative of the monitored activity.

b. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period

of at least five years (or longer as required by 40 CFR Part 503), monitoring and reporting records, including strip charts and records of calibration and maintenance, copies of all records required by this permit, records of all data used to complete the application for this permit, and the certification required by 40 CFR § 264.73(b)(9) shall be retained at the facility site, or shall be readily available for review by a TCEQ representative for a period of three years from the date of the record or sample, measurement, report, application or certification. This period shall be extended at the request of the Executive Director.

c. Records of monitoring activities shall include the following:

i. date, time and place of sample or measurement;

ii. identity of individual who collected the sample or made the measurement.

iii. date and time of analysis;

iv. identity of the individual and laboratory who performed the analysis;

v. the technique or method of analysis; and

vi. the results of the analysis or measurement and quality assurance/quality control records.

The period during which records are required to be kept shall be automatically extended to the date of the final disposition of any administrative or judicial enforcement action that may be instituted against the permittee.

4. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit using approved analytical methods as specified above, all results of such monitoring shall be included in the calculation and reporting of the values submitted on the approved self-report form. Increased frequency of sampling shall be indicated on the self-report form.

5. Calibration of Instruments

All automatic flow measuring or recording devices and all totalizing meters for measuring flows shall be accurately calibrated by a trained person at plant start-up and as often thereafter as necessary to ensure accuracy, but not less often than annually unless authorized by the Executive Director for a longer period. Such person shall verify in writing that the device is operating properly and giving accurate results. Copies of the verification shall be retained at the facility site and/or shall be readily available for review by a TCEQ representative for a period of three years.

6. Compliance Schedule Reports

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date to the Regional Office and the Compliance Monitoring Team of the Enforcement Division (MC 224).

7. Noncompliance Notification

   a. In accordance with 30 TAC § 305.125(9) any noncompliance which may endanger human health or safety, or the environment shall be reported by the permittee to the TCEQ. Except as allowed by 30 TAC § 305.132, report of such information shall be provided orally or by facsimile transmission (FAX) to the Regional Office within 24 hours of becoming aware of the noncompliance. A written submission of such information shall also be provided by the permittee to the Regional Office and the Compliance Monitoring Team of the Enforcement Division (MC 224) within five working days of becoming aware of the noncompliance. For Publicly Owned Treatment Works (POTWs), effective December 21, 2023, the permittee must submit the written report for unauthorized discharges and unanticipated bypasses that exceed any effluent limit in the permit using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver. The written submission shall contain a description of the noncompliance and its cause; the potential danger to human health or safety, or the environment; the period of noncompliance, including exact dates and times; if the noncompliance has not been corrected, the time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance, and to mitigate its adverse effects.

   b. The following violations shall be reported under Monitoring and Reporting Requirement 7.a.:

      i. Unauthorized discharges as defined in Permit Condition 2(g).

      ii. Any unanticipated bypass that exceeds any effluent limitation in the permit.

      iii. Violation of a permitted maximum daily discharge limitation for pollutants listed specifically in the Other Requirements section of an Industrial TPDES permit.

   c. In addition to the above, any effluent violation which deviates from the permitted effluent limitation by more than 40% shall be reported by the permittee in writing to the Regional Office and the Compliance Monitoring Team of the Enforcement Division (MC 224) within 5 working days of becoming aware of the noncompliance.

   d. Any noncompliance other than that specified in this section, or any required information not submitted or submitted incorrectly, shall be reported to the Compliance Monitoring Team of the Enforcement Division (MC 224) as promptly as possible. For effluent limitation violations, non-compliances shall be reported on the approved self-report form.

8. In accordance with the procedures described in 30 TAC §§ 35.301 - 35.303 (relating to Water Quality Emergency and Temporary Orders) if the permittee knows in advance of the need for a bypass, it shall submit prior notice by applying for such authorization.

9. Changes in Discharges of Toxic Substances

   All existing manufacturing, commercial, mining, and silvicultural permittees shall notify the Regional Office, orally or by facsimile transmission within 24 hours, and both the Regional Office and the Compliance Monitoring Team of the Enforcement Division (MC 224) in writing within five (5) working days, after becoming aware of or having reason to believe:

a. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant listed at 40 CFR Part 122, Appendix D, Tables II and III (excluding Total Phenols) which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. One hundred micrograms per liter (100 µg/L);

   ii. Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;

   iii. Five (5) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

b. That any activity has occurred or will occur which would result in any discharge, on a nonroutine or infrequent basis, of a toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels":

   i. Five hundred micrograms per liter (500 µg/L);

   ii. One milligram per liter (1 mg/L) for antimony;

   iii. Ten (10) times the maximum concentration value reported for that pollutant in the permit application; or

   iv. The level established by the TCEQ.

10. Signatories to Reports

All reports and other information requested by the Executive Director shall be signed by the person and in the manner required by 30 TAC § 305.128 (relating to Signatories to Reports).

11. All POTWs must provide adequate notice to the Executive Director of the following:

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to CWA § 301 or § 306 if it were directly discharging those pollutants;

b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit; and

c. For the purpose of this paragraph, adequate notice shall include information on:

   i. The quality and quantity of effluent introduced into the POTW; and

   ii. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

PERMIT CONDITIONS

1. General

   a. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in an application or in any report to the Executive Director, it shall promptly submit such facts or information.

   b. This permit is granted on the basis of the information supplied and representations made by the permittee during action on an application, and relying upon the accuracy and completeness of that information and those representations. After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked, in whole or in part, in accordance with 30 TAC Chapter 305, Subchapter D, during its term for good cause including, but not limited to, the following:

      i. Violation of any terms or conditions of this permit;

      ii. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

      iii. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

   c. The permittee shall furnish to the Executive Director, upon request and within a reasonable time, any information to determine whether cause exists for amending, revoking, suspending or terminating the permit. The permittee shall also furnish to the Executive Director, upon request, copies of records required to be kept by the permit.

2. Compliance

   a. Acceptance of the permit by the person to whom it is issued constitutes acknowledgment and agreement that such person will comply with all the terms and conditions embodied in the permit, and the rules and other orders of the Commission.

   b. The permittee has a duty to comply with all conditions of the permit. Failure to comply with any permit condition constitutes a violation of the permit and the Texas Water Code or the Texas Health and Safety Code, and is grounds for enforcement action, for permit amendment, revocation, or suspension, or for denial of a permit renewal application or an application for a permit for another facility.

   c. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

   d. The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal or other permit violation that has a reasonable likelihood of adversely affecting human health or the environment.

   e. Authorization from the Commission is required before beginning any change in the permitted facility or activity that may result in noncompliance with any permit requirements.

f. A permit may be amended, suspended and reissued, or revoked for cause in accordance with 30 TAC §§ 305.62 and 305.66 and TWC§ 7.302. The filing of a request by the permittee for a permit amendment, suspension and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

g. There shall be no unauthorized discharge of wastewater or any other waste. For the purpose of this permit, an unauthorized discharge is considered to be any discharge of wastewater into or adjacent to water in the state at any location not permitted as an outfall or otherwise defined in the Other Requirements section of this permit.

h. In accordance with 30 TAC § 305.535(a), the permittee may allow any bypass to occur from a TPDES permitted facility which does not cause permitted effluent limitations to be exceeded or an unauthorized discharge to occur, but only if the bypass is also for essential maintenance to assure efficient operation.

1. The permittee is subject to administrative, civil, and criminal penalties, as applicable, under TWC §§ 7.051 - 7.075 (relating to Administrative Penalties), 7.101 - 7.111 (relating to Civil Penalties), and 7.141 - 7.202 (relating to Criminal Offenses and Penalties) for violations including, but not limited to, negligently or knowingly violating the federal CWA §§ 301, 302, 306, 307, 308, 318, or 405, or any condition or limitation implementing any sections in a permit issued under the CWA § 402, or any requirement imposed in a pretreatment program approved under the CWA §§ 402 (a)(3) or 402 (b)(8).

3. Inspections and Entry

a. Inspection and entry shall be allowed as prescribed in the TWC Chapters 26, 27, and 28, and THSC § 361.

b The members of the Commission and employees and agents of the Commission are entitled to enter any public or private property at any reasonable time for the purpose of inspecting and investigating conditions relating to the quality of water in the state or the compliance with any rule, regulation, permit or other order of the Commission. Members, employees, or agents of the Commission and Commission contractors are entitled to enter public or private property at any reasonable time to investigate or monitor or, if the responsible party is not responsive or there is an immediate danger to public health or the environment, to remove or remediate a condition related to the quality of water in the state. Members, employees, Commission contractors, or agents acting under this authority who enter private property shall observe the establishment's rules and regulations concerning safety, internal security, and fire protection, and if the property has management in residence, shall notify management or the person then in charge of his presence and shall exhibit proper credentials. If any member, employee, Commission contractor, or agent is refused the right to enter in or on public or private property under this authority, the Executive Director may invoke the remedies authorized in TWC § 7.002. The statement above, that Commission entry shall occur in accordance with an establishment's rules and regulations concerning safety, internal security, and fire protection, is not grounds for denial or restriction of entry to any part of the facility, but merely describes the Commission's duty to observe appropriate rules and regulations during an inspection.

4. Permit Amendment and/or Renewal

   a. The permittee shall give notice to the Executive Director as soon as possible of any planned physical alterations or additions to the permitted facility if such alterations or additions would require a permit amendment or result in a violation of permit requirements. Notice shall also be required under this paragraph when:

      i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in accordance with 30 TAC § 305.534 (relating to New Sources and New Dischargers); or

      ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are subject neither to effluent limitations in the permit, nor to notification requirements in Monitoring and Reporting Requirements No. 9; or

      iii. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

   b. Prior to any facility modifications, additions, or expansions that will increase the plant capacity beyond the permitted flow, the permittee must apply for and obtain proper authorization from the Commission before commencing construction.

   c. The permittee must apply for an amendment or renewal at least 180 days prior to expiration of the existing permit in order to continue a permitted activity after the expiration date of the permit. If an application is submitted prior to the expiration date of the permit, the existing permit shall remain in effect until the application is approved, denied, or returned. If the application is returned or denied, authorization to continue such activity shall terminate upon the effective date of the action. If an application is not submitted prior to the expiration date of the permit, the permit shall expire and authorization to continue such activity shall terminate.

   d. Prior to accepting or generating wastes which are not described in the permit application or which would result in a significant change in the quantity or quality of the existing discharge, the permittee must report the proposed changes to the Commission. The permittee must apply for a permit amendment reflecting any necessary changes in permit conditions, including effluent limitations for pollutants not identified and limited by this permit.

   e. In accordance with the TWC § 26.029(b), after a public hearing, notice of which shall be given to the permittee, the Commission may require the permittee, from time to time, for good cause, in accordance with applicable laws, to conform to new or additional conditions.

   f. If any toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is promulgated under CWA § 307(a) for a toxic pollutant which is present in the discharge and that standard or prohibition is more stringent than any limitation on the pollutant in this permit, this permit shall be modified or revoked and reissued to conform to the toxic effluent standard or

prohibition. The permittee shall comply with effluent standards or prohibitions established under CWA § 307(a) for toxic pollutants within the time provided in the regulations that established those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

5. Permit Transfer

   a. Prior to any transfer of this permit, Commission approval must be obtained. The Commission shall be notified in writing of any change in control or ownership of facilities authorized by this permit. Such notification should be sent to the Applications Review and Processing Team (MC 148) of the Water Quality Division.

   b. A permit may be transferred only according to the provisions of 30 TAC § 305.64 (relating to Transfer of Permits) and 30 TAC § 50.133 (relating to Executive Director Action on Application or WQMP update).

6. Relationship to Hazardous Waste Activities

   This permit does not authorize any activity of hazardous waste storage, processing, or disposal that requires a permit or other authorization pursuant to the Texas Health and Safety Code.

7. Relationship to Water Rights

   Disposal of treated effluent by any means other than discharge directly to water in the state must be specifically authorized in this permit and may require a permit pursuant to TWC Chapter 11.

8. Property Rights

   A permit does not convey any property rights of any sort, or any exclusive privilege.

9. Permit Enforceability

   The conditions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

10. Relationship to Permit Application

    The application pursuant to which the permit has been issued is incorporated herein; provided, however, that in the event of a conflict between the provisions of this permit and the application, the provisions of the permit shall control.

11. Notice of Bankruptcy

    a. Each permittee shall notify the Executive Director, in writing, immediately following the filing of a voluntary or involuntary petition for bankruptcy under any chapter of Title 11 (Bankruptcy) of the United States Code (11 USC) by or against:

       i. the permittee;

       ii. an entity (as that term is defined in 11 USC, § 101(14)) controlling the permittee or listing the permit or permittee as property of the estate; or

iii. an affiliate (as that term is defined in 11 USC, § 101(2)) of the permittee.

b. This notification must indicate:

i. the name of the permittee and the permit number(s);

ii. the bankruptcy court in which the petition for bankruptcy was filed; and

iii. the date of filing of the petition.

OPERATIONAL REQUIREMENTS

1. The permittee shall at all times ensure that the facility and all of its systems of collection, treatment, and disposal are properly operated and maintained. This includes, but is not limited to, the regular, periodic examination of wastewater solids within the treatment plant by the operator in order to maintain an appropriate quantity and quality of solids inventory as described in the various operator training manuals and according to accepted industry standards for process control. Process control, maintenance, and operations records shall be retained at the facility site, or shall be readily available for review by a TCEQ representative, for a period of three years.

2. Upon request by the Executive Director, the permittee shall take appropriate samples and provide proper analysis in order to demonstrate compliance with Commission rules. Unless otherwise specified in this permit or otherwise ordered by the Commission, the permittee shall comply with all applicable provisions of 30 TAC Chapter 312 concerning sewage sludge use and disposal and 30 TAC §§ 319.21 - 319.29 concerning the discharge of certain hazardous metals.

3. Domestic wastewater treatment facilities shall comply with the following provisions:

   a. The permittee shall notify the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, in writing, of any facility expansion at least 90 days prior to conducting such activity.

   b. The permittee shall submit a closure plan for review and approval to the Municipal Permits Team, Wastewater Permitting Section (MC 148) of the Water Quality Division, for any closure activity at least 90 days prior to conducting such activity. Closure is the act of permanently taking a waste management unit or treatment facility out of service and includes the permanent removal from service of any pit, tank, pond, lagoon, surface impoundment and/or other treatment unit regulated by this permit.

4. The permittee is responsible for installing prior to plant start-up, and subsequently maintaining, adequate safeguards to prevent the discharge of untreated or inadequately treated wastes during electrical power failures by means of alternate power sources, standby generators, and/or retention of inadequately treated wastewater.

5. Unless otherwise specified, the permittee shall provide a readily accessible sampling point and, where applicable, an effluent flow measuring device or other acceptable means by which effluent flow may be determined.

6. The permittee shall remit an annual water quality fee to the Commission as required by 30 TAC Chapter 21. Failure to pay the fee may result in revocation of this permit under TWC § 7.302(b)(6).

7. Documentation

   For all written notifications to the Commission required of the permittee by this permit, the permittee shall keep and make available a copy of each such notification under the same conditions as self-monitoring data are required to be kept and made available. Except for information required for TPDES permit applications, effluent data, including effluent data in permits, draft permits and permit applications, and other information specified as not confidential in 30 TAC §§ 1.5(d), any information submitted pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted in the manner prescribed in the application form or by stamping the words confidential business information on each page containing such information. If no claim is made at the time of submission, information may be made available to the public without further notice. If the Commission or Executive Director agrees with the designation of confidentiality, the TCEQ will not provide the information for public inspection unless required by the Texas Attorney General or a court pursuant to an open records request. If the Executive Director does not agree with the designation of confidentiality, the person submitting the information will be notified.

8. Facilities that generate domestic wastewater shall comply with the following provisions; domestic wastewater treatment facilities at permitted industrial sites are excluded.

   a. Whenever flow measurements for any domestic sewage treatment facility reach 75% of the permitted daily average or annual average flow for three consecutive months, the permittee must initiate engineering and financial planning for expansion and/or upgrading of the domestic wastewater treatment and/or collection facilities. Whenever the flow reaches 90% of the permitted daily average or annual average flow for three consecutive months, the permittee shall obtain necessary authorization from the Commission to commence construction of the necessary additional treatment and/or collection facilities. In the case of a domestic wastewater treatment facility which reaches 75% of the permitted daily average or annual average flow for three consecutive months, and the planned population to be served or the quantity of waste produced is not expected to exceed the design limitations of the treatment facility, the permittee shall submit an engineering report supporting this claim to the Executive Director of the Commission.

      If in the judgment of the Executive Director the population to be served will not cause permit noncompliance, then the requirement of this section may be waived. To be effective, any waiver must be in writing and signed by the Director of the Enforcement Division (MC 219) of the Commission, and such waiver of these requirements will be reviewed upon expiration of the existing permit; however, any such waiver shall not be interpreted as condoning or excusing any violation of any permit parameter.

   b. The plans and specifications for domestic sewage collection and treatment works associated with any domestic permit must be approved by the Commission and failure to secure approval before commencing construction of such works or making a discharge is a violation of this permit and each day is an additional violation until approval has been secured.

c. Permits for domestic wastewater treatment plants are granted subject to the policy of the Commission to encourage the development of area-wide waste collection, treatment, and disposal systems. The Commission reserves the right to amend any domestic wastewater permit in accordance with applicable procedural requirements to require the system covered by this permit to be integrated into an area-wide system, should such be developed; to require the delivery of the wastes authorized to be collected in, treated by or discharged from said system, to such area-wide system; or to amend this permit in any other particular to effectuate the Commission's policy. Such amendments may be made when the changes required are advisable for water quality control purposes and are feasible on the basis of waste treatment technology, engineering, financial, and related considerations existing at the time the changes are required, exclusive of the loss of investment in or revenues from any then existing or proposed waste collection, treatment or disposal system.

9. Domestic wastewater treatment plants shall be operated and maintained by sewage plant operators holding a valid certificate of competency at the required level as defined in 30 TAC Chapter 30.

10. For Publicly Owned Treatment Works (POTWs), the 30-day average (or monthly average) percent removal for BOD and TSS shall not be less than 85%, unless otherwise authorized by this permit.

11. Facilities that generate industrial solid waste as defined in 30 TAC § 335.1 shall comply with these provisions:

    a. Any solid waste, as defined in 30 TAC § 335.1 (including but not limited to such wastes as garbage, refuse, sludge from a waste treatment, water supply treatment plant or air pollution control facility, discarded materials, discarded materials to be recycled, whether the waste is solid, liquid, or semisolid), generated by the permittee during the management and treatment of wastewater, must be managed in accordance with all applicable provisions of 30 TAC Chapter 335, relating to Industrial Solid Waste Management.

    b. Industrial wastewater that is being collected, accumulated, stored, or processed before discharge through any final discharge outfall, specified by this permit, is considered to be industrial solid waste until the wastewater passes through the actual point source discharge and must be managed in accordance with all applicable provisions of 30 TAC Chapter 335.

    c. The permittee shall provide written notification, pursuant to the requirements of 30 TAC § 335.8(b)(1), to the Corrective Action Section (MC 127) of the Remediation Division informing the Commission of any closure activity involving an Industrial Solid Waste Management Unit, at least 90 days prior to conducting such an activity.

    d. Construction of any industrial solid waste management unit requires the prior written notification of the proposed activity to the Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division. No person shall dispose of industrial solid waste, including sludge or other solids from wastewater treatment processes, prior to fulfilling the deed recordation requirements of 30 TAC § 335.5.

    e. The term "industrial solid waste management unit" means a landfill, surface impoundment, waste-pile, industrial furnace, incinerator, cement kiln, injection well,

container, drum, salt dome waste containment cavern, or any other structure vessel, appurtenance, or other improvement on land used to manage industrial solid waste.

f. The permittee shall keep management records for all sludge (or other waste) removed from any wastewater treatment process. These records shall fulfill all applicable requirements of 30 TAC § 335 and must include the following, as it pertains to wastewater treatment and discharge:

i. Volume of waste and date(s) generated from treatment process;
ii. Volume of waste disposed of on-site or shipped off-site;
iii. Date(s) of disposal;
iv. Identity of hauler or transporter;
v. Location of disposal site; and
vi. Method of final disposal.

The above records shall be maintained on a monthly basis. The records shall be retained at the facility site, or shall be readily available for review by authorized representatives of the TCEQ for at least five years.

12. For industrial facilities to which the requirements of 30 TAC § 335 do not apply, sludge and solid wastes, including tank cleaning and contaminated solids for disposal, shall be disposed of in accordance with THSC § 361.

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SLUDGE PROVISIONS

The permittee is authorized to dispose of sludge only at a Texas Commission on Environmental Quality (TCEQ) authorized land application site, co-disposal landfill, wastewater treatment facility, or facility that further processes sludge. **The disposal of sludge by land application on property owned, leased or under the direct control of the permittee is a violation of the permit unless the site is authorized with the TCEQ. This provision does not authorize Distribution and Marketing of Class A or Class AB Sewage Sludge. This provision does not authorize the permittee to land apply sludge on property owned, leased or under the direct control of the permittee.**

SECTION I. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE LAND APPLICATION

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. In all cases, if the person (permit holder) who prepares the sewage sludge supplies the sewage sludge to another person for land application use or to the owner or lease holder of the land, the permit holder shall provide necessary information to the parties who receive the sludge to assure compliance with these regulations.

3. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

B. Testing Requirements

1. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I [Toxicity Characteristic Leaching Procedure (TCLP)] or other method that receives the prior approval of the TCEQ for the contaminants listed in 40 CFR Part 261.24, Table 1. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal. Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC Region 13) within seven (7) days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P.O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 13) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year. Effective December 21, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

2. Sewage sludge shall not be applied to the land if the concentration of the pollutants exceeds the pollutant concentration criteria in Table 1. The frequency of testing for pollutants in Table 1 is found in Section I.C. of this permit.

TABLE 1

Pollutant	Ceiling Concentration (Milligrams per kilogram)*
Arsenic	75
Cadmium	85
Chromium	3000
Copper	4300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
PCBs	49
Selenium	100
Zinc	7500

* Dry weight basis

3. Pathogen Control

All sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site must be treated by one of the following methods to ensure that the sludge meets either the Class A, Class AB or Class B pathogen requirements.

a. For sewage sludge to be classified as Class A with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 most probable number (MPN) per gram of total solids (dry weight basis), or the density of Salmonella sp. bacteria in the sewage sludge must be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

Alternative 1 - The temperature of the sewage sludge that is used or disposed shall be maintained at or above a specific value for a period of time. See 30 TAC § 312.82(a)(2)(A) for specific information;

Alternative 5 (PFRP) - Sewage sludge that is used or disposed of must be treated in one of the Processes to Further Reduce Pathogens (PFRP) described in 40 CFR Part 503, Appendix B. PFRP include composting, heat drying, heat treatment, and thermophilic aerobic digestion; or

Alternative 6 (PFRP Equivalent) - Sewage sludge that is used or disposed of must be treated in a process that has been approved by the U. S. Environmental Protection Agency as being equivalent to those in Alternative 5.

b. For sewage sludge to be classified as Class AB with respect to pathogens, the density of fecal coliform in the sewage sludge must be less than 1,000 MPN per gram of total solids (dry weight basis), or the density of *Salmonella* sp. bacteria in the sewage sludge be less than three MPN per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. In addition, one of the alternatives listed below must be met:

Alternative 2 - The pH of the sewage sludge that is used or disposed shall be raised to above 12 std. units and shall remain above 12 std. units for 72 hours.

The temperature of the sewage sludge shall be above 52° Celsius for 12 hours or longer during the period that the pH of the sewage sludge is above 12 std. units.

At the end of the 72-hour period during which the pH of the sewage sludge is above 12 std. units, the sewage sludge shall be air dried to achieve a percent solids in the sewage sludge greater than 50%; or

Alternative 3 - The sewage sludge shall be analyzed for enteric viruses prior to pathogen treatment. The limit for enteric viruses is less than one Plaque-forming Unit per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(i-iii) for specific information. The sewage sludge shall be analyzed for viable helminth ova prior to pathogen treatment. The limit for viable helminth ova is less than one per four grams of total solids (dry weight basis) either before or following pathogen treatment. See 30 TAC § 312.82(a)(2)(C)(iv-vi) for specific information; or

Alternative 4 - The density of enteric viruses in the sewage sludge shall be less than one Plaque-forming Unit per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed. The density of viable helminth ova in the sewage sludge shall be less than one per four grams of total solids (dry weight basis) at the time the sewage sludge is used or disposed.

c. Sewage sludge that meets the requirements of Class AB sewage sludge may be classified a Class A sewage sludge if a variance request is submitted in writing that is supported by substantial documentation demonstrating equivalent methods for reducing odors and written approval is granted by the executive director. The executive director may deny the variance request or revoke that approved variance if it is determined that the variance may potentially endanger human health or the environment, or create nuisance odor conditions.

d. Three alternatives are available to demonstrate compliance with Class B criteria for sewage sludge.

Alternative 1

i. A minimum of seven random samples of the sewage sludge shall be collected within 48 hours of the time the sewage sludge is used or disposed of during each monitoring episode for the sewage sludge.

ii. The geometric mean of the density of fecal coliform in the samples collected shall be less than either 2,000,000 MPN per gram of total solids (dry weight basis) or 2,000,000 Colony Forming Units per gram of total solids (dry weight basis).

Alternative 2 - Sewage sludge that is used or disposed of shall be treated in one of the Processes to Significantly Reduce Pathogens (PSRP) described in 40 CFR Part 503, Appendix B, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. An independent Texas Licensed Professional Engineer must make a certification to the generator of a sewage sludge that the wastewater treatment facility generating the sewage sludge is designed to achieve one of the PSRP at the permitted design loading of the facility. The certification need only be repeated if the design loading of the facility is increased. The certification shall include a statement indicating the design meets all the applicable standards specified in Appendix B of 40 CFR Part 503;

iii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iv. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review; and

v. If the sewage sludge is generated from a mixture of sources, resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the PSRP, and shall meet the certification, operation, and record keeping requirements of this paragraph.

Alternative 3 - Sewage sludge shall be treated in an equivalent process that has been approved by the U.S. Environmental Protection Agency, so long as all of the following requirements are met by the generator of the sewage sludge.

i. Prior to use or disposal, all the sewage sludge must have been generated from a single location, except as provided in paragraph v. below;

ii. Prior to any off-site transportation or on-site use or disposal of any sewage sludge generated at a wastewater treatment facility, the chief certified operator of the wastewater treatment facility or other responsible official who manages the processes to significantly reduce pathogens at the wastewater treatment facility for the permittee, shall certify that the sewage sludge underwent at least the minimum operational requirements necessary in order to meet one of the PSRP. The acceptable processes and the minimum operational and record keeping requirements shall be in accordance with established U.S. Environmental Protection Agency final guidance;

iii. All certification records and operational records describing how the requirements of this paragraph were met shall be kept by the generator for a minimum of three years and be available for inspection by commission staff for review;

iv. The Executive Director will accept from the U.S. Environmental Protection Agency a finding of equivalency to the defined PSRP; and

v. If the sewage sludge is generated from a mixture of sources resulting from a person who prepares sewage sludge from more than one wastewater treatment facility, the resulting derived product shall meet one of the Processes to Significantly Reduce Pathogens, and shall meet the certification, operation, and record keeping requirements of this paragraph.

In addition to the Alternatives 1 – 3, the following site restrictions must be met if Class B sludge is land applied:

i. Food crops with harvested parts that touch the sewage sludge/soil mixture and are totally above the land surface shall not be harvested for 14 months after application of sewage sludge.

ii. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of sewage sludge when the sewage sludge remains on the land surface for 4 months or longer prior to incorporation into the soil.

iii. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of sewage sludge when the sewage sludge remains on the land surface for less than 4 months prior to incorporation into the soil.

iv. Food crops, feed crops, and fiber crops shall not be harvested for 30 days after application of sewage sludge.

v. Animals shall not be allowed to graze on the land for 30 days after application of sewage sludge.

vi. Turf grown on land where sewage sludge is applied shall not be harvested for 1 year after application of the sewage sludge when the harvested turf is placed on either land with a high potential for public exposure or a lawn.

vii. Public access to land with a high potential for public exposure shall be restricted for 1 year after application of sewage sludge.

viii. Public access to land with a low potential for public exposure shall be restricted for 30 days after application of sewage sludge.

ix. Land application of sludge shall be in accordance with the buffer zone requirements found in 30 TAC § 312.44.

4. Vector Attraction Reduction Requirements

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, or a reclamation site shall be treated by one of the following Alternatives 1 through 10 for vector attraction reduction.

Alternative 1 - The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

Alternative 2 - If Alternative 1 cannot be met for an anaerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge anaerobically in the laboratory in a bench-scale unit for 40 additional days at a temperature between 30° and 37° Celsius. Volatile solids must be reduced by less than 17% to demonstrate compliance.

Alternative 3 - If Alternative 1 cannot be met for an aerobically digested sludge, demonstration can be made by digesting a portion of the previously digested sludge with percent solids of two percent or less aerobically in the laboratory in a bench-scale unit for 30 additional days at 20° Celsius. Volatile solids must be reduced by less than 15% to demonstrate compliance.

Alternative 4 - The specific oxygen uptake rate (SOUR) for sewage sludge treated in an aerobic process shall be equal to or less than 1.5 milligrams of oxygen per hour per gram of total solids (dry weight basis) at a temperature of 20° Celsius.

Alternative 5 - Sewage sludge shall be treated in an aerobic process for 14 days or longer. During that time, the temperature of the sewage sludge shall be higher than 40° Celsius and the average temperature of the sewage sludge shall be higher than 45° Celsius.

Alternative 6 - The pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours at the time the sewage sludge is prepared for sale or given away in a bag or other container.

Alternative 7 - The percent solids of sewage sludge that does not contain unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 75% based on the moisture content and total solids prior to mixing with other materials. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 8 - The percent solids of sewage sludge that contains unstabilized solids generated in a primary wastewater treatment process shall be equal to or greater than 90% based on the moisture content and total solids prior to mixing with other materials at the time the sludge is used. Unstabilized solids are defined as organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Alternative 9 - i. Sewage sludge shall be injected below the surface of the land.

ii. No significant amount of the sewage sludge shall be present on the land surface within one hour after the sewage sludge is injected.

iii. When sewage sludge that is injected below the surface of the land is Class A or Class AB with respect to pathogens, the sewage sludge shall be injected below the land surface within eight hours after being discharged from the pathogen treatment process.

Alternative 10- 1 Sewage sludge applied to the land surface or placed on a surface disposal site shall be incorporated into the soil within six hours after application to or placement on the land.

ii. When sewage sludge that is incorporated into the soil is Class A or Class AB with respect to pathogens, the sewage sludge shall be applied to or placed on the land within eight hours after being discharged from the pathogen treatment process.

C. Monitoring Requirements

Toxicity Characteristic Leaching Procedure (TCLP) Test	- once during the term of this permit
PCBs	- once during the term of this permit

All metal constituents and fecal coliform or *Salmonella* sp. bacteria shall be monitored at the appropriate frequency shown below, pursuant to 30 TAC § 312.46(a)(1):

Amount of sewage sludge (*) metric tons per 365-day period	Monitoring Frequency
0 to less than 290	Once/Year
290 to less than 1,500	Once/Quarter
1,500 to less than 15,000	Once/Two Months
15,000 or greater	Once/Month

(*) *The amount of bulk sewage sludge applied to the land (dry wt. basis).*

Representative samples of sewage sludge shall be collected and analyzed in accordance with the methods referenced in 30 TAC § 312.7

Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and de-gritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a mono-fill) and whether the material is ultimately conveyed off-site in bulk or in bags.

SECTION II. REQUIREMENTS SPECIFIC TO BULK SEWAGE SLUDGE FOR APPLICATION TO THE LAND MEETING CLASS A, CLASS AB or CLASS B PATHOGEN REDUCTION AND THE CUMULATIVE LOADING RATES IN TABLE 2, OR CLASS B PATHOGEN REDUCTION AND THE POLLUTANT CONCENTRATIONS IN TABLE 3

For those permittees meeting Class A, Class AB or Class B pathogen reduction requirements and that meet the cumulative loading rates in Table 2 below, or the Class B pathogen reduction requirements and contain concentrations of pollutants below listed in Table 3, the following conditions apply:

A. Pollutant Limits

Table 2

Pollutant	Cumulative Pollutant Loading Rate (pounds per acre)*
Arsenic	36
Cadmium	35
Chromium	2677
Copper	1339
Lead	268
Mercury	15
Molybdenum	Report Only
Nickel	375
Selenium	89
Zinc	2500

Table 3

Pollutant	Monthly Average Concentration (milligrams per kilogram)*
Arsenic	41
Cadmium	39
Chromium	1200
Copper	1500
Lead	300
Mercury	17
Molybdenum	Report Only
Nickel	420
Selenium	36
Zinc	2800

*Dry weight basis

B. Pathogen Control

All bulk sewage sludge that is applied to agricultural land, forest, a public contact site, a reclamation site, shall be treated by either Class A, Class AB or Class B pathogen reduction requirements as defined above in Section I.B.3.

C. Management Practices

1. Bulk sewage sludge shall not be applied to agricultural land, forest, a public contact site, or a reclamation site that is flooded, frozen, or snow-covered so that the bulk sewage sludge enters a wetland or other waters in the State.

2. Bulk sewage sludge not meeting Class A requirements shall be land applied in a manner which complies with Applicability in accordance with 30 TAC §312.41 and the Management Requirements in accordance with 30 TAC § 312.44.

3. Bulk sewage sludge shall be applied at or below the agronomic rate of the cover crop.

4. An information sheet shall be provided to the person who receives bulk sewage sludge sold or given away. The information sheet shall contain the following information:

   a. The name and address of the person who prepared the sewage sludge that is sold or given away in a bag or other container for application to the land.

   b. A statement that application of the sewage sludge to the land is prohibited except in accordance with the instruction on the label or information sheet.

   c. The annual whole sludge application rate for the sewage sludge application rate for the sewage sludge that does not cause any of the cumulative pollutant loading rates in Table 2 above to be exceeded, unless the pollutant concentrations in Table 3 found in Section II above are met.

D. Notification Requirements

1. If bulk sewage sludge is applied to land in a State other than Texas, written notice shall be provided prior to the initial land application to the permitting authority for the State in which the bulk sewage sludge is proposed to be applied. The notice shall include:

   a. The location, by street address, and specific latitude and longitude, of each land application site.

   b. The approximate time period bulk sewage sludge will be applied to the site.

   c. The name, address, telephone number, and National Pollutant Discharge Elimination System permit number (if appropriate) for the person who will apply the bulk sewage sludge.

2. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

E. Record keeping Requirements

The sludge documents will be retained at the facility site and/or shall be readily available for review by a TCEQ representative. The person who prepares bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at

the facility site and/or shall be readily available for review by a TCEQ representative for a period of five years. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply.

1. The concentration (mg/kg) in the sludge of each pollutant listed in Table 3 above and the applicable pollutant concentration criteria (mg/kg), or the applicable cumulative pollutant loading rate and the applicable cumulative pollutant loading rate limit (lbs/ac) listed in Table 2 above.

2. A description of how the pathogen reduction requirements are met (including site restrictions for Class AB and Class B sludge, if applicable).

3. A description of how the vector attraction reduction requirements are met.

4. A description of how the management practices listed above in Section II.C are being met.

5. The following certification statement:

   "I certify, under penalty of law, that the applicable pathogen requirements in 30 TAC § 312.82(a) or (b) and the vector attraction reduction requirements in 30 TAC § 312.83(b) have been met for each site on which bulk sewage sludge is applied. This determination has been made under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate the information used to determine that the management practices have been met. I am aware that there are significant penalties for false certification including fine and imprisonment."

6. The recommended agronomic loading rate from the references listed in Section II.C.3. above, as well as the actual agronomic loading rate shall be retained. The person who applies bulk sewage sludge or a sewage sludge material shall develop the following information and shall retain the information at the facility site and/or shall be readily available for review by a TCEQ representative indefinitely. If the permittee supplies the sludge to another person who land applies the sludge, the permittee shall notify the land applier of the requirements for record keeping found in 30 TAC § 312.47 for persons who land apply:

   a. A certification statement that all applicable requirements (specifically listed) have been met, and that the permittee understands that there are significant penalties for false certification including fine and imprisonment. See 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii), as applicable, and to the permittee's specific sludge treatment activities.

   b. The location, by street address, and specific latitude and longitude, of each site on which sludge is applied.

   c. The number of acres in each site on which bulk sludge is applied.

   d. The date and time sludge is applied to each site.

e. The cumulative amount of each pollutant in pounds/acre listed in Table 2 applied to each site.

f. The total amount of sludge applied to each site in dry tons.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

F. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 13) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year the following information. Effective December 21, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and de-gritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Identify the nature of material generated by the facility (such as a biosolid for beneficial use or land-farming, or sewage sludge for disposal at a mono-fill) and whether the material is ultimately conveyed off-site in bulk or in bags.

3. Results of tests performed for pollutants found in either Table 2 or 3 as appropriate for the permittee's land application practices.

4. The frequency of monitoring listed in Section I.C. that applies to the permittee.

5. Toxicity Characteristic Leaching Procedure (TCLP) results.

6. PCB concentration in sludge in mg/kg.

7. Identity of hauler(s) and TCEQ transporter number.

8. Date(s) of transport.

9. Texas Commission on Environmental Quality registration number, if applicable.

10. Amount of sludge disposal dry weight (lbs/acre) at each disposal site.

11. The concentration (mg/kg) in the sludge of each pollutant listed in Table 1 (defined as a monthly average) as well as the applicable pollutant concentration criteria (mg/kg) listed in Table 3 above, or the applicable pollutant loading rate limit (lbs/acre) listed in Table 2 above if it exceeds 90% of the limit.

12. Level of pathogen reduction achieved (Class A, Class AB or Class B).

13. Alternative used as listed in Section I.B.3.(a. or b.). Alternatives describe how the pathogen reduction requirements are met. If Class B sludge, include information on how site restrictions were met.

14. Identify each of the analytic methods used by the facility to analyze enteric viruses, fecal coliforms, helminth ova, *Salmonella* sp., and other regulated parameters.

15. Vector attraction reduction alternative used as listed in Section I.B.4.

16. Amount of sludge transported in dry tons/year.

17. The certification statement listed in either 30 TAC § 312.47(a)(4)(A)(ii) or 30 TAC § 312.47(a)(5)(A)(ii) as applicable to the permittee's sludge treatment activities, shall be attached to the annual reporting form.

18. When the amount of any pollutant applied to the land exceeds 90% of the cumulative pollutant loading rate for that pollutant, as described in Table 2, the permittee shall report the following information as an attachment to the annual reporting form.

    a. The location, by street address, and specific latitude and longitude.

    b. The number of acres in each site on which bulk sewage sludge is applied.

    c. The date and time bulk sewage sludge is applied to each site.

    d. The cumulative amount of each pollutant (i.e., pounds/acre) listed in Table 2 in the bulk sewage sludge applied to each site.

    e. The amount of sewage sludge (i.e., dry tons) applied to each site.

    The above records shall be maintained on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION III. REQUIREMENTS APPLYING TO ALL SEWAGE SLUDGE DISPOSED IN A MUNICIPAL SOLID WASTE LANDFILL

A. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC § 330 and all other applicable state and federal regulations to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present. The permittee shall ensure that the sewage sludge meets the requirements in 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

B. If the permittee generates sewage sludge and supplies that sewage sludge to the owner or operator of a municipal solid waste landfill (MSWLF) for disposal, the permittee shall provide to the owner or operator of the MSWLF appropriate information needed to be in compliance with the provisions of this permit.

C. The permittee shall give 180 days prior notice to the Executive Director in care of the Wastewater Permitting Section (MC 148) of the Water Quality Division of any change planned in the sewage sludge disposal practice.

D. Sewage sludge shall be tested once during the term of this permit in accordance with the method specified in both 40 CFR Part 261, Appendix II and 40 CFR Part 268, Appendix I (Toxicity Characteristic Leaching Procedure) or other method, which receives the prior approval of the TCEQ for contaminants listed in Table 1 of 40 CFR § 261.24. Sewage sludge failing this test shall be managed according to RCRA standards for generators of hazardous waste, and the waste's disposition must be in accordance with all applicable requirements for hazardous waste processing, storage, or disposal.

Following failure of any TCLP test, the management or disposal of sewage sludge at a facility other than an authorized hazardous waste processing, storage, or disposal facility shall be prohibited until such time as the permittee can demonstrate the sewage sludge no longer exhibits the hazardous waste toxicity characteristics (as demonstrated by the results of the TCLP tests). A written report shall be provided to both the TCEQ Registration and Reporting Section (MC 129) of the Permitting and Registration Support Division and the Regional Director (MC Region 13) of the appropriate TCEQ field office within 7 days after failing the TCLP Test.

The report shall contain test results, certification that unauthorized waste management has stopped and a summary of alternative disposal plans that comply with RCRA standards for the management of hazardous waste. The report shall be addressed to: Director, Permitting and Registration Support Division (MC 129), Texas Commission on Environmental Quality, P. O. Box 13087, Austin, Texas 78711-3087. In addition, the permittee shall prepare an annual report on the results of all sludge toxicity testing. This annual report shall be submitted to the TCEQ Regional Office (MC Region 13) and the Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30 of each year.

E. Sewage sludge shall be tested as needed, in accordance with the requirements of 30 TAC Chapter 330.

F. Record keeping Requirements

The permittee shall develop the following information and shall retain the information for five years.

1. The description (including procedures followed and the results) of all liquid Paint Filter Tests performed.

2. The description (including procedures followed and results) of all TCLP tests performed.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

G. Reporting Requirements

The permittee shall report annually to the TCEQ Regional Office (MC Region 13) and Compliance Monitoring Team (MC 224) of the Enforcement Division by September 30th of each year the following information. Effective December 21, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and de-gritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. Toxicity Characteristic Leaching Procedure (TCLP) results.

3. Annual sludge production in dry tons/year.

4. Amount of sludge disposed in a municipal solid waste landfill in dry tons/year.

5. Amount of sludge transported interstate in dry tons/year.

6. A certification that the sewage sludge meets the requirements of 30 TAC § 330 concerning the quality of the sludge disposed in a municipal solid waste landfill.

7. Identity of hauler(s) and transporter registration number.

8. Owner of disposal site(s).

9. Location of disposal site(s).

10. Date(s) of disposal.

The above records shall be maintained on-site on a monthly basis and shall be made available to the Texas Commission on Environmental Quality upon request.

SECTION IV. REQUIREMENTS APPLYING TO SLUDGE TRANSPORTED TO ANOTHER FACILITY FOR FURTHER PROCESSING

These provisions apply to sludge that is transported to another wastewater treatment facility or facility that further processes sludge. These provisions are intended to allow transport of sludge to facilities that have been authorized to accept sludge. These provisions do not limit the ability of the receiving facility to determine whether to accept the sludge, nor do they limit the ability of the receiving facility to request additional testing or documentation.

A. General Requirements

1. The permittee shall handle and dispose of sewage sludge in accordance with 30 TAC Chapter 312 and all other applicable state and federal regulations in a manner that protects public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants that may be present in the sludge.

2. Sludge may only be transported using a registered transporter or using an approved pipeline.

B. Record Keeping Requirements

1. For sludge transported by an approved pipeline, the permittee must maintain records of the following:

   a. the amount of sludge transported;

   b. the date of transport;

   c. the name and TCEQ permit number of the receiving facility or facilities;

   d. the location of the receiving facility or facilities;

   e. the name and TCEQ permit number of the facility that generated the waste; and

   f. copy of the written agreement between the permittee and the receiving facility to accept sludge.

2. For sludge transported by a registered transporter, the permittee must maintain records of the completed trip tickets in accordance with 30 TAC § 312.145(a)(1)-(7) and amount of sludge transported.

3. The above records shall be maintained on-site on a monthly basis and shall be made available to the TCEQ upon request. These records shall be retained for at least five years.

C. Reporting Requirements

The permittee shall report the following information annually to the TCEQ Regional Office (MC Region 13) and Compliance Monitoring Team (MC 224) of the Enforcement Division, by September 30th of each year. Effective December 21, 2020, the permittee must submit this annual report using the online electronic reporting system available through the TCEQ website unless the permittee requests and obtains an electronic reporting waiver.

1. Identify in the following categories (as applicable) the sewage sludge treatment process or processes at the facility: preliminary operations (e.g., sludge grinding and de-gritting), thickening (concentration), stabilization, anaerobic digestion, aerobic digestion, composting, conditioning, disinfection (e.g., beta ray irradiation, gamma ray irradiation, pasteurization), dewatering (e.g., centrifugation, sludge drying beds, sludge lagoons), heat drying, thermal reduction, and methane or biogas capture and recovery.

2. the annual sludge production;

3. the amount of sludge transported;

4. the owner of each receiving facility;

5. the location of each receiving facility; and

6. the date(s) of disposal at each receiving facility.

TCEQ Revision 01/2016

OTHER REQUIREMENTS

1. The permittee shall employ or contract with one or more licensed wastewater treatment facility operators or wastewater system operations companies holding a valid license or registration according to the requirements of 30 TAC Chapter 30, Occupational Licenses and Registrations, and in particular 30 TAC Chapter 30, Subchapter J, Wastewater Operators and Operations Companies.

   This Category C facility must be operated by a chief operator or an operator holding a Category C license or higher. The facility must be operated a minimum of five days per week by the licensed chief operator or an operator holding the required level of license or higher. The licensed chief operator or operator holding the required level of license or higher must be available by telephone or pager seven days per week. Where shift operation of the wastewater treatment facility is necessary, each shift that does not have the on-site supervision of the licensed chief operator must be supervised by an operator in charge who is licensed not less than one level below the category for the facility.

2. The facility is not located in the Coastal Management Program boundary.

3. The permittee shall comply with the requirements of 30 TAC § 309.13(a) through (d). In addition, by ownership of the required buffer zone area, the permittee shall comply with the requirements of 30 TAC § 309.13(e).

4. The permittee shall provide facilities for the protection of its wastewater treatment facility from a 100-year flood.

5. In accordance with 30 TAC § 319.9, a permittee that has at least twelve months of uninterrupted compliance with its bacteria limit may notify the commission in writing of its compliance and request a less frequent measurement schedule. To request a less frequent schedule, the permittee shall submit a written request to the TCEQ Wastewater Permitting Section (MC 148) for each phase that includes a different monitoring frequency. The request must contain all of the reported bacteria values (Daily Avg. and Daily Max/Single Grab) for the twelve consecutive months immediately prior to the request. If the Executive Director finds that a less frequent measurement schedule is protective of human health and the environment, the permittee may be given a less frequent measurement schedule. For this permit, 1/month may be reduced to 1/quarter in the Interim I, Interim II, and Final phases. **A violation of any bacteria limit by a facility that has been granted a less frequent measurement schedule will require the permittee to return to the standard frequency schedule and submit written notice to the TCEQ Wastewater Permitting Section (MC 148).** The permittee may not apply for another reduction in measurement frequency for at least 24 months from the date of the last violation. The Executive Director may establish a more frequent measurement schedule if necessary, to protect human health or the environment.

6. Prior to construction of the Interim I, Interim II, and Final phases wastewater treatment facility, the permittee shall submit to the TCEQ Wastewater Permitting Section (MC 148) a summary transmittal letter in accordance with the requirements in 30 TAC § 217.6(d). If requested by the Wastewater Permitting Section, the permittee shall submit plans and specifications and a final engineering design report which comply with 30 TAC Chapter 217, Design Criteria for Domestic Wastewater Systems. The permittee shall clearly show how the treatment system will meet the permitted effluent limitations required on Pages 2, 2a, and

2b of this permit. A copy of the summary transmittal letter shall be available at the plant site for inspection by authorized representatives of the TCEQ.

7. Reporting requirements according to 30 TAC §§ 319.1-319.11 and any additional effluent reporting requirements contained in this permit are suspended from the effective date of the permit until plant startup or discharge from the facility described by this permit, whichever occurs first. The permittee shall provide written notice to the TCEQ Regional Office (MC Region 13) and the Applications Review and Processing Team (MC 148) of the Water Quality Division at least forty-five (45) days prior to plant startup or anticipated discharge, whichever occurs first, and prior to completion of each additional phase on Notification of Completion Form 20007.

8. Within the first 120 days upon commencement of discharges via Outfalls 001 or 002, the permittee is required to submit results of a total dissolved solids, chloride, and sulfate 24-hour composite effluent sample to the Standards Implementation Team (MC 150). Based on a technical review of the submitted analytical results, an amendment may be initiated by TCEQ staff to include additional effluent limitations and/or monitoring requirements.

9. Within 30 days of the startup of the new plant, and completion of the necessary collection system to transfer the flow from the Kendall West Utility LLC, Tapatio Springs WWTP, TPDES Permit No. WQ0012404001 to the new facility, the permittee shall submit a "Clean Closure Plan" and initiate the process for canceling TPDES Permit No. WQ0012404001.

EXHIBIT B

FREESE AND NICHOLS

Innovative approaches
Practical results
Outstanding service

Job No. LBH22423

SOUTH FORK SAN GABRIEL RIVER NUTRIENT EVALUATION

Prepared for:

City of Liberty Hill
926 Loop 332
Liberty Hill, Texas 78642

Prepared by:

Freese and Nichols, Inc.
10431 Morado Circle, Suite 300
Austin, Texas 78759

November 9, 2022

EXECUTIVE SUMMARY

The South Fork San Gabriel River (SFSG) and two of its tributaries were sampled during 2022 according to a monitoring plan approved by the City of Liberty Hill for a SFSG nutrient evaluation study. Sampling was conducted by Freese and Nichols, Inc. (FNI) from June 21 through October 17, 2022.

The study objective was to measure nutrients and algae in the SFSG, understand where nutrients enter the river, sources of those nutrients, and how those nutrients contribute to algal growth. These analyses were conducted in accordance with Texas Commission on Environmental Quality (TCEQ) Agreed Order, Docket No. 2018-1024-MLM-E. The study included collection of samples during normal to low flows on three dates and during two rainfall runoff events.

Water chemistry and benthic algae were analyzed at four sites on the SFSG, two tributaries to the river, and the City of Liberty Hill Regional wastewater treatment plant discharge. For this project, the study area extended from U.S. Highway 183 downstream to Garey Park and the study period was from June 21 through October 17, 2022.

The wastewater treatment plant (WWTP) discharge appears to contribute much of the daily nitrogen and phosphorus in the study reach. Judging from the presence of algae at multiple points where water from seeps and tributaries enter the river, nutrients are being contributed from other sources in addition to the WWTP.

Highest concentrations of ammonia nitrogen, Kjeldahl nitrogen, and total phosphorus were measured in the August 22, 2022 rainfall runoff event samples from the two tributaries. Rainfall runoff from road construction and suburban development are nutrient sources. Tributaries like those sampled in this study also contribute nutrients daily to the river although the concentrations during low flow appear to be below laboratory detection limits.

The study found the highest percent cover of algae in the river about 0.1 miles downstream of the WWTP discharge to the river. Algal growth is present in the tributaries where low flow nutrient concentrations are typically below detectable concentrations during low flows.

Nutrients and conditions in the river near the WWTP discharge support a different community of algae and aquatic plants than are seen upstream of the wastewater discharge. Bushy pondweed, water net, and *Cladophora* are abundant at times in this part of the river. Upstream of the WWTP discharge, nutrients and conditions support the growth of the filamentous green algae, *Spirogyra* and *Mougeotia*, and the aquatic plant, Eurasian milfoil. The submerged aquatic plant community transitions with increasing distance downstream of the WWTP discharge. Bushy pondweed, *Cladophora*, and water net become less common downstream of Ronald Reagan Boulevard.

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Acronyms and Abbreviations

°C	degrees Celsius or Centigrade
°F	degrees Fahrenheit
µg/L	micrograms per liter (parts per billion)
µS/cm	microSiemens per centimeter
CDT	Central Daylight Time
cfs	cubic feet per second
DO	dissolved oxygen
FNI	Freese and Nichols, Inc.
LCRA	Lower Colorado River Authority
mg/L	milligrams per liter (parts per million)
s.u.	standard units
SFSG	South Fork San Gabriel River
TCEQ	Texas Commission on Environmental Quality
TSS	total suspended solids
US 183	U.S. Highway 183
USGS	U.S. Geological Survey
WWTP	wastewater treatment plant

1.0 INTRODUCTION

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The study objective was to measure nutrients and algae in the SFSG River, understand where nutrients are added to the river, sources of those nutrients, and how those nutrients contribute to algal growth in the river. These analyses were conducted in accordance with Texas Commission on Environmental Quality (TCEQ) Agreed Order, Docket No. 2018-1024-MLM-E. The study included collection of samples during normal to low flows on three dates and during two rainfall runoff events.

The study area was defined as the SFSG from U.S. Highway (US) 183 downstream to Garey Park. The study period was from June 21 through October 17, 2022.

2.0 STUDY AREA

The study area included the SFSG in Williamson County, between the cities of Leander to the west and Georgetown to the east. Nine locations were sampled (Table 1, Figure 1) including six in the SFSG, the City of Liberty Hill Regional Wastewater Treatment Plant (WWTP) discharge, and two unnamed tributaries flowing into the river's north shore. The WWTP operates under the requirements of TCEQ's Texas Pollutant Discharge Elimination System permit number, WQ0014477001. All stations were sampled on all sample dates unless otherwise specified in the table below (see descriptions for stations 7, 8, and 9).

Table 1
Sample Stations

Station	Station Description	Latitude (North)	Longitude (West)
Station 1	SFSG, 560 feet downstream of downstream edge of north-bound US 183 bridge and about 0.73 miles upstream of the point at which the WWTP discharge enters the river	30.621451	–97.858602
Station 2	Unnamed tributary, 80 feet upstream of the confluence with the SFSG which is 210 feet downstream of Station 1 and about 0.70 miles upstream of the WWTP discharge	30.621806	–97.858065
Station 3	City of Liberty Hill WWTP (TCEQ Permit WQ0014477001) discharge directly into the SFSG, 0.73 miles downstream of Station 1	30.617436	–97.847712
Station 4	SFSG, 720 feet downstream from the WWTP outfall	30.616254	–97.845924
Station 5	Unnamed tributary, 10 feet upstream of its confluence with the SFSG. Confluence with the SFSG is 0.2 miles downstream of WWTP outfall and 0.1 mile downstream of Station 4	30.616190	–97.844523
Station 6	SFSG, 170 feet downstream of downstream edge of north-bound lane of Ronald Reagan Boulevard and 1.9 miles downstream of the outfall	30.611717	–97.818499
Station 7	SFSG near Gabriel Overlook neighborhood park and 3.5 miles downstream of the WWTP outfall. Station not sampled after June 22, 2022 because of limited access	30.613808	–97.797437
Station 8 (Station 7 after 6/22/22)	SFSG at the downstream end of Garey Park, Georgetown, 3.7 miles downstream of the WWTP outfall. Sampled on August 4 and 22, September 12, 2022, and October 17, 2022	30.613833	–97.794328
Station 9 (Station 7 for 8/22/2022 rainfall sample)	SFSG downstream of the Rancho Siena neighborhood stormwater detention pond, 3.1 miles downstream of the WWTP outfall. Treated as the rainfall runoff sample location for Station 7 on August 22, 2022	30.610805	–97.802712

Figure 1: South Fork San Gabriel River Nutrient Evaluation Study Area Sample Locations

The SFSG is designated by the TCEQ as Water Quality Segment 1250 (TCEQ, 2018). Its watershed extends from its confluence with the North Fork San Gabriel River in downtown Georgetown, Williamson County east of the study area, upstream to its headwaters about 3 miles east of downtown Burnet in Burnet County. The watershed ranges up to 8 miles wide in parts of the upper watershed and from 2 to 5 miles wide in the study area. It is in U.S. Environmental Protection Agency Level IV Ecoregion 30c, the Balcones Canyonlands of the Edwards Plateau which is described as an area "…highly dissected through the erosion and solution of springs, streams, and rivers…through porous limestone." The study area passes through the Edwards Aquifer contributing zone.

The SFSG flows about 4 miles from US 183 downstream to Garey Park over a solid limestone bedrock bottom and frequently between limestone bluffs. The channel is narrow at US 183, frequently less than 10 feet wide, gradually widening to a shallow, open channel more than 60 feet wide in places at Station 7.

There are two substantial pools in the reach, and both are between US 183 and the discharge from the WWTP. About 560 feet downstream of US 183, the river flows into a natural pool about 5 or 6 feet deep, 80 feet wide, and nearly a quarter of a mile long (Figure 2). The unnamed tributary, Station 2, also flows into the headwaters of this pool. This pool is created by a natural limestone ridge across the river. Flow from another unnamed tributary enters the river from the north bank just downstream of this limestone ridge, and before the river flows into a second pool.

The second pool which is up to 100 feet wide and nearly a quarter of a mile long, is created by a low, artificial dam across the river (Figure 3). Water depths reach 6 feet. Both pools harbor the filamentous algae, *Chara,* in shallow areas, along with extensive beds of the exotic Eurasian milfoil (*Myriophyllum spicatum*) and some filamentous algae. Downstream of this pool, the river flows as a series of long runs and glides occasionally separated by cobble or limestone bedrock riffles for the remainder of the study reach. The river's shore is thickly vegetated with a wide variety of grasses, shrubs, and trees. Except for a few short reaches, the river is not shaded by trees.

The river receives a variety of inputs which were not sampled during this study. Several tributaries, seeps, and springs enter the river from US 183 downstream to Ronald Reagan Boulevard. There were fewer observed flow contributions downstream of Ronald Reagan Boulevard. During a reconnaissance trip by foot from US 183 to Gabriel Overlook neighborhood park on June 21 at the beginning of this study, over 20 areas along the shore were observed which had been disturbed by wild hogs. These areas of disturbance were not seen during a similar reconnaissance trip in March 2021.

Figure 2: Natural Pool Downstream of US 183 on June 21, 2022

Eurasian milfoil was common around US 183 and in the pools downstream of US 183. It could be found further downstream, for example, at Station 6, but was not common in the downstream part of the study reach. The filamentous algae, *Chara*, was abundant at the upstream end of the natural pool below US 183 and was also observed at Ronald Reagan Boulevard. Bushy pondweed (*Najas guadalupensis*) was abundant around the WWTP outfall and at times captured filamentous algae around its leaves.

Figure 3: Artificial Pool Downstream of US 183 on September 12, 2022

Shoreline aquatic plants included water hyssop (*Bacopa monnieri*); American water willow (*Justicia americana*); pennywort (*Hydrocotyle*); and arrowhead (*Sagittaria*), among a variety of grasses and sedges. Sunfish, particularly Longear Sunfish (*Lepomis megalotis*); minnows, including Blacktail Shiner (*Cyprinella venusta*), and Western Mosquitofish (*Gambusia affinis*), were observed at the different stations on the SFSG and at Station 2. Fish were not recorded or observed from Station 5, Angel Springs. Largemouth Bass (*Micropterus salmoides*) were observed in the river at the WWTP outfall downstream to Ronald Reagan Boulevard. Active sunfish spawning beds were observed at Ronald Reagan Boulevard.

Rapid suburban development is adding impervious cover in the watershed (Figure 4) (U.S. Geological Survey [USGS], 2022a). The WWTP is the only permitted municipal wastewater discharge in the watershed. Sediment from highway bridge construction at US 183 was entering the river.

Figure 4: Study Area Impervious Cover from the National Land Cover Dataset
(Red in images represents impervious cover)

Figure 5: Wild Hog Wallow on Riverbank

3.0 METHODS

FNI staff, David Buzan and Tam Tran, collected all data and samples for this study. The following sequence of events was followed at each sample station during low flow sampling:

1. Water sample collection for water chemistry analysis at the Lower Colorado River Authority (LCRA) Environmental Services Lab in Austin, Texas,
2. Field water chemistry measurements,
3. Flow measurements, and
4. Benthic algae sampling was done while flow data were collected and only at SFSG stations. David Buzan analyzed samples. Benthic algal samples were collected upstream of the water sample collection points at each station.

Flows were not measured, and benthic algal data were not collected during rainfall runoff sampling because these sample events focused on collecting samples as soon as possible after rainfall runoff occurred to characterize rainfall runoff water quality. Flow was visually estimated during rainfall runoff sampling.

Data and/or samples were collected on the following days:

- Low flow reconnaissance to confirm sample locations, June 21, 2022. Photos were taken but water samples were not collected, and field measurements were not made.
- Low flow sampling, June 22, August 4, and September 12, 2022. Water samples, field water quality and flow measurements, and benthic algal samples were collected. Photos were taken.
- Rainfall runoff sampling, June 27, August 19, August 22, and October 17, 2022. Water samples and field water quality were measured. Photos were taken. Water samples for lab analysis were only collected on August 22 and October 17. Water samples were not collected on June 27 and August 19, 2022. On those days, sampling began when it started to rain in the watershed, but the rain did not increase flows or change existing conditions at the sample stations.

3.1 LABORATORY WATER CHEMISTRY

Water samples were collected from the centroid of the flow and mid-depth between the surface and the bottom. Clean sample bottles were provided by the LCRA lab which conducted the chemical analysis. Water samples were collected according to TCEQ Surface Water Monitoring Protocols (TCEQ, 2012).

3.2 FIELD WATER CHEMISTRY

Field water chemistry was measured with a Hydrolab CMS5 or Compact MS5 water quality meter, precalibrated less than 24 hours before sampling began. Measurements were made in the centroid of the flow and mid-depth between the surface and the bottom at each station. Water depth at most locations

where measurements were made was less than 1 foot. Water quality meters were calibrated, post-calibrated, and field water quality data collected according to TCEQ Surface Water Monitoring Protocols (TCEQ, 2012).

Water quality meter probe specifications are:

- Dissolved oxygen (DO) (optical probe): accuracy of ±0.1 milligrams per liter (mg/L) at DO levels below 8.0 mg/L and 0.2 mg/L at DO levels between 8 and 20 mg/L
- Conductivity: ±0.5 percent of reading in microSiemens per centimeter (µS/cm)
- pH: ±0.2 pH units
- Temperature: ±0.1 degrees Celsius (°C)

3.3 FLOWS

Flows were measured with a SonTek FlowTracker 2 according to TCEQ Surface Water Monitoring Protocols (TCEQ, 2012). Depths at the Gabriel Overlook neighborhood park were too shallow for the flow meter probe to collect data on June 22, 2022. Flows were visually estimated on all sample dates except June 22, 2022. Flows were not measured on August 22, 2022 or October 17, 2022 during rainfall runoff sampling.

WWTP flows were provided by the City of Liberty Hill. Travel time of the treated effluent from the WWTP to the SFSG is 28 minutes (Matthew Brown, City of Liberty Hill, personal communication).

SFSG flow data were retrieved from the USGS gage (08104900) which measures river flow just upstream of the south-bound lanes of Interstate Highway 35 in Georgetown.

3.4 BENTHIC ALGAE QUALITATIVE SAMPLING

Benthic algae were sampled according to TCEQ Surface Water Monitoring Protocols (TCEQ, 2014) at each of the four river stations during each of the three, low flow sample dates. Benthic algae were observed in five, one square foot quadrats across each of four transects for up to 20 observations per station on each sample date. Quadrats were sampled adjacent to the right bank, left bank, center of the stream, and midway between the right bank and stream center and midway between the left bank and the middle of the stream. Twenty quadrats were not sampled at Station 1 on each low flow sample date. The river in this area was frequently less than 5 feet wide and some transects were not wide enough to allow five quadrats to be sampled.

Each transect was perpendicular to the riverbanks (Figure 6). Transects were spaced 16 feet apart with the distance between transects measured with a tape measure. The first transect was randomly selected by throwing a hammer upstream from the water quality monitoring point. The person throwing the hammer was facing downstream while throwing the hammer behind him towards upstream to avoid a visual bias in selecting the first transect. The point at which the hammer landed was the point at which the first transect was sampled. The remaining three transects were sampled moving upstream. Benthic algae were identified alive in the FNI Austin office to the lowest possible taxon (usually genus).

Figure 6: Example of Benthic Algal Sample Transects at Station 6 on September 12, 2022

3.5 PHOTOGRAPHS

Photographs in the field and used in this report were taken by David Buzan (FNI) with an iPhone 11 Pro camera and a DJI Phantom drone.

4.0 RESULTS

4.1 WEATHER

Daily maximum air temperatures obtained from the Georgetown Airport weather station (72254753942) during the study period was higher than average daily maximum temperatures for the period from 2006 to 2020 until a cooler period with more rain started around August 13, 2022 and lasted until September 15, 2022. Daily maximum temperatures from September 15, 2022 through October 17, were again higher than the average daily maximum temperatures over the period from 2006 to 2020. Daily maximum temperatures exceeded 100 degrees Fahrenheit (°F) on 44 days from June 1 through October 17, 2022 (Figure 7).

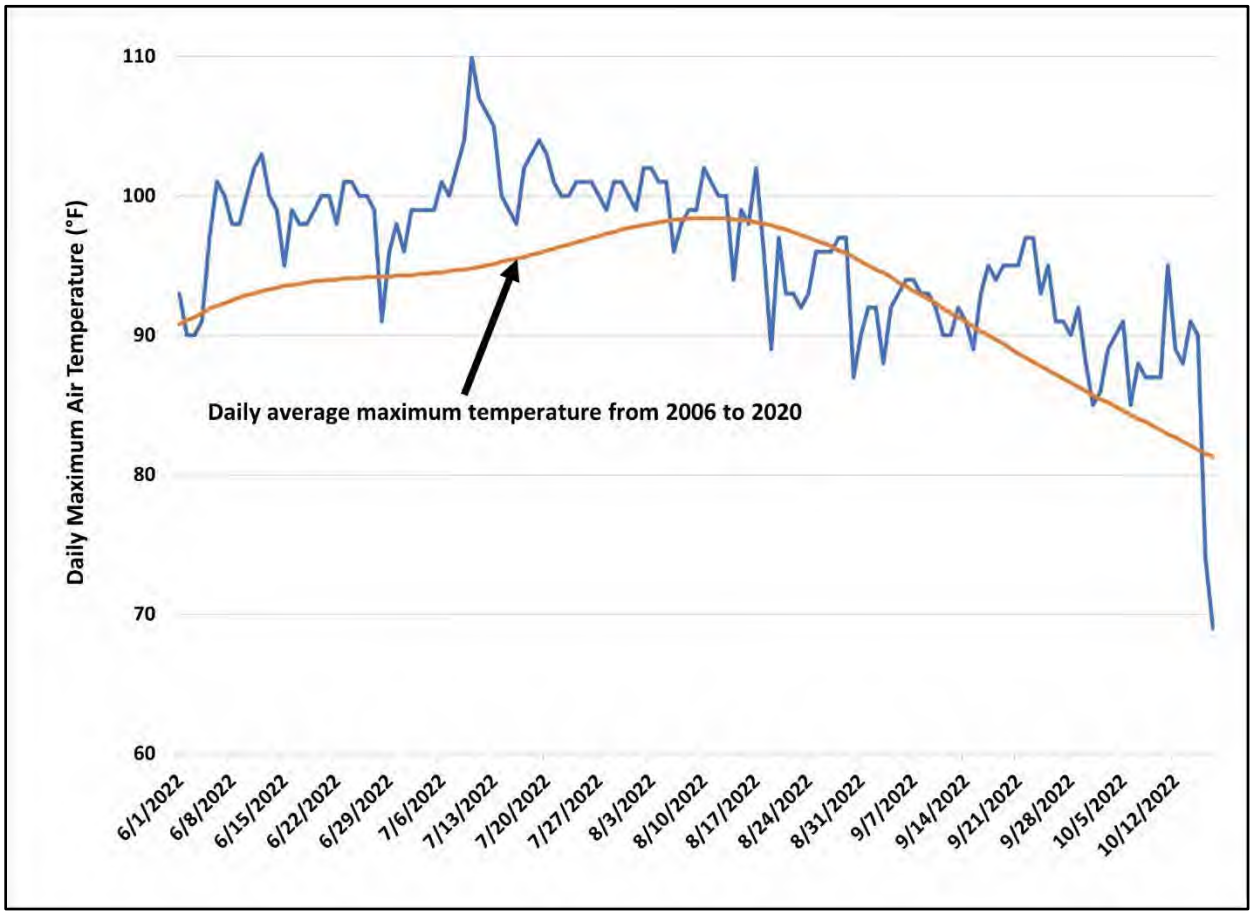

Figure 7: Daily Maximum Air Temperature (°F)

Rainfall was lower than normal during the study period (Figure 8). Normal rainfall for the months of June through October for the years from 2006 to 2020 at weather station, USC00413507, at Lake Georgetown was 16.4 inches. Rainfall at the USGS gage, 08104900, from June 5 through October 17, was 6.25 inches (provisional data from USGS at the time this report was written) (USGS, 2022b). LCRA Hydromet rain data

were checked from Station Leander5W because this station is adjacent to the SFSG upstream of the study reach (LCRA, 2022).

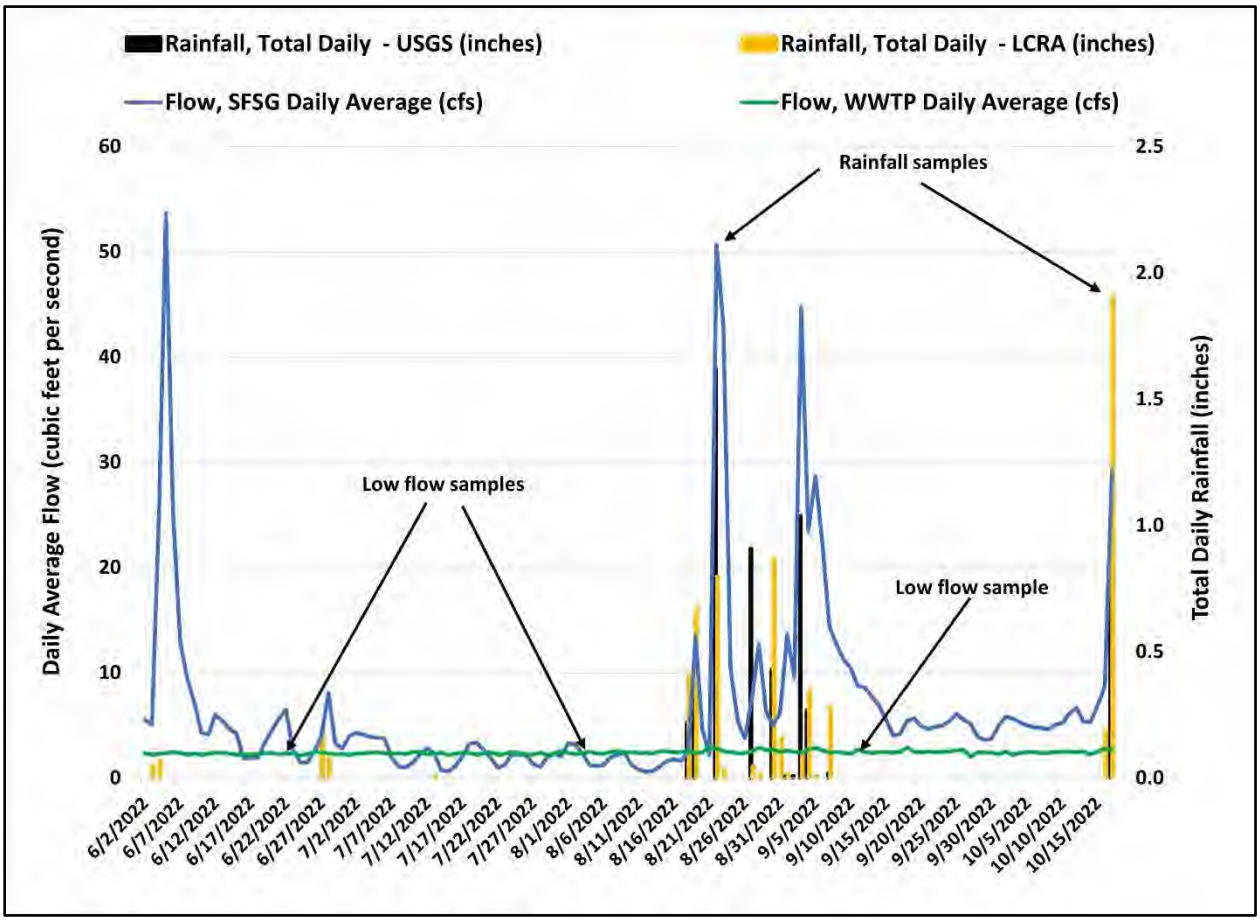

Figure 8: River Flow and Rainfall

4.2 FLOW

The USGS flow gage, #08104900, near the downstream end of the river in Georgetown recorded its lowest flow of 0.35 cubic feet per second (cfs) during the study on July 15 and the highest flow of 299 cfs on August 22, 2022 (USGS, 2022b). The USGS gage captures rainfall runoff from adjacent shopping center parking lots and development in Georgetown. The peak flows recorded at the USGS gage are not reflective of flows upstream in the study area. During the study, the daily average flow from the WWTP ranged from 2.0 to 3.0 cfs and averaged 2.4 cfs.

Although elevated flow and turbid water were observed during rainfall runoff events at stations 1 and 2, there was no obvious sign of turbidity resulting from rainfall runoff where the WWTP enters the river. It appears the natural pool and the pool retained by the artificial dam, both of which are upstream of the WWTP discharge, capture sediment, and moderate flow moving down the river in the vicinity of stations 3 and 4. Based on elevated flows at stations 6 and 7 during rainfall runoff events, there are sources of

rainfall runoff into the river in addition to contributions from Station 5. Neither rainfall event produced elevated flows which could scour the river bottom. There was no evidence of overbanking or scouring flows at any station on any sample date.

4.3 SOUTH FORK SAN GABRIEL RIVER AT US 183, STATION 1

Station 1, SFSG, is downstream of the US 183 bridge and 0.75 mile upstream of the WWTP discharge (figures 9-12). The river is narrow with a limestone bedrock bottom and widely scattered boulders. Patches of Eurasian milfoil are common. A large school of Blacktail Shiners was observed at this location on September 12, 2022. There was flow at this station on all low flow sample dates. Anecdotal information suggested the river upstream of the WWTP discharge could stop flowing and become dry upstream of the WWTP. The river flows past Station 1 into a large natural pool that is about 0.23 miles long, 70 to 80 feet wide, and up to 6 feet deep.

Figure 9: South Fork San Gabriel River, Station 1, September 12, 2022
Left: Upstream View / Right: Downstream View

Figure 10: South Fork San Gabriel River, Station 1, October 17, 2022
Left: Upstream View / Right: Downstream View

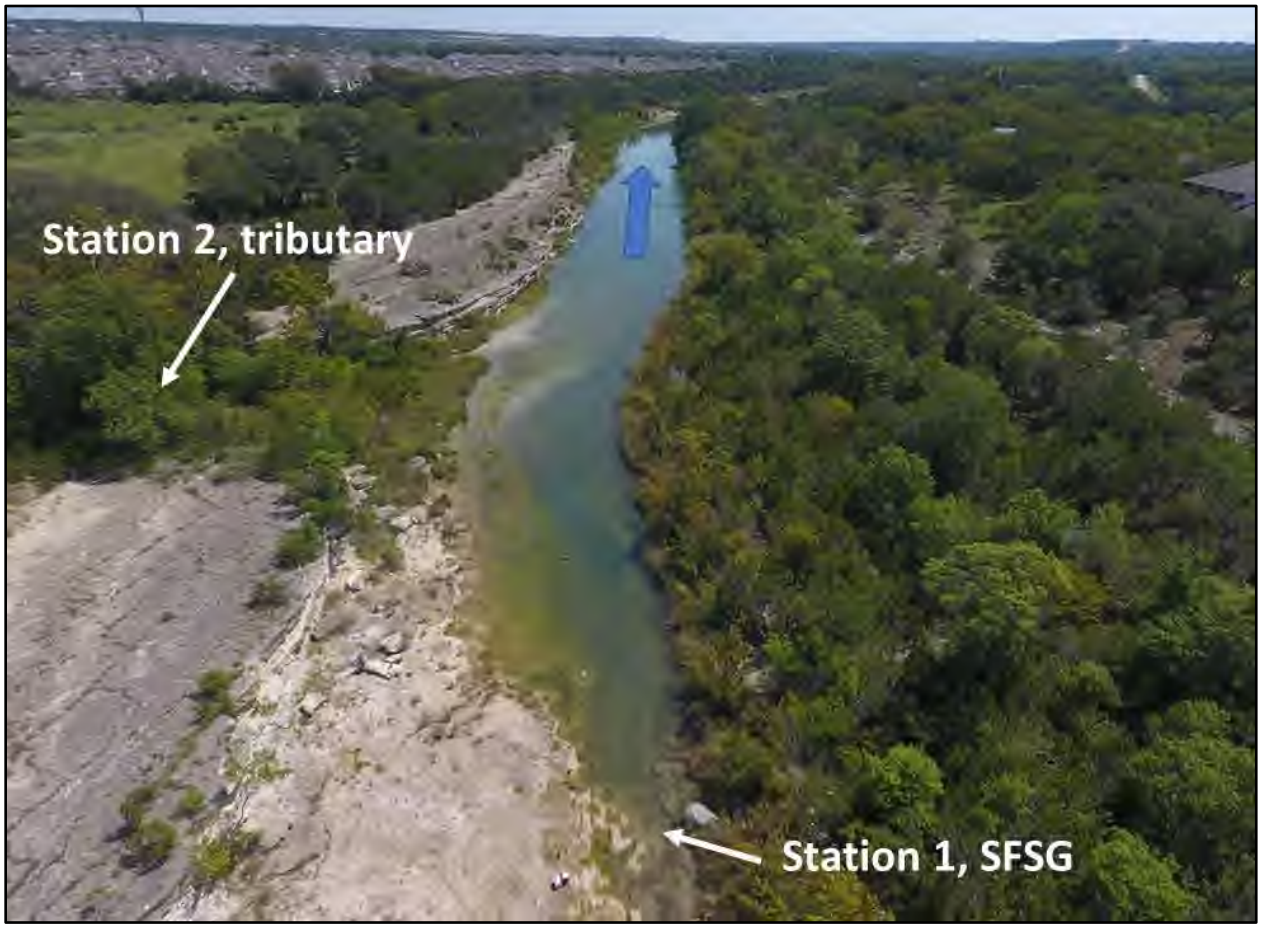

Figure 11: South Fork San Gabriel River, Station 1, Downstream View on September 12, 2022

Temperature, pH, and DO met water quality standards criteria (Table 2). Ammonia nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment. The highest ammonia nitrogen and total Kjeldahl nitrogen levels were measured during the rainfall runoff event on August 22, 2022. Phosphorus concentrations were below detection limits during the August 22, 2022 sample event.

Figure 12: South Fork San Gabriel River, Station 1, Upstream View on September 12, 2022

Table 2
Station 1, SFSG*

Date and Time (Central Daylight Time [CDT])	6/22/22 12:20	6/27/22 23:32	8/4/2022 11:25	8/19/22 11:03	8/22/22 19:34	9/12/22 11:15	10/17/22 7:50	Comparison Value
Depth (feet)	0.5	0.8	0.3	0.5	0.5	0.5	0.5	
Temperature (°C)	32.1	29.3	31.1	28.2	28.2	27.1	21.9	35.0[1]
pH (standard units [s.u.])	8.1	7.8	8.0	7.6	8.0	8.1	8.0	6.0-9.0[1]
Specific conductance (µS/cm)	440	410	450	440	330	410	370	
Oxygen (mg/L)	10.2	4.9	9.5	5.7	6.7	12.1	7.0	4.0[1]
Oxygen (percent saturation)	144	66	131	75	89	157	82	
Turbidity (NTUs)	3							
Flow (cfs) (measured)	0.40		0.02			1.1		
Flow (cfs) (estimated)		1.7	0.1	0.6	10.0	1.2	5.0	
Benthic Algae (percent cover)	38		16			7		
Benthic Algae (percent cover of long filaments)	<1		<1			1		
Nitrogen as ammonia (mg/L)	0.044		0.013		0.035	<0.008	0.018	0.330[2]
Nitrogen as nitrate (mg/L)	0.021					0.387	0.554	1.950[2]
Nitrogen as total Kjeldahl (mg/L)	0.452		0.650		0.534	0.391	0.678	
Phosphorus as total phosphorus (mg/L)	<0.008		0.021		<0.008	<0.008	0.0458	0.690[2]
Phosphorus as orthophosphate (mg/L)			<0.004		<0.004	<0.004	<0.004	
Phosphorus as orthophosphate dissolved (mg/L)	<0.004		<0.004		<0.004	<0.004	<0.004	
Chlorophyll α (micrograms per liter [µg/L])	0.96		5.79		2.04	1.45	2.25	14.10[2]
Pheophytin α (µg/L)	<0.5		1.51		1.39	0.54	0.79	
Total suspended solids (mg/L)	6		6		48	4	61	
Volatile suspended solids (mg/L)	1		2		6	1	6	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

4.4 UNNAMED TRIBUTARY TO THE SOUTH FORK SAN GABRIEL RIVER, STATION 2

Station 2 is an unnamed tributary flowing into the north bank of the SFSG about 0.7 miles upstream of the WWTP discharge (figures 13 and 14). The tributary flows into the same large natural pool the river flows into downstream of US 183. This stream may flow perennially since it was flowing on all sample dates. It captures rainfall runoff from US 183 north of the river and may also capture drainage from the Summerlyn neighborhood west of US 183 and north of the river.

Figure 13: Unnamed Tributary to South Fork San Gabriel River, Station 2, June 21, 2022
Photo on Left and October 17, 2022, View in Photo on Right

Figure 14: Unnamed Tributary Discharging to South Fork San Gabriel River, Station 2, October 17, 2022

Table 3
Station 2, Unnamed Tributary*

Date and Time (CDT)	6/22/22 12:31	6/27/22 23:44	8/4/2022 11:56	8/19/22 10:52	8/22/22 19:44	9/12/22 12:17	10/17/22 8:02	Comparison Value
Depth (feet)	0.3	0.5	0.3	0.3	0.5	0.3	0.5	
Temperature (°C)	25.5	25.8	26.5	25.3	25.8	24.4	20.3	35.0[1]
pH (s.u.)	7.6	7.6	7.6	7.3	7.9	7.7	7.5	6.0-9.0[1]
Specific conductance (µS/cm)	710	700	620	500	230	700	340	
Oxygen (mg/L)	7.6	8.2	7.7	4.4	7.4	8.8	8.3	4[1]
Oxygen (percent saturation)	95	102	99	56	95	109	95	
Turbidity (NTUs)	0							
Flow (cfs) (measured)	0.2		0.0			0.1		
Flow (cfs) (estimated)		0.4	0.1	0.7	6		4	
Benthic Algae (percent cover)								
Benthic Algae (percent cover of long filaments)								
Nitrogen as ammonia (mg/L)	0.029		0.009		0.049	<0.008	0.047	0.330[2]
Nitrogen as nitrate (mg/L)	0.948					0.649	0.727	1.950[2]
Nitrogen as total Kjeldahl (mg/L)	0.216		0.118		0.580	0.198	1.19	
Phosphorus as total phosphorus (mg/L)	<0.008		<0.008		0.166	<0.008	0.152	0.690[2]
Phosphorus as orthophosphate (mg/L)			<0.004		<0.004	<0.004	<0.004	
Phosphorus as orthophosphate dissolved (mg/L)	<0.004		<0.004		<0.004	<0.004	<0.004	
Chlorophyll α (µg/L)	0.54		1.01		4.82	0.37	2.62	14.10[2]
Pheophytin α (µg/L)	<0.5		0.70		2.20	<0.2	0.94	
Total suspended solids (mg/L)	2		1		838	1	271	
Volatile suspended solids (mg/L)	1		1		72	<1	25	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

Temperature, pH, and DO met water quality standards criteria at Station 2 (Table 3). Ammonia nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment. The highest ammonia nitrogen, total Kjeldahl nitrogen, and total phosphorus levels were measured during the rainfall runoff events on August 22 and October 17, 2022. Total suspended solids (TSS), 838 mg/L, was higher in this tributary during the August 22, 2022 rainfall runoff sample event than in any other sample at any other station.

4.5 CITY OF LIBERTY HILL WASTEWATER TREATMENT PLANT, STATION 3

The City of Liberty Hill's WWTP was discharging during each sample event (Figure 15). The effluent was always clear, and no sediment was observed accumulating in the river around the discharge.

Figure 15: City of Liberty Hill Regional WWTP Discharge to the South Fork San Gabriel River, Station 3
August 4, 2022 Photo on Left and October 17, 2022 Photo on Right

DO and pH met effluent permit limits on all sample dates while discharge volumes were always lower than the 2-hour maximum flow limit (Table 4). Flows in Table 4 have been converted from the units used in the facility's discharge permit, millions of gallons per day, to cfs to compare to river flows. Ammonia nitrogen, nitrate nitrogen, and total phosphorus were below the daily average values required in the discharge permit. Ammonia nitrogen concentrations were like those at the other stations while nitrate nitrogen and total phosphorus were higher than at the other stations.

Table 4
Station 3, Liberty Hill WWTP Discharge*

Date and Time (CDT)	6/22/22 10:08	6/28/22 0:28	8/4/2022 10:38	8/19/22 14:44	8/22/22 20:23	9/12/22 10:23	10/17/22 8:45	Comparison Values
Depth (feet)	0.3	0.5	0.5	0.3	0.5	0.5	0.3	
Temperature (°C)	29.4	28.0	30.8	31.2	30.8	30.2	29.1	
pH (s.u.)	8.0	8.0	7.9	7.7	7.9	8.0	7.7	6.5-9.0[1]
Specific conductance (µS/cm)	1,140	1,160	1,000	1,150	1,130	1,150	1,140	
Oxygen (mg/L)	7.6	7.6	7.5	7.5	7.2	7.6	7.6	5.0[1]
Oxygen (percent saturation)	103	100	104	105	100	103	102	
Turbidity (NTUs)	2							
Flow (cfs) (measured)	2.4			2.4	1.1	1.4	3.9	5.3[2]
Flow (cfs) (estimated)								
Benthic Algae (percent cover)								
Benthic Algae (percent cover of long filaments)								
Nitrogen as ammonia (mg/L)	0.025		<0.008		0.044	<0.008	<0.008	2.0[3]
Nitrogen as nitrate (mg/L)	5.320					5.720	4.66	16.6[3]
Nitrogen as total Kjeldahl (mg/L)	1.620		0.953		0.917	0.864	1.01	
Phosphorus as total phosphorus (mg/L)	0.143		0.477		0.208	0.119	0.119	0.5[3]
Phosphorus as orthophosphate (mg/L)			0.416		0.211	0.120	0.120	
Phosphorus as orthophosphate dissolved (mg/L)	0.148		0.448		0.208	0.121	0.118	
Chlorophyll α (µg/L)	1.21		0.25		0.94	0.41	0.31	
Pheophytin α (µg/L)	<0.5		<0.2		0.54	<0.2	<0.2	
Total suspended solids (mg/L)	<1		<1		8	<1	<1	5[3]
Volatile suspended solids (mg/L)	<1		<1		2	<1	<1	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Permit limit not to exceed

[2] Permitted maximum rate for 2 hours not to exceed

[3] Permitted daily average value not to exceed over a month

4.6 SOUTH FORK SAN GABRIEL RIVER, STATION 4

Station 4 was characterized by abundant growths of algae and bushy pondweed. Water was always clear at this location, even during rainfall runoff events (Figure 16). The sample site is where the river enters a short reach with thick canopy shading the stream. Longear Sunfish were abundant and Largemouth Bass were common at this location. Minnows (Family Cyprinidae) and Western Mosquitofish were also present.

Figure 16: South Fork San Gabriel River, Station 4
August 4, 2022 Photo on Left and October 17, 2022 Photo on right

Temperature, pH, and DO did not exceed water quality standard criteria at Station 4 (Table 5). High DO values and measurements of pH of 9.0 on two sample dates reflect elevated plant productivity in this part of the river. Values of ammonia nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment. Nitrate nitrogen and chlorophyll α exceeded TCEQ (2022) screening criteria on the first sample date, June 22, 2022. Total phosphorus and TSS were highest in the October 17, 2022 rainfall runoff sample.

Table 5
Station 4, SFSG*

Date and Time (CDT)	6/22/22 9:48	6/28/22 1:14	8/4/2022 8:54	8/19/22 14:20	8/22/22 20:50	9/12/22 8:48	10/17/22 9:05	Comparison Value
Depth (feet)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Temperature (°C)	30.8	26.2	28.3	32.3	28.4	26.4	24.2	35.0[1]
pH (s.u.)	9.0	7.8	8.7	9.0	7.9	8.2	7.6	6.0-9.0[1]
Specific conductance (µS/cm)	1,080	990	950	750	630	830	650	
Oxygen (mg/L)	18.3	5.3	11.7	16.3	5.9	9.6	7.4	4.0[1]
Oxygen (percent saturation)	255	67	155	234	79	122	91	
Turbidity (NTUs)	2							
Flow (cfs) (measured)	2.9		2.2			4.1		
Flow (cfs) (estimated)		6			18	5	15	
Benthic Algae (percent cover)	62		76			75		
Benthic Algae (percent cover of long filaments)	43		30			35		
Nitrogen as ammonia (mg/L)	0.037		0.063		0.055	<0.008	0.012	0.33[2]
Nitrogen as nitrate (mg/L)	3.460					1.590	1.53	1.95[2]
Nitrogen as total Kjeldahl (mg/L)	1.680		1.240		0.815	0.886	0.986	
Phosphorus as total phosphorus (mg/L)	0.120		0.526		0.052	0.083	0.950	0.69[2]
Phosphorus as orthophosphate (mg/L)			0.420		0.033	0.073	0.040	
Phosphorus as orthophosphate dissolved (mg/L)	0.090		0.420		0.050	0.073	0.040	
Chlorophyll α (µg/L)	16.50		8.91		5.02	3.79	6.86	14.1[2]
Pheophytin α (µg/L)	6.37		11.20		6.04	3.28	6.72	
Total suspended solids (mg/L)	10		7		10	3	13	
Volatile suspended solids (mg/L)	4		3		3	1	3	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

4.7 UNNAMED TRIBUTARY (ANGEL SPRINGS) AT COUNTY ROAD 267, STATION 5

Station 5 may be a perennial stream because it was flowing on all sample dates (Figure 17). The water was clear and cooler than other sample stations during low flow sampling. Its maximum temperature on low flow sample dates was 22.2°C which was lower than at any other station. The cool temperatures, clear water, and lower pH values, pH of 6.9 on two dates, indicates this tributary receives substantial spring flow.

Figure 17: Unnamed Tributary (possibly Angel Springs)
Photo on left taken June 21, 2022 and Photo on Right Taken October 17, 2022

The stream bed was covered with filamentous algae just above the point at which it flowed into the SFSG. During rainfall runoff samples, this tributary was cloudy with suspended sediment. It may also receive runoff from housing development in the Larkspur subdivision north of the river (Figure 18). Anecdotal information suggests there are on-site wastewater treatment systems in the watershed. Temperature, pH, and DO did not exceed water quality standard criteria at Station 5 (Table 6).

Figure 18: Watershed Development for Station 5
Google Earth image from August 2012 on the left and from July 2022 on the right

Table 6
Station 5, Unnamed Tributary*

Date and Time (CDT)	6/22/22 10:30	6/28/22 1:33	8/4/2022 9:53	8/19/22 12:55	8/22/22 20:37	9/12/22 9:40	10/17/22 9:18	Comparison Value
Depth (feet)	0.3	0.5	0.3	0.5	0.5	0.5	0.5	
Temperature (°C)	21.5	20.8	22.2	24.2	25.0	20.9	19.7	35.0[1]
pH (s.u.)	7.5	7.2	7.4	6.9	7.7	7.3	6.9	6.0-9.0[1]
Specific conductance (µS/cm)	760	790	730	490	160	730	280	
Oxygen (mg/L)	8.0	5.5	7.1	6.2	7.5	6.8	7.4	4.0[1]
Oxygen (percent saturation)	93	63	85	76	93	79	83	
Turbidity (NTUs)	0							
Flow (cfs) (measured)	0.3		0.2			0.4		
Flow (cfs) (estimated)		0.4	0.4				4	
Benthic Algae (percent cover)								
Benthic Algae (percent cover of long filaments)								
Nitrogen as ammonia (mg/L)	0.021		<0.008		0.039	<0.008	0.031	0.33[2]
Nitrogen as nitrate (mg/L)	0.242					0.386	0.486	1.95[2]
Nitrogen as total Kjeldahl (mg/L)	0.459		0.093		0.935	0.244	1.26	
Phosphorus as total phosphorus (mg/L)	0.009		<0.008		0.154	<0.008	0.217	0.69[2]
Phosphorus as orthophosphate (mg/L)	<0.004				0.073	<0.004	0.163	
Phosphorus as orthophosphate dissolved (mg/L)			<0.004		0.072	<0.004	0.163	
Chlorophyll α (µg/L)	1.43		1.95		2.89	0.45	0.69	14.1[2]
Pheophytin α (µg/L)	<0.5		1.06		2.15	0.36	0.53	
Total suspended solids (mg/L)	2		3		326	1	52	
Volatile suspended solids (mg/L)	<1		1		43	<1	8	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

Values of all nitrogen compounds and phosphorus were highest in the August 22 and October 17, 2022 rainfall runoff samples. TSS, 326 mg/L, in the August 22, 2022 rainfall runoff sample was the second highest value measured at any of the stations. Ammonia nitrogen, nitrate nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment in all samples.

4.8 SOUTH FORK SAN GABRIEL RIVER AT RONALD REAGAN BOULEVARD, STATION 6

Station 6 had clear water on all low flow sample dates (Figure 19). Longear Sunfish were abundant in this reach and several of their active spawning beds were observed (Figure 20). During rainfall runoff events, there was more duckweed (*Lemna*) and detached filamentous algae flowing down the river.

Figure 19: South Fork San Gabriel River, Station 6
Photo from August 4, 2022 on the left and from October 17, 2022 on the right

Temperature and pH met water quality standard criteria at Station 6 (Table 7). DO values on all low flow sample dates were below the DO criterion for minimum DO during the day. This was the first station sampled during each low flow sample trip and all low flow data were collected before 08:00 CDT. The low DO values reflect high oxygen uptake during the night upstream of this station.

Ammonia nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment. Nitrate nitrogen, 3.03 mg/L, on September 12 and 6.04 mg/L on October 17, 2022 exceeded the TCEQ (2022) screening criteria for nitrate nitrogen of 1.95 mg/L. Ammonia nitrogen and TSS was highest during the August 22, 2022 rainfall runoff sample event. Nitrate nitrogen, phosphorus, and chlorophyll α levels were highest during the rainfall runoff sampling of October 17, 2022.

Figure 20: Sunfish Spawning Beds, Station 6

Table 7
Station 6, SFSG*

Date and Time (CDT)	6/22/22 7:21	6/27/22 22:41	8/4/2022 7:08	8/19/22 13:14	8/22/22 21:20	9/12/22 7:10	10/17/22 9:44	Comparison Value
Depth (feet)	0.4	1.0	0.3	0.5	0.5	0.5	0.5	
Temperature (°C)	28.1	28.2	27.7	29.2	26.9	24.9	21.3	35.0[1]
pH (s.u.)	7.6	7.6	8.3	8.4	7.8	7.6	7.3	6.0-9.0[1]
Specific conductance (µS/cm)	850	980	950	840	640	810	1,000	
Oxygen (mg/L)	3.2	8.6	2.7	17.7	5.2	3.8	4.8	4[1]
Oxygen (percent saturation)	42	114	36	239	68	47	56	
Turbidity (NTUs)	6							
Flow (cfs) (measured)	3.2		2.7			5.0		
Flow (cfs) (estimated)				10	70	8	21	
Benthic Algae (percent cover)	25		37			85		
Benthic Algae (percent cover of long filaments)	10		34			55		
Nitrogen as ammonia (mg/L)	0.112		0.043		0.221	0.023	0.106	0.33[2]
Nitrogen as nitrate (mg/L)	1.460					3.030	6.04	1.95[2]
Nitrogen as total Kjeldahl (mg/L)	1.290		1.090		1.110	0.988	1.17	
Phosphorus as total phosphorus (mg/L)	0.014		0.119		0.146	0.024	0.155	0.69[2]
Phosphorus as orthophosphate (mg/L)			0.077		0.109	0.013	0.081	
Phosphorus as orthophosphate dissolved (mg/L)	<0.004		0.074		0.095	0.014	0.079	
Chlorophyll α (µg/L)	1.10		4.15		6.38	1.33	11.5	14.1[2]
Pheophytin α (µg/L)	1.67		4.22		12.00	2.17	10.8	
Total suspended solids (mg/L)	8		7		64	5	35	
Volatile suspended solids (mg/L)	2		2		9	1	5	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

4.9 SOUTH FORK SAN GABRIEL RIVER DOWNSTREAM OF RONALD REAGAN BOULEVARD, STATION 7

The channel is typically a shallow, wide, limestone bedrock stream with little shading. The June 22, 2022 low-flow sample was collected at the neighborhood park in the Gabriel Overlook neighborhood (Figure 21). To facilitate access to the river on future sample dates, the sampling station was moved about 0.2 miles downstream to Garey Park (Figure 22). This location was sampled on all subsequent sample dates except one. The rainfall runoff sample on August 22, 2022 was collected by accessing the river through the Rancho Siena neighborhood about 0.4 miles upstream of the Garey Park location. This location was sampled because the sample was collected at 22:10 CDT and Garey Park was closed at that time.

Figure 21: South Fork San Gabriel River at Gabriel Overlook Neighborhood Park, June 22, 2022

Figure 22: South Fork San Gabriel River at Garey Park, September 12, 2022

Water was always clear at this location. Dislodged filamentous algae could be observed floating downstream on the last two low-flow sample dates. During the September 12, 2022 low-flow sampling, a group of women and children were wading in the river.

DO and pH met water quality standard criteria at Station 7 (Table 8) however temperature exceeded the water quality criterion of 35°C (95°F) on the first two low-flow sample dates when temperatures were over 36°C. These high temperatures reflect the high air temperatures and the wide, shallow, open nature of the river channel at this location.

Values of ammonia nitrogen, total phosphorus, and chlorophyll α were below screening criteria used by TCEQ to assess nutrient enrichment. Nitrate nitrogen was higher than the TCEQ screening criteria during the October 17, 2022 rainfall runoff event. The ammonia nitrogen concentration was highest in the August 22, 2022 rainfall runoff sample and TSS of 157 mg/L was the third highest TSS recorded from any of the samples on that day. Kjeldahl nitrogen, total phosphorus, and chlorophyll α were highest during the October 17, 2022 rainfall runoff event.

4.10 BENTHIC ALGAL ANALYSIS

Benthic algae percent cover and taxonomic composition were analyzed at four stations (1, 4, and 7) on the SFSG on three dates under low-flow conditions (Table 9). Benthic algal community composition was also checked in the two tributaries sampled for this study. This discussion includes submerged aquatic plants as well as benthic algae because of the relative abundance of submerged aquatic plants at some locations. Submerged aquatic plants are included in this discussion because they may grow and cover large parts of the bottom just as filamentous algae does. In this study, the quantity of submerged aquatic plants in the river is measured as the percent of the bottom covered with algae and submerged aquatic plants.

Photos were taken of each benthic algal quadrat, generating 224 photos of quadrats. Drone photos were also taken of each area where transects were sampled at each station on each sample date. Those drone photos are included in Appendix A and offer a visual comparison of benthic algae and submerged aquatic plant cover and how it changed over time at each station.

Table 8
Station 7, SFSG*

Date and Time (CDT)	6/22/22 14:24	8/4/22 13:20	8/19/22 13:52	8/22/22 22:10	9/12/22 13:26	10/17/22 10:51	Comparison Value
Depth (feet)	0.5	0.3	0.5	0.5	0.5	0.5	
Temperature (°C)	36.2	36.3	34.0	27.0	33.1	21.6	35.0[1]
pH (s.u.)	8.5	8.7	8.2	7.7	8.7	7.7	6.0-9.0[1]
Specific conductance (µS/cm)	820	900	840	590	620	1,000	
Oxygen (mg/L)	12.5	12.5	10.6	6.0	18.8	8.3	4.0[1]
Oxygen (percent saturation)	189	191	155	78	270	97	
Turbidity (NTUs)	0						
Flow (cfs) (measured)		2.8			4.9		
Flow (cfs) (estimated)		6		30		20	
Benthic Algae (percent cover)	36	26			37		
Benthic Algae (percent cover of long filaments)	20	2			36		
Nitrogen as ammonia (mg/L)	0.0321	<0.008		0.0495	<0.008	0.027	0.33[2]
Nitrogen as nitrate (mg/L)	0.829				1.160	3.22	1.95[2]
Nitrogen as total Kjeldahl (mg/L)	0.928	0.536		0.955	0.579	1.55	
Phosphorus as total phosphorus (mg/L)	<0.008	0.013		0.022	<0.008	0.032	0.69[2]
Phosphorus as orthophosphate (mg/L)		<0.004		0.006	<0.004	<0.004	
Phosphorus as orthophosphate dissolved (mg/L)	<0.004	<0.004		0.006	<0.004	<0.004	
Chlorophyll α (µg/L)	0.63	4.66		4.52	12.80	5.77	14.1[2]
Pheophytin α (µg/L)	<0.5	1.47		4.64	1.39	2.76	
Total suspended solids (mg/L)	2	5		157	2	27	
Volatile suspended solids (mg/L)	<1	2		20	2	4	

* Shaded columns represent dates when rainfall runoff was sampled. Blank cells indicate no data were collected.

[1] Water quality criterion for the SFSG in the Texas Surface Water Quality Standards

[2] Screening criteria (TCEQ, 2022)

Table 9
Benthic Algae and Submerged Aquatic Plant Cover

Date	Filamentous Algae (filaments >1 inch) (Average percent cover)	Algae without Filaments >1 inch) (Average percent Cover)	Submerged Aquatic Plant (All Algae and Plants) (Average percent Cover)	Number of Quadrats
		Station 1		
6/22/2022	<1	38	61	18
8/4/2022	<1	16	54	7
9/12/2022	<1	7	24	19
		Station 4		
6/22/2022	43	3	19	20
8/4/2022	30	15	46	20
9/12/2022	35	<1	40	20
		Station 6		
6/22/2022	10	2	15	20
8/4/2022	34	0	3	20
9/12/2022	55	29	29	20
		Station 7		
6/22/2022	20	17	26	20
8/4/2022	2	18	25	20
9/12/2022	36	0	1	20

Filamentous green algae were present at all stations and were the dominant form of benthic algae in the study reach. In benthic algal samples from station 4 to 7, the submerged aquatic plant community consisted primarily of filamentous green algae and a thin green layer on rocks. This thin green layer consisted primarily of a mixture of small filamentous cyanobacteria, diatoms, and colonial green algae. Eurasian milfoil dominated the submerged plant community at Station 1. Substantial amounts of diatoms or accumulations of cyanobacteria were not observed in any samples.

Station 1, upstream of the WWTP discharge, was dominated by the presence of the aquatic plant, Eurasian milfoil (Figure 23). Filamentous algae, in short filaments (<1 inch), were the algae providing most of the benthic algal cover. Most of the river bottom at this station had a layer of fine brown sediment. The filamentous green algae, *Spirogyra*, was present on all sample dates. Also present in June and August were the filamentous green algae, *Mougeotia*, and the filamentous cyanobacteria, *Oscillatoria*. Few diatoms, represented by the genera, *Cymbella*, *Achnanthes*, *Synedra*, and *Surirella* were observed in the August 4, 2022 sample.

Figure 23: Example Benthic Algal Quadrat, Station 1, September 12, 2022

Station 4 was downstream of the WWTP and had a submerged aquatic plant community dominated by filamentous green algae and bushy pondweed (Figure 24). During the June 22 sample event, the dominant filamentous green algae was water net (*Hydrodictyon reticulatum*), with some *Cladophora* and small unicellular and colonial green algae, like *Desmodesmus* present. The algal community on August 4 was more mixed with a combination of the filamentous green algae: water net, *Chara*, *Spirogyra*, *Cladophora* and *Stigeoclonium*. Cocoons with larval moths (*Petrophila*) were colonized with green algae and were abundant on the river bottom on August 4. These cocoons were also abundant on the rocks over which the WWTP outfall flowed down into the river. On September 12, the dominant filamentous alga was *Cladophora* with some water net, *Spirogyra*, and *Petrophila* cocoons. Bushy pondweed was common in this area and observed in some sample quadrats.

The June 22, 2022 benthic algal samples at Station 6 were dominated by dying long filaments of *Cladophora* with some *Spirogyra* and water net and very few diatoms (Figure 25). By August 4, the benthic algal community composition had shifted with primarily long filaments of *Spirogyra*, water net, and *Rhizoclonium*. There was a flocculant present with high numbers of the diatom, *Nitzschia*, and some filamentous cyanobacteria, *Oscillatoria* and *Pseudoanabaena*. On September 12, the dominant benthic algae were the filamentous green *Spirogyra* and *Rhizoclonium* with the filamentous cyanobacteria, *Oscillatoria*. *Rhizoclonium* was abundant on October 17 when the rainfall runoff sampling event took place.

Figure 24: Example Benthic Algal Quadrat, Station 4 on June 22, 2022

Station 7, downstream of Ronald Reagan Boulevard, had filamentous green algae, predominantly *Mougeotia,* and *Spirogyra* (Figure 27). Some of this area had the thin green layer growing on rocks. This thin green layer had some filamentous cyanobacteria like *Oscillatoria*, colonial and unicellular green algae like *Cosmarium*, with a few diatoms.

Filamentous green algae were the dominant benthic algae in the two tributaries sampled. *Spirogyra* was the dominant alga at Station 2 on June 22, 2022 (see Figure 13). Station 5 also had *Spirogyra* and high numbers of the filamentous diatom, *Fragiliaria*, and the filamentous green algae, *Cladophora*, on June 22, 2022. Known toxic algae were not observed in any samples.

Figure 25: Example Benthic Algal Quadrat, Station 6 on August 4, 2022

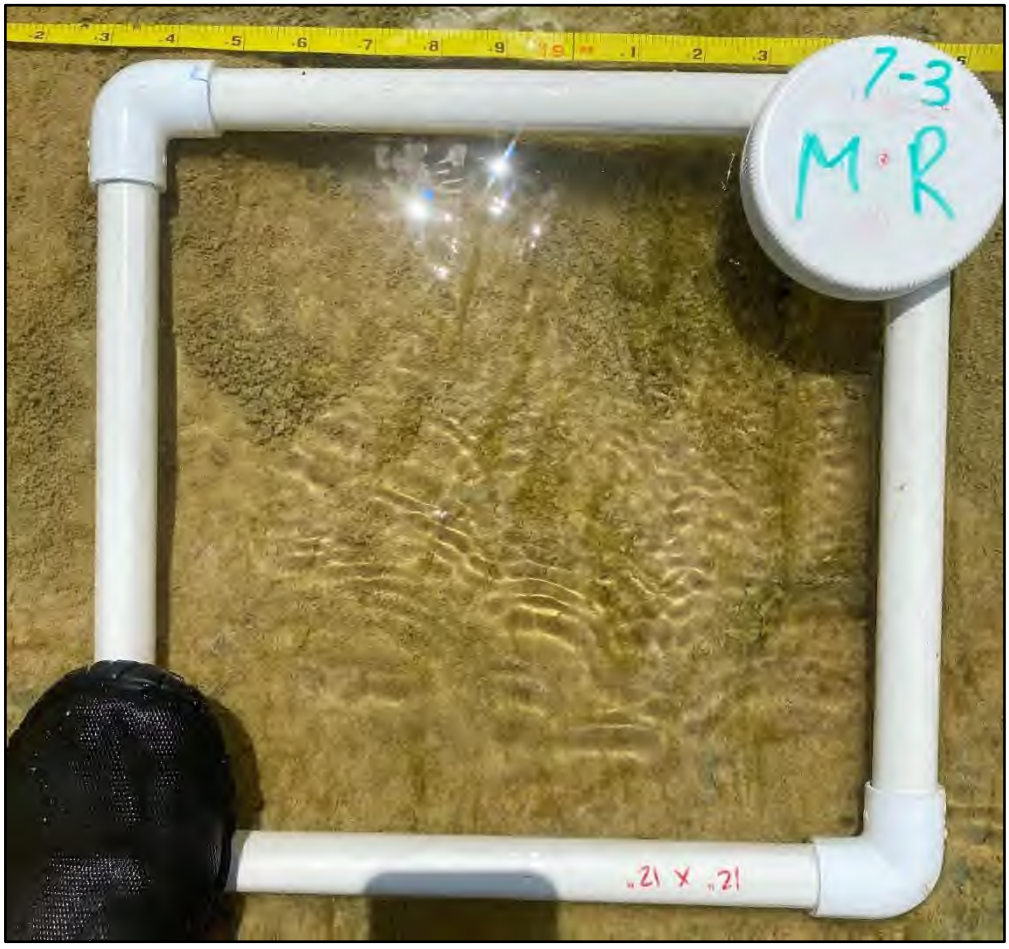

Figure 26: Example Benthic Algal Quadrat, Station 7, on June 22, 2022

5.0 CONCLUSIONS

5.1 NUTRIENT MEASUREMENTS

One objective of the study was to measure nutrients in the river. Part of this objective involved sampling nutrients during rainfall runoff events. This part of the objective was only partially achieved.

An unusually dry summer resulted in few rainfall events. No rainfall event generated enough runoff to flood the entire river and scour sediments and/or algae or aquatic plants from the river bottom. The rainfall runoff events which were sampled generated small amounts of runoff in the river upstream of the study area.

Access to Station 1 underneath the US 183 bridge indicated sediment from the construction site was entering the river from the construction site. Flow was elevated at Station 2 during the rainfall runoff sampling and high TSS at that station may have come from construction on US 183 in the tributary's watershed as well as from Summerlyn and Larkspur neighborhoods north of the river. The absence of turbid water and elevated flows downstream of the two pools between US 183 and the WWTP discharge during rainfall events suggests sediments and nutrients from the river and tributary upstream are accumulating in those pools. The pools contain filamentous algae and Eurasian milfoil which utilize nutrients from upstream sources.

During the rainfall runoff sample events, water downstream of the second pool, was clear and there was no visual evidence flow had risen on the shore. There was also no visible evidence algae and aquatic plants in the river near the WWTP discharge had been physically disturbed by runoff.

The LCRA agreed to report detectable values for ammonia nitrogen, total phosphorus, and orthophosphorus below the minimum quantification level. This enabled the lab to report concentrations for ammonia nitrogen and total phosphorus down to a low concentration of 0.008 mg/L. Orthophosphorus was reported to a low concentration of 0.004 mg/L.

The lab did not analyze the August 4, 2022 low-flow samples and the August 22, 2022 rainfall runoff samples for nitrate nitrogen as had been requested on the chain-of-custody forms when samples were submitted to the lab. Consequently, there is only nitrate nitrogen data for the low-flow samples collected on June 22 and September 12, 2022.

Field duplicates were collected for lab analysis during each sample trip (Table 10). Results of these analyses indicate nutrient results from the water samples should be considered comparable.

Table 10
Water Chemistry of Field Duplicate Samples[1]

Station	7	7	5	5	7	7	6	6
Date Time (CDT)	6/22/22 14:24	6/22/22 14:24	8/4/22 09:48	8/4/22 10:00	9/12/22 13:25	9/12/22 13:25	10/17/22 09:44	10/17/22 09:44
Depth (feet)	0.5	0.5	0.3	0.3	0.5	0.5	0.5	0.5
Nitrogen as ammonia (mg/L)	0.0321	0.0330	<0.008	<0.008	<0.008	<0.008	0.106	0.110
Nitrogen as nitrate (mg/L)	0.829	0.844			1.160	1.170	6.04	6.06
Nitrogen as total Kjeldahl (mg/L)	0.928	0.823	0.093	0.083	0.579	0.670	1.17	1.29
Phosphorus as total phosphorus (mg/L)	<0.008	<0.02	<0.008	0.008	<0.008	<0.008	0.155	0.156
Phosphorus as orthophosphate (mg/L)		<0.01		<0.004	<0.004	<0.004	0.081	0.078
Phosphorus as orthophosphate dissolved (mg/L)	<0.004		<0.004	<0.004	<0.004	<0.004	0.079	0.075
Chlorophyll α (µg/L)	0.63	<0.5	1.95	3.26	12.80	2.47	11.5	12.6
Pheophytin α (µg/L)	<0.5	<0.5	1.06	0.98	1.39	0.50	10.8	12.1
Total suspended solids (mg/L)	2	2	3	1	2	2	35	34
Volatile suspended solids (mg/L)	<	1	1	<1.09	2	1	5	5

[1] A field duplicate sample was not collected during the rainfall runoff sample event on August 22, 2022.

Nutrient data for each station are reported in tables 2-8.

- Ammonia nitrogen was below the TCEQ (2022) screening criterion of 0.33 mg/L in all samples from all stations. The highest ammonia nitrogen concentration was reported from Station 6 during the August 22, 2022 rainfall runoff sample event. Station 4 had the highest average ammonia nitrogen concentration.
- Nitrate nitrogen exceeded the TCEQ (2022) screening criterion of 1.95 mg/L in one of two samples from Station 4 and two of three samples from Station 6. Nitrate nitrogen concentrations in the WWTP discharge were below the discharge permit limit for nitrate nitrogen.

- Total phosphorus was below the TCEQ (2022) screening criterion of 0.69 mg/L in all samples. The highest total phosphorus of 0.526 mg/L was recorded at Station 4. Total phosphorus at the two tributary stations (2 and 5) was highest during the rainfall runoff sample events. On those days total phosphorus exceeded 0.150 mg/L at both tributary stations. The lowest average total phosphorus concentration was at Station 1 and the highest was at the WWTP discharge. Average total phosphorus concentrations and benthic algal percent cover decreased at increasing distance downstream of the WWTP discharge.

5.2 NUTRIENT SOURCES

The WWTP discharge, which was within nutrient permit limits on all sample dates, appears to contribute much of the nitrogen and phosphorus in the study reach daily. Tributaries like those sampled in this study also contribute nutrients to the river although the concentrations during low flow appear to be low (below laboratory detection limits).

The highest concentrations of ammonia nitrogen, Kjeldahl nitrogen, and total phosphorus were measured in the August 22 and October 17, 2022 rainfall runoff event samples from the two tributaries. Rainfall runoff from road construction and suburban development are probably sources of nutrients to the river.

At Station 1, the WWTP discharge, and Station 4, increased nutrients were not measured in the rainfall runoff samples compared to data from the low-flow samples (figures 27 and 28). At stations 6 and 7 further downstream, nutrient concentrations were higher during the August 22, 2022 rainfall runoff sample event.

It is not known if the increased activity by wild hogs observed along the river downstream of Station 4 may be increasing nutrient concentrations through additions of hog waste or disturbance of soil and vegetation releasing nutrients to the river.

5.3 NUTRIENTS AND ALGAL GROWTH

Most algal growth is found in the river around the WWTP discharge to the river suggesting the WWTP discharge supports much of the algal growth in the study reach. Algal growth is stimulated in the tributaries where low-flow nutrient concentrations are typically below detectable concentrations (Figure 29).

Concentrations of nutrients and conditions in the river near the WWTP discharge support a different community of algae and aquatic plants than upstream of the wastewater discharge. Bushy pondweed, water net, and *Cladophora* are abundant at times in this part of the river. Upstream of the WWTP discharge, the filamentous green algae, *Spirogyra* and *Mougeotia*, and Eurasian milfoil are common. The submerged aquatic plant community transitions with increasing distance downstream of the WWTP discharge. Bushy pondweed, *Cladophora*, and water net become less common and were not commonly seen downstream of Ronald Reagan Boulevard.

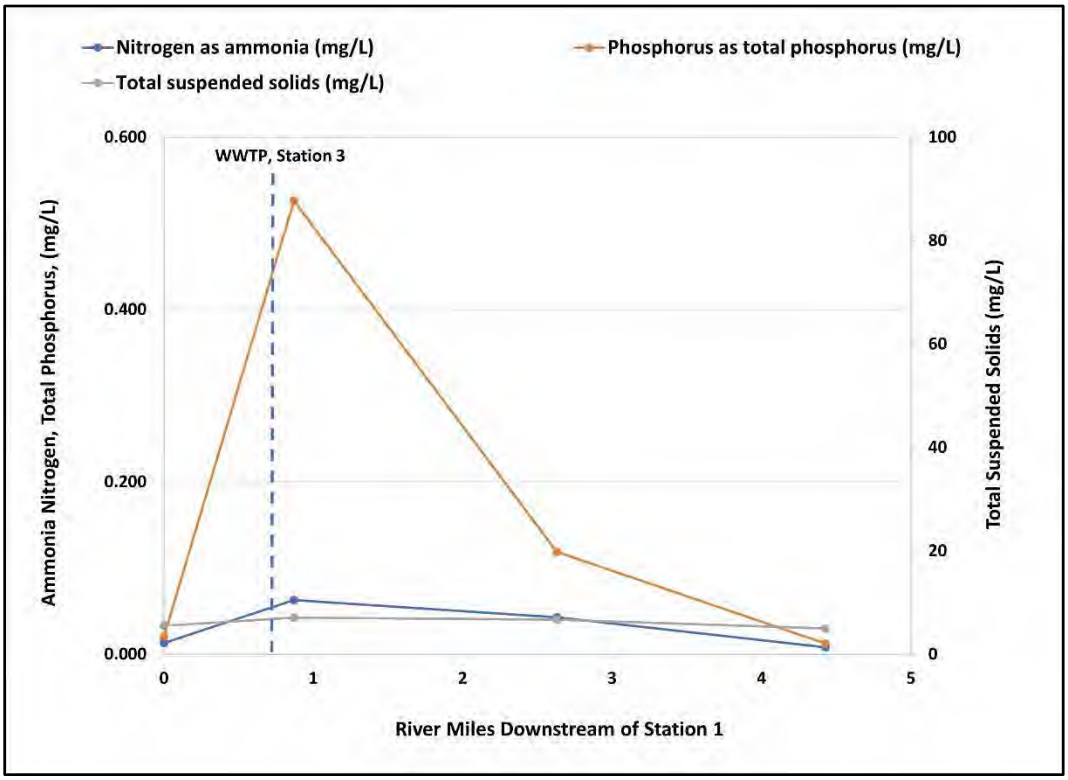

Figure 27: Nutrients and TSS at South Fork San Gabriel River Stations at Low Flow, August 4, 2022

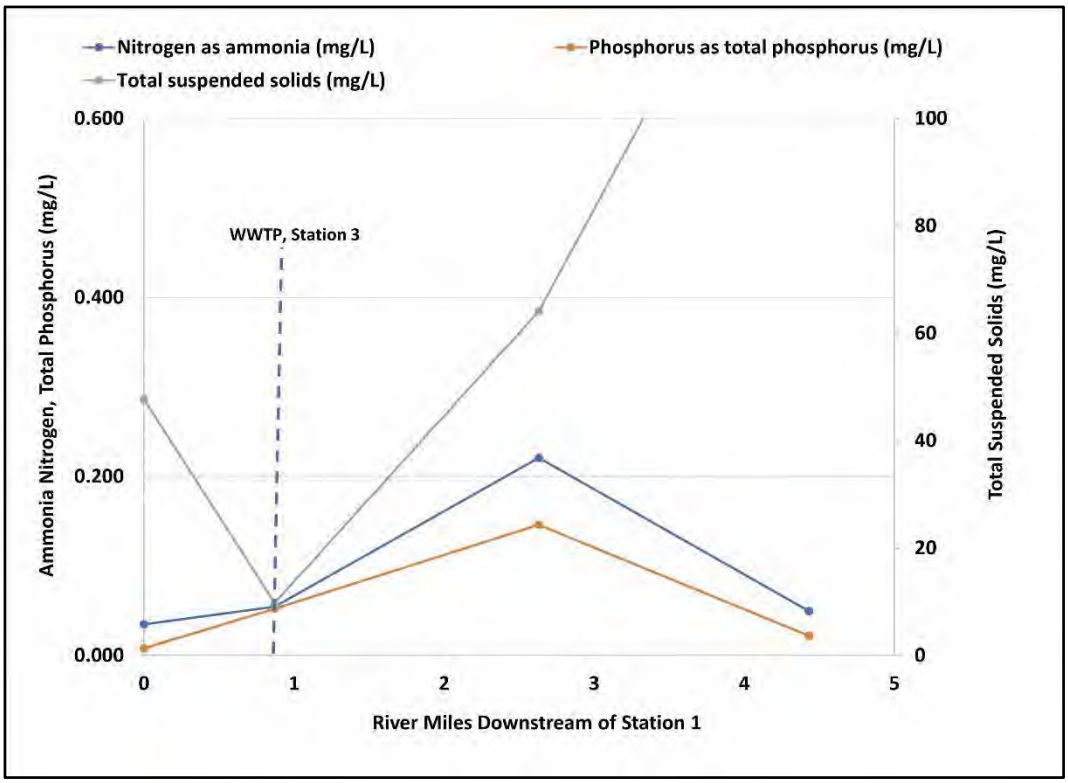

Figure 28: Nutrients and TSS at South Fork San Gabriel River Stations During Rainfall, August 22, 2022

Figure 29: Filamentous Algae at Tributary Discharge into South Fork San Gabriel River on June 22, 2022 0.5 Miles Upstream of WWTP Discharge

5.4 SEDIMENTS

On June 21, 2022, FNI biologists walked the 4.2-mile length of the river from US 183 downstream to Gabriel Overlook neighborhood park over a seven-hour period. Except for the area where the unnamed tributary at Station 2 discharges into the river upstream of the WWTP outfall, substantial accumulations of sediment were not observed. Sludge from treated wastewater discharge was not observed anywhere in the river.

Anoxic sediments were observed at Station 1 and at seeps flowing into the river from the north bank between Station 1 and the city's outfall, and near Station 7 where sediments had accumulated around aquatic macrophytes in the middle of the river.

A thin layer of brown sediment extended along much of the study reach. Highway construction at US 183 and neighborhood construction north of the river appear to be sources of the brown sediment. This brown sediment was particularly noticeable on aquatic plants immediately downstream of the US 183 bridge.

Thick (greater than 2 inches thick) black organic sediments were not observed at any locations. The black organic sediment observed in small patches appears to originate from accumulated decomposing algae and aquatic plants with a mix of silt and clay sediments. These small patches of black sediments were in a layer less than 3 inches thick. Much of the river had a thin layer, less than 0.1 inch thick, of brown silt.

6.0 REFERENCES

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Appendix A

Benthic Algal Sample Reaches

Station 1: June 22, 2022

Station 1: August 4, 2022

Station 1: September 12, 2022

Station 4: June 22, 2022

Station 4: August 4, 2022

Station 4: September 12, 2022

Station 6: June 22, 2022

Station 6: August 4, 2022

Station 6: September 12, 2022

Station 7
Station 7 (Gabriel Overlook Neighborhood Park): June 22, 2022

Station 7 (Garey Park): August 4, 2022

Station 7 (Garey Park): September 12, 2022