



June 26, 2024

Via E-mail: deq.publicnotices@la.gov; bryan.johnston@la.gov

Bryan Johnston, Air Permits Administrator
Office of Environmental Services
Louisiana Department of Environmental Quality
P.O. Box 4313
Baton Rouge, Louisiana 70821-4313

Re: FG LA LLC Application to Renew its Title V Permits, Nos. 3141 to 3154,
AI No.: 198351, as well as Modeled PM_{2.5} NAAQS violations in River Parishes.

Dear Mr. Johnston:

RISE St. James, Louisiana Bucket Brigade, Sierra Club, Center for Biological Diversity, Healthy Gulf, and Earthworks (“Commenters”) write to object to renewing the PM_{2.5} emissions limits in FG LA LLC’s (Formosa Plastics’) Title V operating permits, Nos. 3141-3154 (the “Title V Permits”) for a proposed petrochemical complex in St. James Parish. In specific, Commenters wish to alert LDEQ to new air modeling results that require LDEQ to: 1.) deny Formosa Plastics’ renewal application, or substantially reduce the complex’s fine particulate (PM_{2.5}) emissions, because they cause or contribute to National Ambient Air Quality Standards (NAAQS) violations; and 2.) act immediately to remedy broader, modeled NAAQS violations in St. James and surrounding parishes shown in this model, irrespective of Formosa Plastics’ contributions. If LDEQ nonetheless intends to renew Formosa Plastics’ Title V Permits without change, Commenters intend to submit more extensive comments during the required public comment period. *See* LAC 33:III.507(E)(5), .519(C), .531(A)(2) (requiring public comment period for Title V permit renewal).

Attached as Exhibit 1 to this letter is the expert air modeling report prepared for Commenters by Steven Klafka. Klafka is an environmental engineer with over 40 years of experience in permitting under the Clean Air Act, including air modeling for

NAAQS compliance.¹ Using Formosa Plastics' own emissions data and modeling assumptions that the company provided to LDEQ, Klafka conducted air modeling that reveals that Formosa Plastics would exacerbate violations of the NAAQS for both the PM_{2.5} annual- and 24-hour-average periods for St. James and surrounding parishes. And as Klafka's modeling also demonstrates, Formosa Plastics' contributions to these violations would exceed the Significant Impact Level ("SIL") for the PM_{2.5} annual standard across a wide area; i.e., Formosa Plastics would be "culpable" for an array of violations, regardless of whether it lawfully could rely on SILs here.² LDEQ must take immediate action to address the modeled violations of both PM_{2.5} standards, and Formosa Plastics' role in them.

I. Factual and Regulatory Background.

LDEQ first issued Formosa Plastics a PSD Permit and the Title V Permits on January 6, 2020. Formosa Plastics now faces a July 6, 2024, deadline to apply to renew its Title V Permits, which are set to expire in six months. *See* LAC 33:III.507(E) (specifying that Title V permits expire after five years). Formosa Plastics has not started to construct the facility and therefore has not operated pursuant to the Title V permits. And since LDEQ first granted the Title V Permits, several Clean Air Act rules governing the plant's approval and operations have changed, including the NAAQS for annual-average exposure to PM_{2.5} emissions that cause serious health and environmental harm. The air permits remain in litigation, and, in 2020, the U.S. Army Corps of Engineers suspended Formosa Plastics' Section 404 wetlands permit,³ subsequently announcing the agency would complete an Environmental Impact Statement to assess whether it could approve or deny the permit.⁴

As far as Commenters are aware, Formosa Plastics has not commenced the new

¹ Exhibit 1, Aff. of S. Klafka, Att. B, "FG LA LLC (Formosa Plastics), St. James Parish, Louisiana, Evaluation of Compliance with the NAAQS for PM_{2.5}" (May 21, 2024) [hereinafter: "Klafka Report"].

² *See generally* EPA, "Guidance on SILs for Ozone and Fine Particles in the PSD Permitting Program" (Apr. 17, 2018) [hereinafter SILs Guidance], https://www.epa.gov/sites/default/files/2018-04/documents/sils_policy_guidance_document_final_signed_4-17-18.pdf

³ Letter from Army Corps District Commander Col. Stephen Murphy to FG LA (Nov. 10, 2020), https://drive.google.com/file/d/1nAEv3XFWevceS3ADJ5N_Wwt4YFu3Bzpc/view (suspending permit).

⁴ Memo from Acting Assistant Secretary of the Army (Civil Works) to Commanding General, U.S. Army Corps of Engineers (Aug. 18, 2021), https://www.biologicaldiversity.org/campaigns/ocean_plastics/pdfs/Formosa-Memo-Signed-18-Aug-2021.pdf.

Section 404 permit process or proposed any schedule to construct the complex. Nonetheless, in February 2024, Formosa Plastics filed an application to extend the 18-month construction deadline for its PSD Permit for the third time, providing an Air Quality Analysis for PM_{2.5} and other criteria pollutants but making no changes to its proposed complex (the "PSD Application").⁵ The Air Quality Analysis contained in the PSD Application is the basis for the air modeling Klafka conducted.

Problematically, Formosa Plastics' Air Quality Analysis failed to show compliance with the NAAQS currently in force. Less than a month after Formosa Plastics submitted its PSD Application, EPA finalized a rule to lower the annual-average PM_{2.5} NAAQS from 12 to 9 µg/m³.⁶ And Formosa Plastics' modeling contained in the PSD Application showed the complex may not be able to meet the new standard, projecting that PM_{2.5} concentrations could be greater than 9 µg/m³ after Formosa Plastics' emissions are added to existing sources of pollution.⁷ Nonetheless, neither did Formosa Plastics update its modeling nor did LDEQ require it to do so. Instead, LDEQ approved the application on March 22, 2024, without change, and without any public notice, let alone opportunity for public comment—indeed only publishing the application on the Electronic Document Management System (EDMS) the same day the agency granted it.⁸ But in its approval letter, LDEQ explained that Formosa Plastics still would need to apply to renew its Title V Permits "no later than July 6, 2024," and that, at that time, Formosa Plastics "shall include a demonstration that the FG LA Complex will not cause or contribute to a violation of the recently revised primary annual PM_{2.5} NAAQS (i.e., 9.0 µg/m³) unless the standard has been suspended or revoked by a court

⁵ PSD Application, EDMS Doc. No. 14215546.

⁶ See *Reconsideration of the National Ambient Air Quality Standards for Particulate Matter*, 89 Fed. Reg. 16202 (Mar. 6, 2024).

⁷ PSD Application at p. 240 of 588.

⁸ LDEQ Ltr Granting Extension of PSD Deadline to Commence Construction (Mar. 22, 2024), EDMS Doc. No. 14223424 [hereinafter: "PSD Permit Extension Approval Ltr."]. Commenters immediately filed letters objecting to LDEQ's last two decisions, in December 2023 and again in March 2024, to extend the PSD Permit deadline without any public process or starting the permitting proceeding over. See Letters filed on December 7, 2023 and March 25, 2024, EDMS Doc. Nos. 13598824, 14222673. And Commenters continue to object to LDEQ's decisions to do so, which conflict with the agency's obligation as a public trustee and EPA guidance on point. See EPA, *Guidance on Extension of Prevention of Significant Deterioration (PSD) Permits under 40 CFR 52.21(r)(2)* (Jan. 31, 2014), <https://www.epa.gov/nsr/guidance-extension-prevention-significant-deterioration-psd-permits>.

of proper jurisdiction.”⁹ The 9.0 µg/m³ annual NAAQS has not been suspended or revoked. *See* 40 C.F.R. § 50.20(a).

Klafka's attached report analyzes Formosa Plastics' compliance with both the annual and 24-hour PM_{2.5} NAAQS in the 50-kilometer area surrounding the proposed petrochemical complex, using the PSD Application's modeling data and assumptions.¹⁰ These assumptions include all of the data necessary to run the model, including the level of Formosa Plastics' own emissions, the actual, reported emissions of other contributing sources in the area, the air monitor used to assess background air quality levels, and relevant meteorological data, etc.¹¹ In the PSD Application, however, Formosa Plastics performed a more limited modeling exercise, failing to assess the extent of NAAQS violations in the area for either standard, and failing altogether to determine compliance with the current PM_{2.5} annual standard.¹² Klafka performed those missing analyses.

II. Formosa Plastics would cause or contribute to violations of the annual PM_{2.5} NAAQS, requiring LDEQ to deny the Title V Permit renewal application.

Klafka's report demonstrates that Formosa Plastics' emissions would cause or contribute to violations of the annual NAAQS for PM_{2.5}, including in excess of SILs. *See* LAC 33:III.519(C)(5), .509(K). LDEQ must deny a Title V Permit to operate a source, and has the power to prevent construction, when it determines that the new or modified source “would prevent the attainment or maintenance” of any NAAQS, or would fail to comply with requirements of Louisiana's State Implementation Plan (“SIP”), which includes the prohibition on permitting major sources that could “cause or contribute” to NAAQS violations. LAC 33:III.519(C)(5); *see id.* 509(K) (“cause or contribute”

⁹ PSD Permit Extension Approval Ltr. at 3. LDEQ should have required Formosa Plastics to demonstrate compliance with this standard *before* extending the PSD Permit's construction deadline. LDEQ's approval of the extension came two weeks after the final rule announcing that EPA was lowering the NAAQS. After the 60-day delay required by federal law, that rule took effect on May 6, 2024, still two months before the date the PSD Permit would have expired in July 2024. *See* PSD Permit Extension Approval Ltr. at 3. Formosa Plastics made no effort to show it could start construction before May 6, and in fact it could not do so without a valid 404 permit. In other words, there was no legitimate justification to extend the PSD Permit without first requiring compliance with the new NAAQS. Commenters continue to object to LDEQ's failure to require compliance with the new NAAQS before extending the PSD Permit.

¹⁰ Klafka Report at 3.

¹¹ *See id.* at 4–5.

¹² *See id.* at 3–4.

prohibition). Here, the modeling shows that Formosa Plastics is such a prohibited source, because the petrochemical complex would cause or contribute to violations of the annual PM_{2.5} standard.

Namely, the model predicts widespread violations of the annual PM_{2.5} standard. The violations rise to more than *five-times* the level of the NAAQS and would cover a wide geographic area.¹³ The main bloc of violations stretches more than 17 miles long and 9 miles wide in an unbroken area along both sides of the Mississippi River from well south of Formosa Plastics' site to Iberville Parish, as depicted in Figure 1 below.¹⁴ This includes numerous residential communities, as well as places where people recreate and work or do business.

¹³ Klafka Report at 7.

¹⁴ Klafka Report at 11–12.

Figure 1. Modeled violations of the PM_{2.5} annual standard. (Formosa Plastics' proposed emissions sources are in blue; colored areas show cumulative industrial emissions concentrations that are in excess of the assumed background concentration of 7.6 µg/m³.)¹⁵

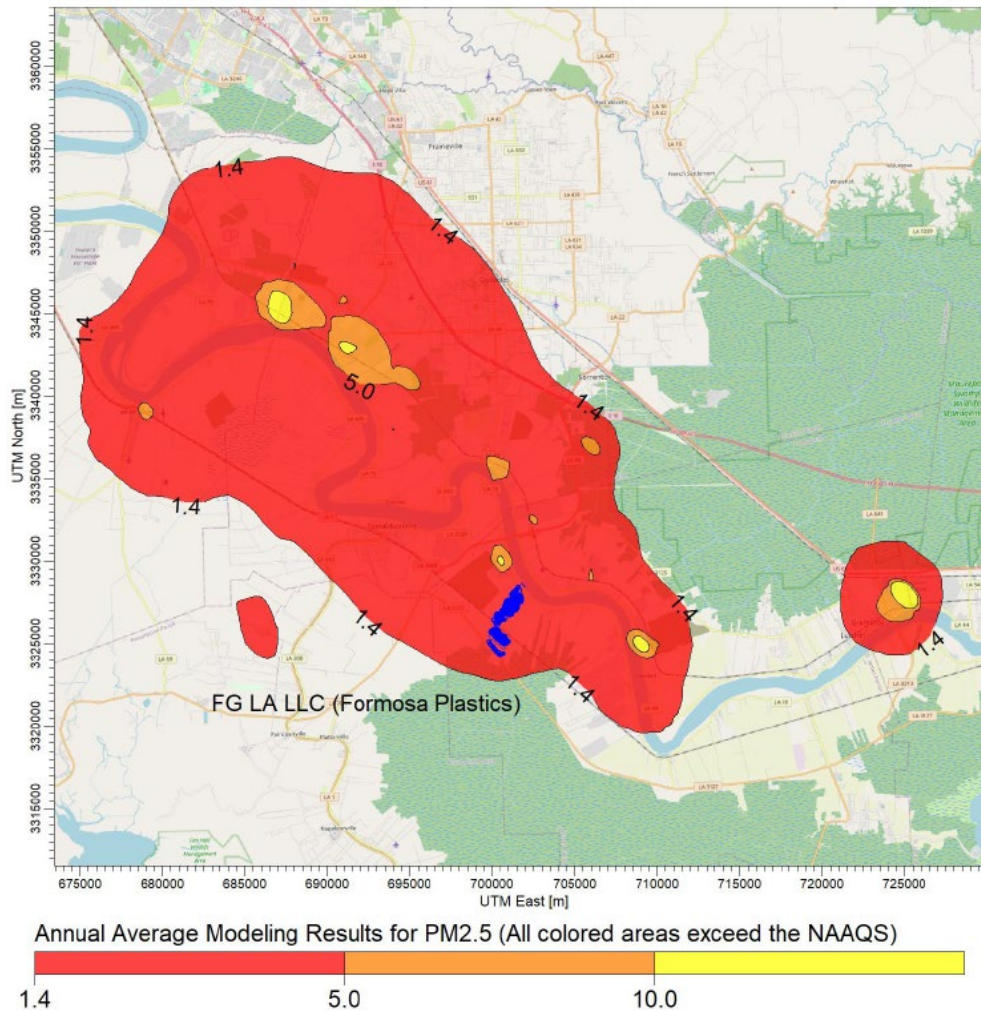


Figure 5 - Regional Results for Annual Average NAAQS of 9 µg/m³

Not only does Formosa Plastics contribute to many of these violations, as prohibited by the Clean Air Act, *see* LAC 33:III.509(K), it contributes even more than the SIL within a circle surrounding the site that is as much as 5 miles across, as shown in Figure 2 below.¹⁶ This area where Formosa Plastics' contributions to NAAQS violations exceed the SIL is so large it comprises 17 percent of the total area modeled.¹⁷ And it

¹⁵ In other words, areas within the contour line of 1.4 µg/m³ reflect concentrations that are 9.0 µg/m³ or larger (i.e., 7.6 + 1.4).

¹⁶ Klafka Report at 11, 13.

¹⁷ Klafka Report at 11.

includes portions of the downriver community of Welcome, such as the St. Louis Academy elementary school, as well as part of the community of Union across the River from Formosa Plastics' site.¹⁸ These Louisianans, including kids, already endure air that fails to meet the NAAQS. And Formosa Plastics would worsen that unhealthy air to a degree that even LDEQ and Formosa Plastics—relying as they do on the SILs—would deem “significant.”

Figure 2. Areas in which Formosa Plastics contributes in excess of the SIL to PM_{2.5} annual NAAQS violations, shown within the black line (Formosa Plastics' proposed emissions sources are in blue).

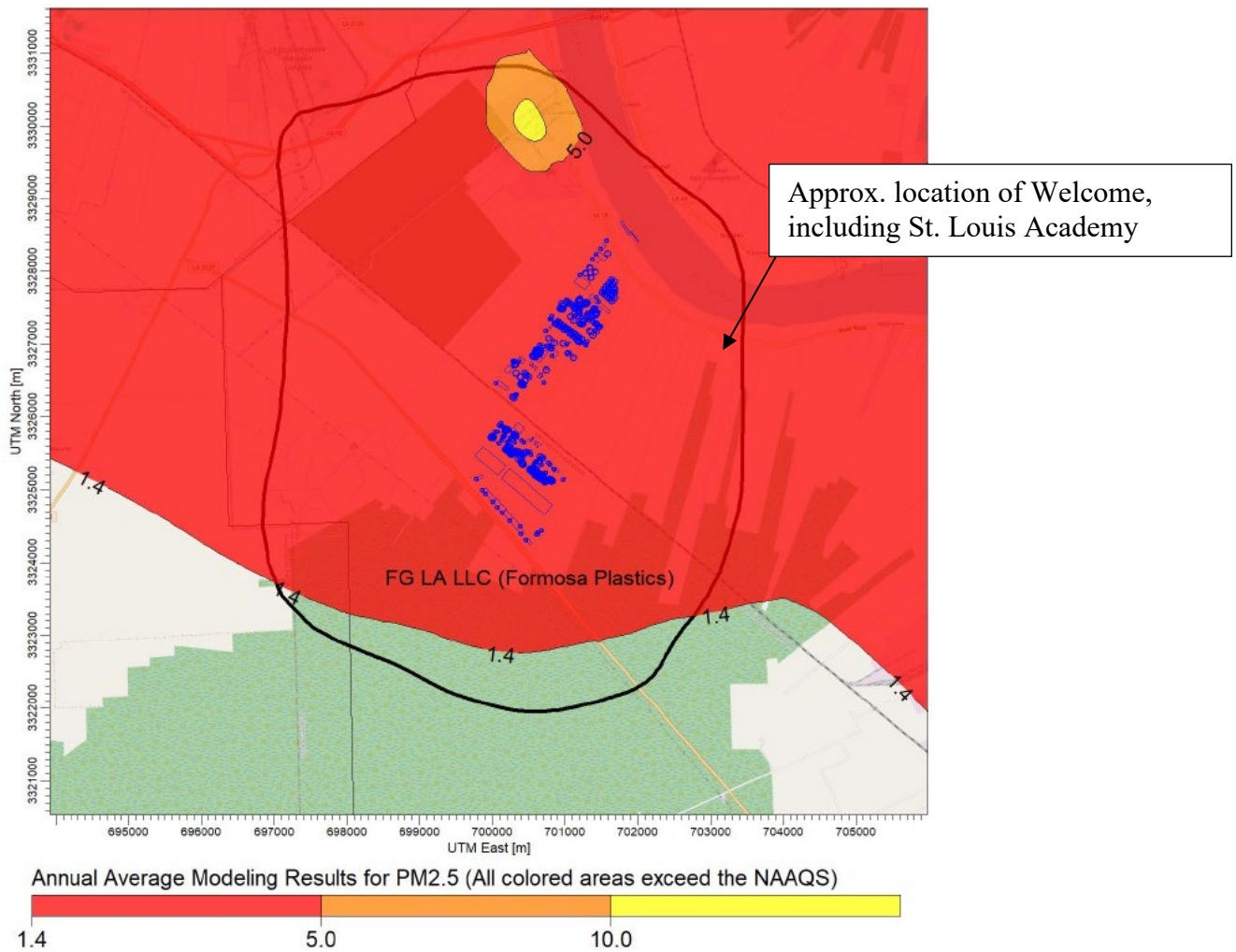


Figure 6 - Regional Results for Annual Average NAAQS and Area that FG LA LLC Exceeds SIL

¹⁸ See Klafka Report at 13.

While this modeling based on Formosa Plastics' own assumptions already requires denying renewal of the PM_{2.5} limits, these results could well be underestimates because Formosa Plastics' assumptions about background air quality may be unjustifiably rosy. Rather than conduct one year of onsite air monitoring to determine background air quality levels as the Clean Air Act presumptively requires, *see* 42 U.S.C. § 7475(e), Formosa Plastics relies on LDEQ's Geismar air monitor's annual design value of 7.6 µg/m³ for supposedly "representative" background air quality in the area.¹⁹ But the Geismar station monitor is located almost 14 miles (as the crow flies) upriver of the site, in Iberville Parish. LDEQ should have required Formosa Plastics to conduct onsite air monitoring, and LDEQ must do so now as other monitors in the area show higher PM_{2.5} concentrations than at Geismar. Indeed, much more representative of air quality near the site would be readings from the new in-parish, "St. James Parish" monitor that LDEQ installed in Welcome less than 3 miles from the site. The St. James Parish monitor was averaging 9.48 µg/m³ (i.e., above the current NAAQS) in its continuous readings from April 23 until June 23, 2024.²⁰ Had Formosa Plastics used data from this monitor, or presumably similar data from an onsite monitor, the area of NAAQS violations and area in which Formosa Plastics contributed to those violations would likely have been larger.

Regardless of Formosa Plastics' assumptions, the outcome of this modeling is clear. LDEQ must deny Formosa Plastics' application to renew its Title V Permits if the company fails to reduce PM_{2.5} emissions, because the company would "cause or contribute" to violations of the PM_{2.5} annual NAAQS. *See* LAC 33:III.519(C)(5), .509(K). At most, Formosa Plastics could only renew its Title V Permits if it greatly reduces or offsets its own proposed emissions, to fully eliminate its contributions at the time and place of the violations. 40 C.F.R. § 51.165(b)(3).

¹⁹ Klafka Report at 7; PSD Application at p. 218 of 588; LDEQ Air Monitoring Stations, Geismar, <https://www.deq.louisiana.gov/page/Geismar>.

²⁰ *See* LDEQ Air Monitoring Data, St. James Parish Monitor, from April 24, 2024 to June 23, 2024, available at <https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING-DATA#>. Likewise, LDEQ's more longstanding French Settlement monitor, which is only a few miles further from the site than the Geismar monitor, showed an average PM_{2.5} reading of 11.87 µg/m³ in 2023. *See* LDEQ, Ambient Air Monitoring Data & Reports, French Settlement Site Data for 2023, available at <https://internet.deq.louisiana.gov/portal/DIVISIONS/AIR-MONITORING/AIR-MONITORING-DATA-WITH-INTERVAL-5-OR-10-MINUTES>.

III. Formosa Plastics also causes or contributes to violations of the PM_{2.5} 24-hour standard, even though using the company's assumptions, it would contribute less than the Significant Impact Level.

For the PM_{2.5} 24-hour standard, the modeling shows Formosa Plastics would worsen violations of the standard throughout the region, with 18 separate pockets of violations, including in residential and commercial areas of communities like Gramercy and White Castle. Figure 3 below shows the area of NAAQS violations for the 24-hour standard.²¹

²¹ Klafka Report at 7–10.

Figure 3. Modeled violations of the PM_{2.5} 24-hour standard.

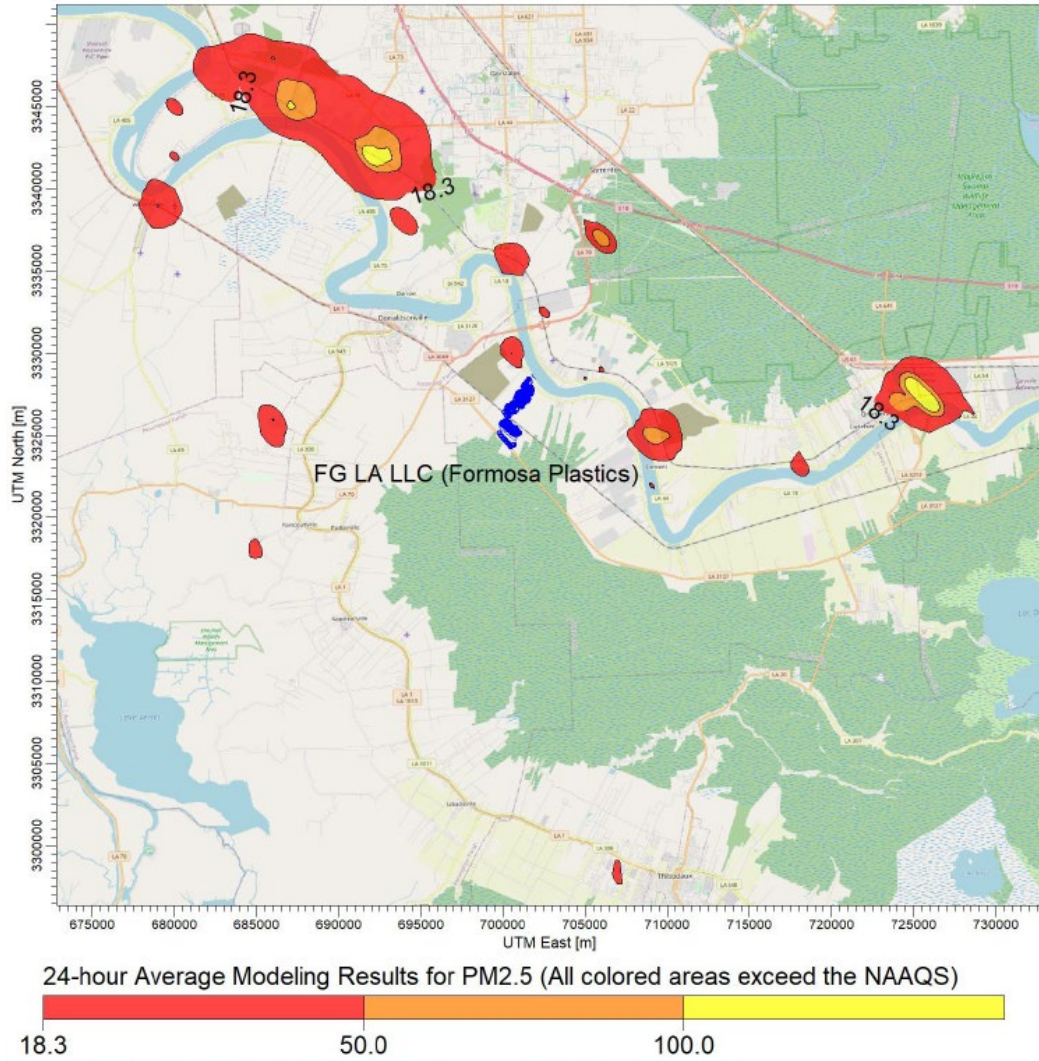


Figure 2 - Regional Results for 24-hour Average NAAQS of 35 µg/m³

LDEQ must deny the renewal of the Title V Permits' PM_{2.5} limits, because Formosa Plastics would cause or contribute to violations of the 24-hour NAAQS, as Klafka's modeling reveals. And LDEQ must require Formosa Plastics to reduce its emissions to avoid worsening the PM_{2.5} 24-hour violations, under the Clean Air Act and the Louisiana constitution's public trust doctrine. While the modeling shows Formosa Plastics would contribute less than the SIL, EPA has specified that even contributions below the SIL to NAAQS violations may "cause or contribute" and therefore warrant denying the permit, where they indicate "basis for concern." See SILs Guidance at 18; see also *Sierra Club v. EPA*, 705 F.3d 458, 464–65 (D.C. Cir. 2013) (holding contributions less than SIL to NAAQS violations could violate the Act); see also *Powder River Basin Res.*

Council v. Wyo. Dep't Env't Quality, 226 P.3d 809, 818–19 (Wyo. 2010) (same). Here, there is basis for concern, particularly given the threat to residents and businesses—as well as places where people recreate, worship, go to school, and receive medical care—from these violations, as Klafka's modeling demonstrates. It is true that the Louisiana First Circuit Court of Appeals recently affirmed LDEQ's decision to rely on SILs in issuing the original PSD Permit to Formosa Plastics, without the benefit of this full cumulative impact modeling in the record. *See Rise St. James v. LDEQ*, 2023-0578, p. 32 (La. App. 1 Cir. 1/19/24), 383 So.3d 956, 980; *see also Sierra Club v. LDEQ*, 100 F.4th 555, 567 (5th Cir. 2024) (deferring to LDEQ's use of SILs in permitting liquified natural gas export terminal). But first, that case was wrongly decided, and Commenters' application for a writ of certiorari to the Louisiana Supreme Court remains pending. *See RISE St. James et al. Application for Writ of Certiorari, RISE St. James et al. v. LDEQ*, Dkt. No. 2024-00355 (La. Sup. Ct. 2024). Second, the First Circuit relied in part on LDEQ's conclusion that the PM_{2.5} violations associated with the PSD Permit only would impact industrial areas, not residential communities, and therefore "the health of those living in the vicinity" would not be "adversely impacted." *See RISE*, at p. 28, 383 So.3d at 977. However, as Klafka's report now makes clear, the violations extend well into residential areas. LDEQ must address Formosa Plastics' emissions worsening these ongoing violations of the PM_{2.5} 24-hour standard, which is meant to protect against acute health harm from heart attacks, aggravated asthma, decreased lung function, and premature death.²²

IV. LDEQ must reduce air pollution in the area to eliminate the modeled NAAQS violations, requiring emissions reductions at existing and proposed sources that contribute to the violations.

LDEQ additionally has an obligation expeditiously to eliminate these NAAQS violations, by ordering any of the sources contributing to the violations (not just Formosa Plastics) to reduce their emissions enough to achieve that result.²³ If LDEQ fails to act timely to do so, EPA Region 6 may initiate a SIP call to do so itself.²⁴ As

²² *Recon. of the NAAQS for PM*, 88 Fed. Reg. 5558, 5583–5607 (Jan. 27, 2023).

²³ *See* EPA Memo, Gerald A Emison, Director OAQPS, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)" (July 5, 1988), https://archive.epa.gov/airquality/ttnsr01/web/html/p6_22.html (stating that regardless of whether a source is entitled to a permit, "the State must also take the appropriate steps to substantiate the NAAQS or increment violation and begin to correct it through the State implementation plan (SIP)").

²⁴ *Id.* "The EPA Regional Offices' role in this process should be to establish with the State agency a timetable for further analysis and/or corrective action leading to a SIP revision, where necessary.

explained above, the data show widespread violations of both PM_{2.5} NAAQS in St. James Parish and the surrounding parishes. The violations are large in scale and in the geographic area they impact. LDEQ must investigate each of these violations and require existing and proposed sources to make emissions reductions necessary to return air quality to below the NAAQS and protective of public health.

For the foregoing reasons, we ask LDEQ to deny Formosa Plastics' application to renew the Title V Permits and act to correct the NAAQS violations shown in the attached air modeling.

Respectfully submitted by,



Mike Brown, Senior Attorney
Corinne Van Dalen, Senior Attorney
EARTHJUSTICE
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New Orleans, LA 70130
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cvandalen@earthjustice.org
On behalf of Commenters

Cc:

David Garcia, Director Air and Radiation Division, EPA Region 6

Garcia.david@epa.gov

Jeffrey Robinson, Branch Chief, Air Permits, Monitoring & Grants, EPA Region 6

Robinson.jeffrey@epa.gov

Brad Toups, Louisiana Air Permit, EPA Region 6

Toups.brad@epa.gov

Additionally, the Regional Office should seriously consider a notice of SIP deficiency, especially if the State does not provide a schedule in a timely manner." *Id.*

Exhibit 1

LOUISIANA DEPARTMENT OF ENVIRONMENTAL QUALITY

Prevention of Significant Deterioration Permit (PSD-LA-812)
14 Title V Permits (Nos. 3141 to 3154)
Associated Environmental Assessment Statement

FG LA LLC – FG LA Complex (AI 198351)
Welcome, St. James Parish, Louisiana

AFFIDAVIT OF STEVEN KLAFKA

I, Steven Klafka, state:

1. I have personal knowledge of the statements made herein.
2. I am a licensed professional engineer (PE) and board certified environmental engineer (BCEE).
3. I am a consultant in the field of environmental engineering and air pollution control and compliance, and have approximately 44 years of experience in interpreting and implementing the 1970 Clean Air Act and subsequent amendments, including expertise in federal/major New Source Review (NSR), Prevention of Significant Deterioration (PSD) and air dispersion modeling including the ISCST3, AERMOD, and CALPUFF models. I began as an environmental engineer for the Wisconsin Department of Natural Resources, responsible for reviewing air permit applications, and then have spent more than 35 years as a consultant specializing in air permitting work. I founded and have been President of my own consulting firm, Wingra Engineering, since 1991.
4. Attachment A hereto is a true and accurate copy of my curriculum vitae.
5. I have been asked by attorneys at Earthjustice, on behalf of their clients, to express my expert opinions concerning FG LA LLC (“Formosa Plastics”) air modeling. In particular, I am providing opinions concerning whether this modeling shows that the air in the area surrounding the proposed Formosa Plastics petrochemical complex in St. James Louisiana (the “Project”) complies with the National Ambient Air Quality Standards (NAAQS) for fine particulate matter (PM_{2.5}).
6. To do this, I reviewed Formosa Plastics’ application to extend its Prevention of Significant Deterioration (PSD) permit, PSD-LA-812, which the company filed with the Louisiana Department of Environmental Quality (LDEQ) on February 9, 2024. I reviewed the Air Quality Analysis report that Formosa Plastics produced as Exhibit C to its application. I also obtained the underlying air quality modeling files Formosa Plastics submitted to LDEQ in connection with the application, and these are the files that I used to conduct further air dispersion modeling.

Exhibit 1

7. Through my education, training and experience, and using the relevant documents described in paragraph 6, I have conducted air dispersion modeling on AERMOD and formed opinions regarding compliance of the 50 kilometer area surrounding the Project site with the NAAQS for 24-hour-average and annual-average PM_{2.5}. I also have formed opinions on whether Formosa Plastics exceeds the current, annual-average PM_{2.5} significant impact level (SIL) at the time and place of predicted NAAQS violations.
8. Attachment B to this affidavit is a true and correct copy of my report explaining the methods I used and opinions I formed concerning this air dispersion modeling.

I hereby certify under penalties of perjury that the foregoing representations are true to the best of my knowledge.

Steven Klafka Date 5/23/24
Steven Klafka

State of Wisconsin

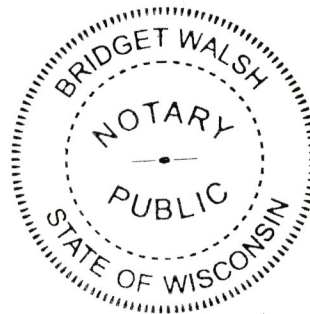
County of Dane

Sworn to and subscribed before me on 5/23/2024
Date

by Bridget Walsh
Notary Public (print)

Bridget Walsh
Signature of Notary Public

My commission expires 4/3/28



CURRICULUM VITAE OF STEVEN KLAFKA, P.E., BCEE

Experience With Current Firm

President/Environmental Engineering Consultant Wingra Engineering, S.C., Madison, Wisconsin (1991 to Present)

- Conducts environmental engineering projects related to air pollution control, hazardous waste management, compliance with regulations, and environmental impact studies. Formed Wingra Engineering in 1991.
- Provides environmental and regulatory consulting services for a diverse range of clients including manufacturing plants, electrical utilities, environmental advocacy groups, law firms and individuals.
- Worked for a wide range of industrial operations including foundries, glass manufacture, painting, coating, mineral quarries, lime manufacturing, coal handling, chemical manufacture, and electrical utilities.
- Completed projects in numerous states including Wisconsin, Minnesota, Iowa, Illinois, Ohio, Virginia, North Carolina, Tennessee, Oklahoma, Texas, Colorado, California, Oregon, and Washington.
- Services provided to clients include preparation of permit applications; dispersion modeling; risk assessment; environmental impact analysis; regulatory training; expert witness services; compliance inspections and audits; reporting and recordkeeping development; testing programs; air pollution control system design and selection; and air quality monitoring systems.
- Significant projects include preparation of permit applications for major air pollution sources located near Class I national parks and wilderness areas; evaluation of cumulative air toxic risk from manufacturing plants; dispersion modeling analysis for over 200 coal-fired generating stations to determine compliance with air quality standards; and, expert witness services for litigation regarding air pollution control, dispersion modeling and emission control methods.

Past Experience

Associate/Senior Environmental Engineer Dames & Moore Consultants, Madison, Wisconsin (1988-1991)

- Conducted environmental audits and analyses to verify compliance with local air pollution control regulations at manufacturing facilities throughout the U.S., as well as Canada, India, Singapore and Taiwan.
- Managed and developed multi-disciplinary environmental impact studies for a wide variety of projects including utility turbine generating stations, a biomedical waste disposal facility, and a flat glass manufacturing facility.

Environmental Engineer, Wisconsin Department of Natural Resources Bureau of Air Management, Madison, Wisconsin (1981-1988)

- Evaluated air pollution control permit applications for diverse range of air pollution sources. Duties included estimation of air pollution emissions, verification of compliance with applicable regulations and policies, and use of computer dispersion models to predict air quality impacts and determine health risks.
- Developed the air pollution control permit application forms used by the agency.
- Assisted in the development of the Wisconsin state policy for the control of hazardous air pollutant emissions.

Academic B.S., Mechanical Engineering, University of Wisconsin, Madison, Wisconsin (1980).

Background M.S., Civil & Environmental Engineering, University of Wisconsin (1994).

Professional Affiliations Air and Waste Management Association, Past Chair for Wisconsin Chapter
American Academy of Environmental Engineers

Exhibit 1

CURRICULUM VITAE OF STEVEN KLAFKA, P.E., BCEE

Registration Registered Professional Engineer
Wisconsin (#E-24305), Illinois (#062-045104) and North Carolina (PE #023787)

Professional Honors Certified by the American Academy of Environmental Engineers
Designated Board Certified Environmental Engineer (BCEE) in 2002.

Publications

"Recent Air Pollution Control and Permit Experience in the Lime Industry", Annual Meeting of the Air & Waste Management Association, Pittsburgh, Pennsylvania, 2007.

"Evaluation of Cumulative Risk from an Iron Foundry", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"The Challenge of Air Quality Permit Approval for a Glass Plant near Mount Rainier and Olympic National Parks", Annual Meeting of the Air & Waste Management Association, New Orleans, Louisiana, 2006.

"New Source MACT and Residual Risk at an Iron Foundry", Presented at the Annual Meeting of the Air & Waste Management Association, San Diego, California, 2003.

"Influence of Emission Estimates on a BACT Determination for Iron Foundry Core Making Operations", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Challenging a Title V Operation Permit with the Part 70(8) Petition Process: An Aluminum Foundry Case Study", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluating Local Impacts of a Utility SCR Retrofit Project", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Using a Flexible Compliance Strategy to Issue a Title V Operation Permit", Annual Meeting of the Air & Waste Management Association, Baltimore, Maryland, 2002.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Electric Utilities Environmental Conference, Tucson, Arizona, January 2002.

"Recent New Source MACT Determinations and Air Quality Compliance Experience in the Iron Foundry Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Complexities of Air Quality Permit Issuance for an Iron Foundry near Great Smoky Mountains National Park", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Air Quality Permit Issuance and Varying Interpretations of BACT in the Flat Glass Industry", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Evaluation of Gas Turbine Air Quality Impacts from a Community Perspective", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Benzene Emissions and Exposure - Targeting Sources for the Greatest Benefit", Annual Meeting of the Air & Waste Management Association, Orlando, Florida, 2001.

"Measurement of Organic Air Toxics at Iron Foundries", Annual Meeting of the Air & Waste Management Association, San Antonio, Texas, 1995.

"Air Toxics Emission from Two Wood and RDF-Fired Fluidized Bed Combustors", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Recent Air Quality Compliance Experience at Wisconsin Gray and Ductile Iron Foundries", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Composition of VOC Emissions from the Sycamore Landfill", Annual Meeting of the Air & Waste Management Association, Cincinnati, Ohio, 1994.

"Sulfur Dioxide Control in a Rotary Lime Kiln", Annual Meeting of the Air & Waste Management Association, Denver, Colorado, 1993.

"Air Toxics Control Alternatives for Iron Foundry Pouring, Cooling and Shakeout Operations", Annual Meeting of the Air & Waste Management Association, Kansas City, Missouri, 1992.

FG LA, LLC (Formosa Plastics)
St. James Parish, Louisiana
Evaluation of Compliance with the NAAQS for PM_{2.5}
May 21, 2024

Conducted by:

Steven Klafka, P.E., BCEE

Wingra Engineering

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1. Introduction

Earthjustice requested that Steven Klafka, P.E., BCEE, of Wingra Engineering, evaluate the proposed petrochemical complex by FG LA, LLC (“Formosa Plastics”) in St. James Parish, Louisiana and the surrounding area for compliance with the current National Ambient Air Quality Standards (NAAQS) for Particulate Matter less than 2.5 microns (PM_{2.5}).¹ There are currently a 24-hour average NAAQS of 35 µg/m³ and an annual average NAAQS of 9 µg/m³. The annual NAAQS was recently lowered by USEPA from 12 to 9 µg/m³ by a rule issued on February 7, 2024, and that became effective on May 6, 2024.² The enclosed evaluation includes a review of the latest dispersion modeling analyses submitted to Louisiana Department of Environmental Quality (LDEQ) by Formosa Plastics with its February 9, 2024 application to extend its PSD permit. It then presents new and updated modeling analyses conducted by Wingra Engineering.

On February 9, 2024, Formosa Plastics submitted a request for extension of PSD Permit No. PSD-LA-812 to LDEQ.³ This included an updated Best Available Control Technology analysis. It also contains an Air Quality Analysis Report that describes the air dispersion modeling procedures and results, provided as Exhibit C to the request, that we refer to here as the “Formosa Analysis.” The Formosa Analysis concludes that Formosa Plastics complies with air quality standards including the NAAQS.

Formosa Plastics has also applied to LDEQ for renewal of the Title V operating permits for the entire petrochemical complex. In a March 22, 2024 letter, LDEQ requested that Formosa Plastics provide updated modeling analyses to demonstrate “that the FG LA Complex will not cause or contribute to a violation of the recently revised primary annual PM_{2.5} NAAQS (i.e., 9.0 µg/m³) unless the standard has been suspended or revoked by a court of proper jurisdiction.” This new NAAQS became effective on May 6, 2024.

¹ <https://www.epa.gov/criteria-air-pollutants/naaqs-table>

² <https://www.epa.gov/pm-pollution/national-ambient-air-quality-standards-naaqs-pm>

³ BACT Analysis and AQA Review, In Support of FG LA Permit No. PSD-LA-812, Start of Construction, February 9, 2024.

2. The Formosa Analysis

To verify compliance with the NAAQS, the February 9th report and Formosa Analysis first modeled the PSD project emissions using a regional receptor grid extending 50 kilometers from the facility location. This regional grid consisted of 11,488 “receptors,” which are regularly-spaced locations on the map where air pollutant concentrations are predicted. Formosa Plastics then evaluated compliance with the NAAQS at receptors where its emissions exceeded the applicable Significant Impact Level (SIL). It did not assess the broader air quality in the region, such as areas with NAAQS violations where Formosa Plastics might contribute less than a SIL.

In the first stage of its February 9th modeling analysis, Formosa Plastics identified the receptors or locations where project emissions would exceed the Significant Impact Level (SIL) of 1.2 µg/m³ for the 24-hour average and 0.2 µg/m³ for the annual average for PM_{2.5}.⁴ Only the receptors where the project emissions were predicted to exceed the SIL were used by Formosa Plastics for the next stage in the modeling analysis, a cumulative modeling effort including background emissions. This cumulative modeling included other contributing industrial pollution sources in the region to determine compliance with the NAAQS. The SIL-exceedance grid consisted of 1,369 receptors. There were approximately 1,900 emission sources that Formosa Plastics modeled, in addition to its own emissions, to determine total air pollution levels at these receptors.

A copy of Table 11-5 from the Formosa Analysis is provided here. This summarizes the February 9th modeling results for NAAQS compliance. It shows that exceedances of the 24-hour average NAAQS for PM_{2.5} were predicted to occur where Formosa Plastics’ emissions exceeded the SIL. No exceedances of the former annual average NAAQS for PM_{2.5} of 12 µg/m³ were predicted. However, the Formosa Analysis did predict exceedances of the new NAAQS for PM_{2.5} of 9 µg/m³.

The exceedances of the 24-hour average NAAQS presented in its Table 11-5 were further evaluated by Formosa Plastics to determine if the company was “culpable” for the NAAQS violations using a time and space analysis. This evaluates emission source contributions during the specific 24-hour period and location of the exceedance. Formosa Plastics concluded its project did not exceed the SIL during the exact time and location of the exceedances. It stated:

“The results show that for all periods with predicted NAAQS exceedances, the contribution of the FG LA project sources does not exceed the SILs. This demonstrates that the FG LA project sources do not cause or contribute to any of the modeled exceedances of the 1-hour NO₂ and 24-hour PM_{2.5}”

⁴ In guidance issued on April 30, 2024, EPA announced that it was lowering the SIL for the PM_{2.5} annual standard to 0.13 µg/m³. Supplement to Guidance on SILs for Ozone and Fine Particles in PSD Permitting Program, <https://www.epa.gov/system/files/documents/2024-04/supplement-to-the-guidance-on-significant-impact-levels-for-ozone-and-fine-particles-in-the-psd-permitting-program-4-30-2024.pdf>. Thus, the Formosa Analysis for annual PM_{2.5} is now outdated both with respect to the NAAQS and SIL for annual PM_{2.5}.

NAAQS. No additional modeling demonstration is required for 1-hour NO₂ and 24-hour PM_{2.5}.”

TABLE 11-5 NAAQS ANALYSIS RESULTS – PROJECT FG LA AND OFF-SITE SOURCES

POLLUTANT	AVERAGING PERIOD	FORM	MAXIMUM PREDICTED CONCENTRATIONS (µG/M ³)	BACKGROUND CONCENTRATION (µG/M ³)	TOTAL (µG/M ³)	NAAQS (µG/M ³)
NO ₂	1-Hour	5-Year Average of 98 th Percentile of the 1-Hour Daily Maximums	263.7 ¹	25.1	288.8	-
	Annual	1 st High of 5 Years	162.8 ²	25.1	187.9	188
CO	8-Hour	2 nd High of 5 Years	15.5	4.2	19.7	100
PM _{2.5} ³	24-Hour	5-Year Average of 98 th Percentile of the 24-Hour Averages	2,040	1029	3,069	10,000
	Annual	5-Year Average of the Annual Averages	26.60 ¹	16.7	43.3	-
PM ₁₀	24-Hour	6 th High of 5 Years	17.04 ²	16.7	33.74	35
			3.27	7.6	10.9	12
			29.97	68	98.0	150

¹ The maximum predicted ground-level concentrations exceed the NAAQS at select receptors (locations). Additional modeling, based on EPA guidance using MAXDCONT analysis, was conducted to demonstrate that the proposed FG LA project sources do not cause or contribute to the modeled exceedances at these locations.

² The maximum predicted ground-level concentrations on receptors after MAXDCONT analysis was performed. No additional modeling is required on these receptors.

³ Includes secondary PM_{2.5} estimate.

3. Updated Modeling Analysis by Wingra Engineering

Formosa Plastics used its modeling analysis to conclude it satisfied the requirements for PSD permit issuance. However, the Formosa Analysis did not determine the full extent of NAAQS violations in the area of the project. The areas of NAAQS violations are where LDEQ might seek to reduce emissions of Formosa Plastics or other sources in the region to correct predicted violations of the NAAQS, which indicate harm to the health of the people in the region. Further, as explained above, the Formosa Analysis is now outdated with respect to the newer and more protective annual average NAAQS for PM_{2.5}.

Wingra Engineering undertook to expand and update the Formosa Analysis to address its shortcomings, while still using the assumptions used by Formosa Plastics. LDEQ provided the supporting modeling files used in the Formosa Analysis. These files had been generated by Formosa Plastics using USEPA’s AERMOD dispersion model, and associated software including AERMET for preparing meteorological data, AERMAP for determining terrain elevations, and BPIP for evaluating building and structure downwash effects. Wingra Engineering used the same modeling software, the same assumptions, and same emissions for Formosa Plastics and other regional sources.

The 24-hour and annual average modeling analyses for PM_{2.5} were first repeated by Wingra Engineering to verify the results presented in the February 9th report. No updated weather, terrain or downwash analyses were conducted. The same version of the AERMOD model (v. 23132) was used to determine the predicted concentrations.

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An updated analysis was then conducted to determine NAAQS compliance throughout the entire modeling domain extending 50 kilometers from the Formosa Plastics facility. The Formosa Analysis considered only the 1,369 locations where Formosa Plastics' emissions exceeded the SIL. These locations or receptors only extended as far as 1.2 kilometers from the boundary of the Formosa Plastics facility.

The updated analysis instead used the entire regional grid of 11,488 receptors extending to a distance of 50 kilometers from the Formosa Plastics facility. This is the farthest distance which USEPA and LDEQ accept the accuracy of the AERMOD dispersion model. Use of this larger receptor grid allowed AERMOD to show all areas within the modeling domain that exceeded the NAAQS for PM_{2.5}.

Figure 1 shows the new regional receptor grid extending 50 kilometers from the Formosa Plastics facility. Individual receptors are shown as green cross marks. Emission sources are represented by the red circles with a cross through them. The blue areas represent the buildings of the Formosa Plastics facility in the center of the modeling domain which is identified in the figure.

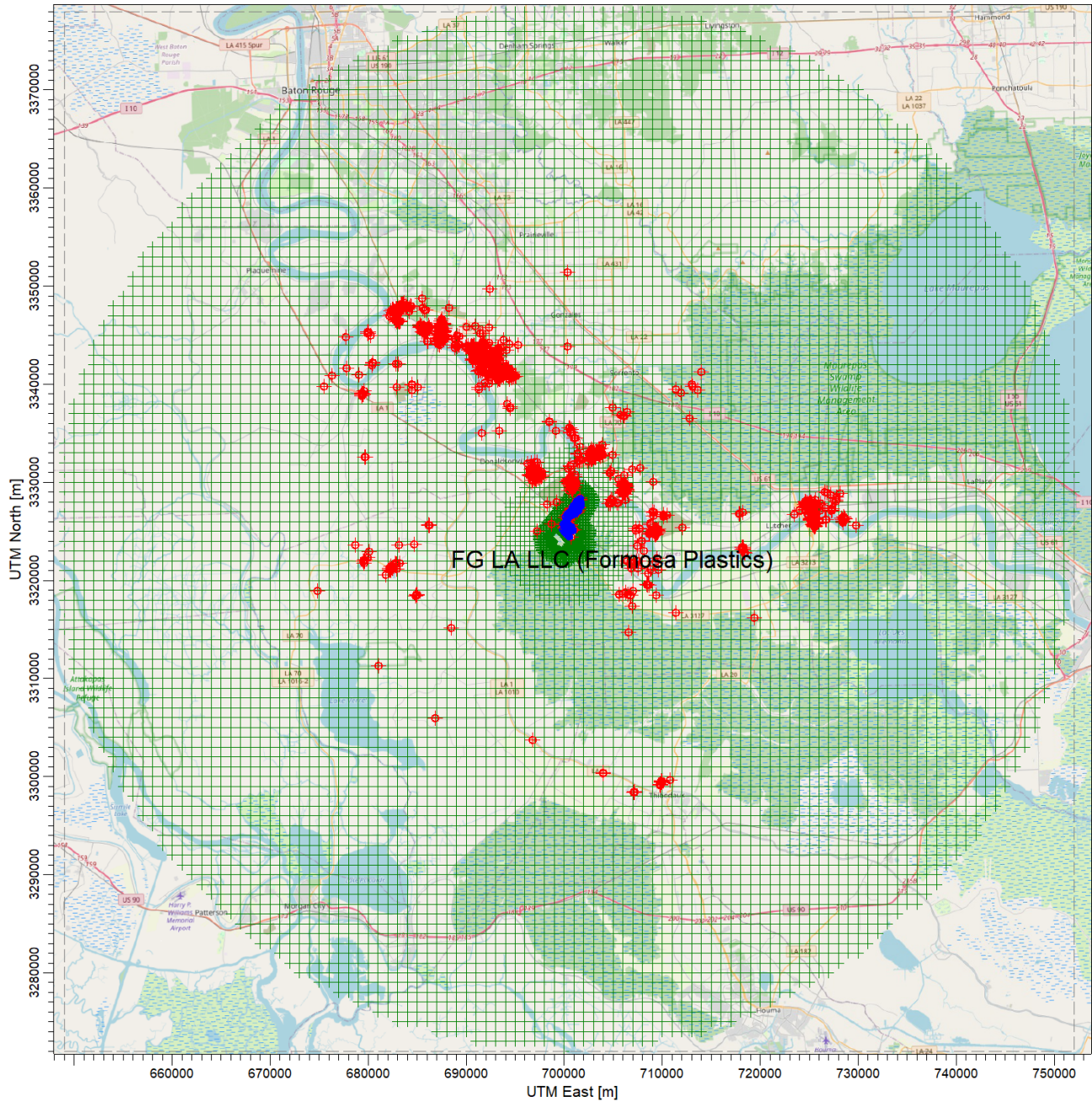


Figure 1 - 50-Kilometer Regional Receptor Grid

4. Updated Modeling Results by Wingra Engineering

Table 1 presents the updated modeling results for the 24-hour and annual averaging periods considering the entire region. Exceedances of both the 24-hour and annual average NAAQS for PM_{2.5} were predicted to occur. The maximum exceedances are 6 times the 24-hour standard, and almost 5 times the annual standard.

Pollutant	Averaging Period	Form	Maximum Predicted Concentrations (µg/m ³)	Background Concentration (µg/m ³)	Total (µg/m ³)	NAAQS (µg/m ³)	NAAQS Exceeded?
PM _{2.5}	24-hour	5-year Average of the 98 th Percentile of the 24-hour Averages	196.3	16.7	213.0	35	Yes
PM _{2.5}	Annual	5-Year Average of the Annual Averages	36.8	7.6	44.4	9	Yes

Figure 2 presents the modeling results for the 24-hour average NAAQS of 35 µg/m³ as concentration contours. All colored areas represent predicted exceedances of the NAAQS throughout the region. The background concentration is 16.7 µg/m³, so NAAQS exceedances begin at 18.3 µg/m³. All areas in red, orange and yellow have predicted exceedances. There are 18 separate areas. The predicted exceedances of the NAAQS occur in the following Louisiana parishes: St. James, Assumption, Iberville, Ascension, and St. John the Baptist. The blue areas represent the buildings of the Formosa Plastics facility which is identified in center of the figure.

Figure 3 uses Google Earth aerial photography to show predicted exceedances of the 24-hour average NAAQS in the community of Gramercy located approximately 20 kilometers east of Formosa Plastics. Areas of exceedances are tinted in red. The areas of NAAQS exceedances includes the Gramercy Elementary School, Woods Learning Academy, and Sacred Heart of Jesus Catholic Church.

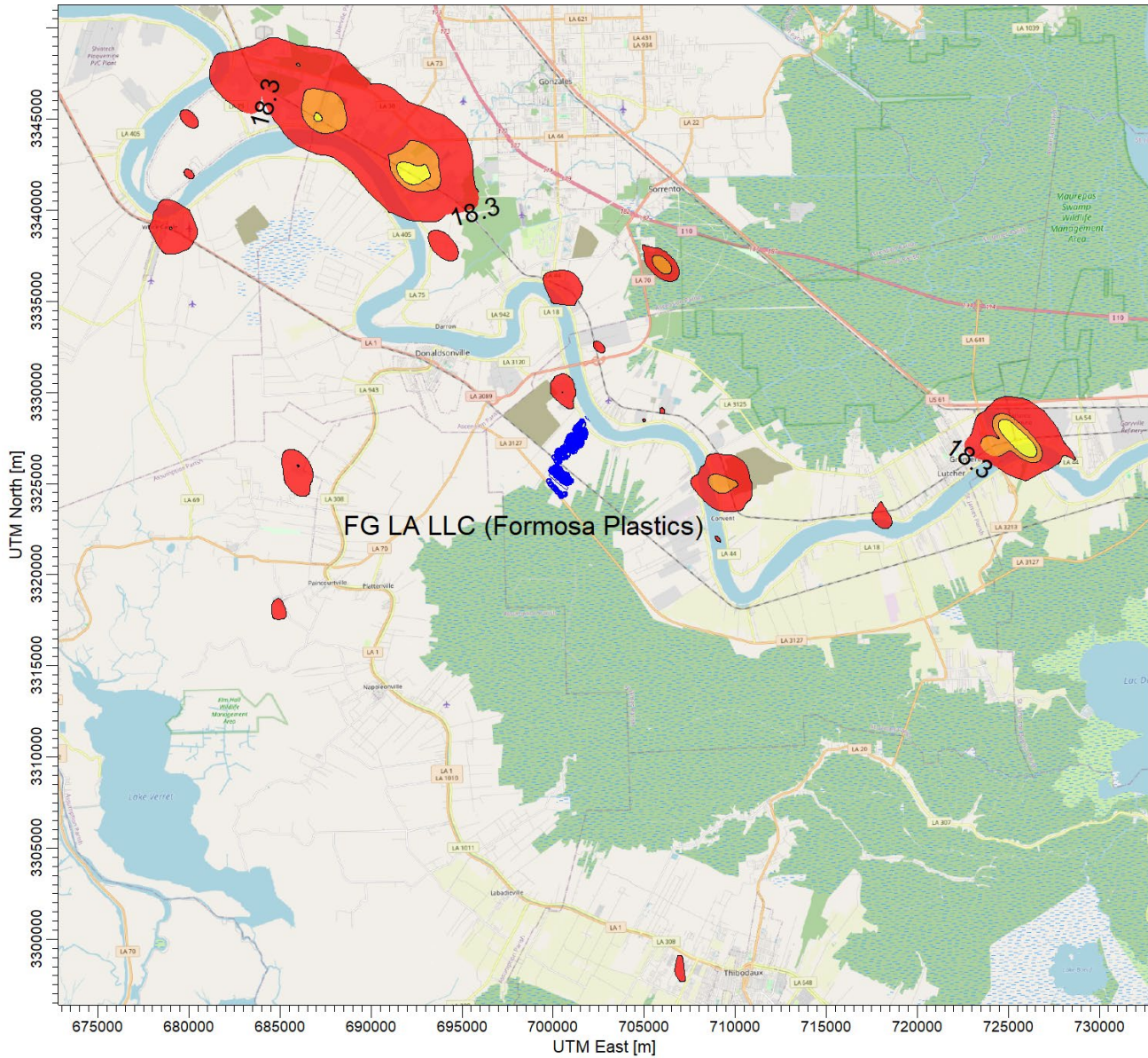
Figure 4 uses Google Earth aerial photography to show predicted exceedances of the 24-hour average NAAQS in the community of White Castle located approximately 20 kilometers northeast for Formosa Plastics. Areas of exceedances are tinted in red. The areas of NAAQS exceedances include the Hilda's Soul Kitchen and Lounge and Mount Zion Baptist Church.

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24-hour Average Modeling Results for PM_{2.5} (All colored areas exceed the NAAQS)



Figure 2 - Regional Results for 24-hour Average NAAQS of 35 $\mu\text{g}/\text{m}^3$

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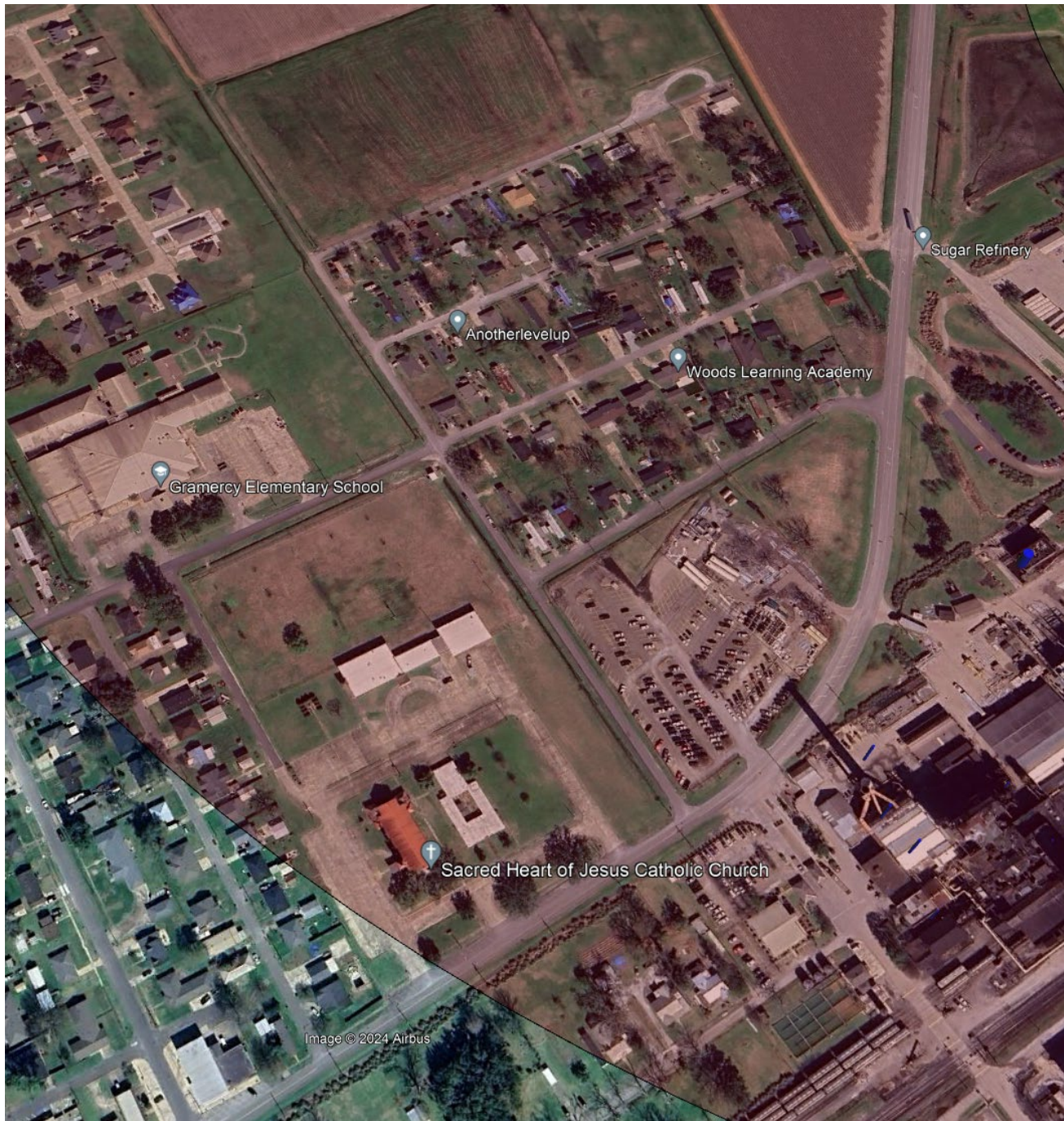


Figure 3 - Predicted 24-hour Average NAAQS Exceedences in Gramercy

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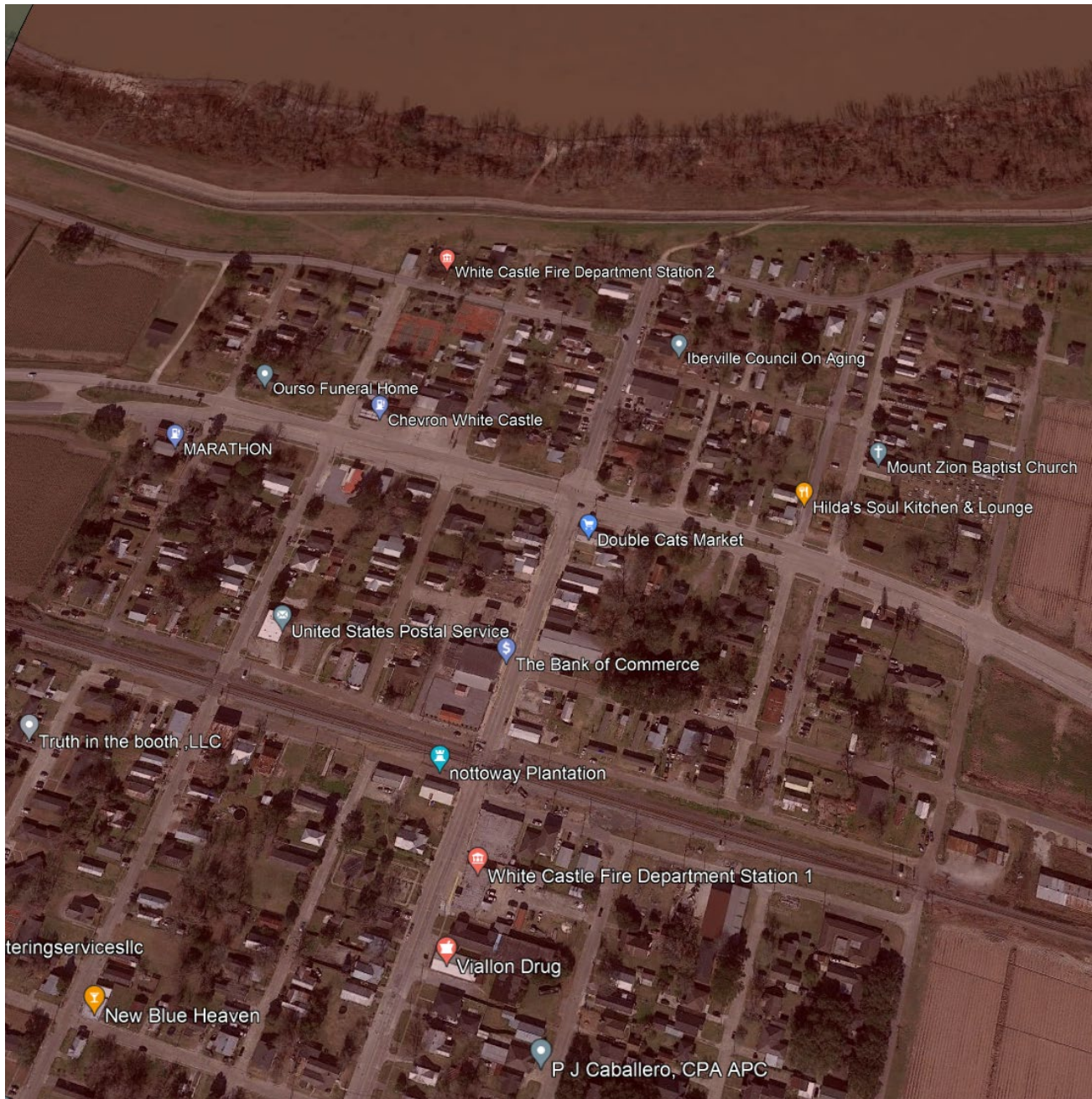


Figure 4 - Predicted 24-hour Average NAAQS Exceedences in White Castle

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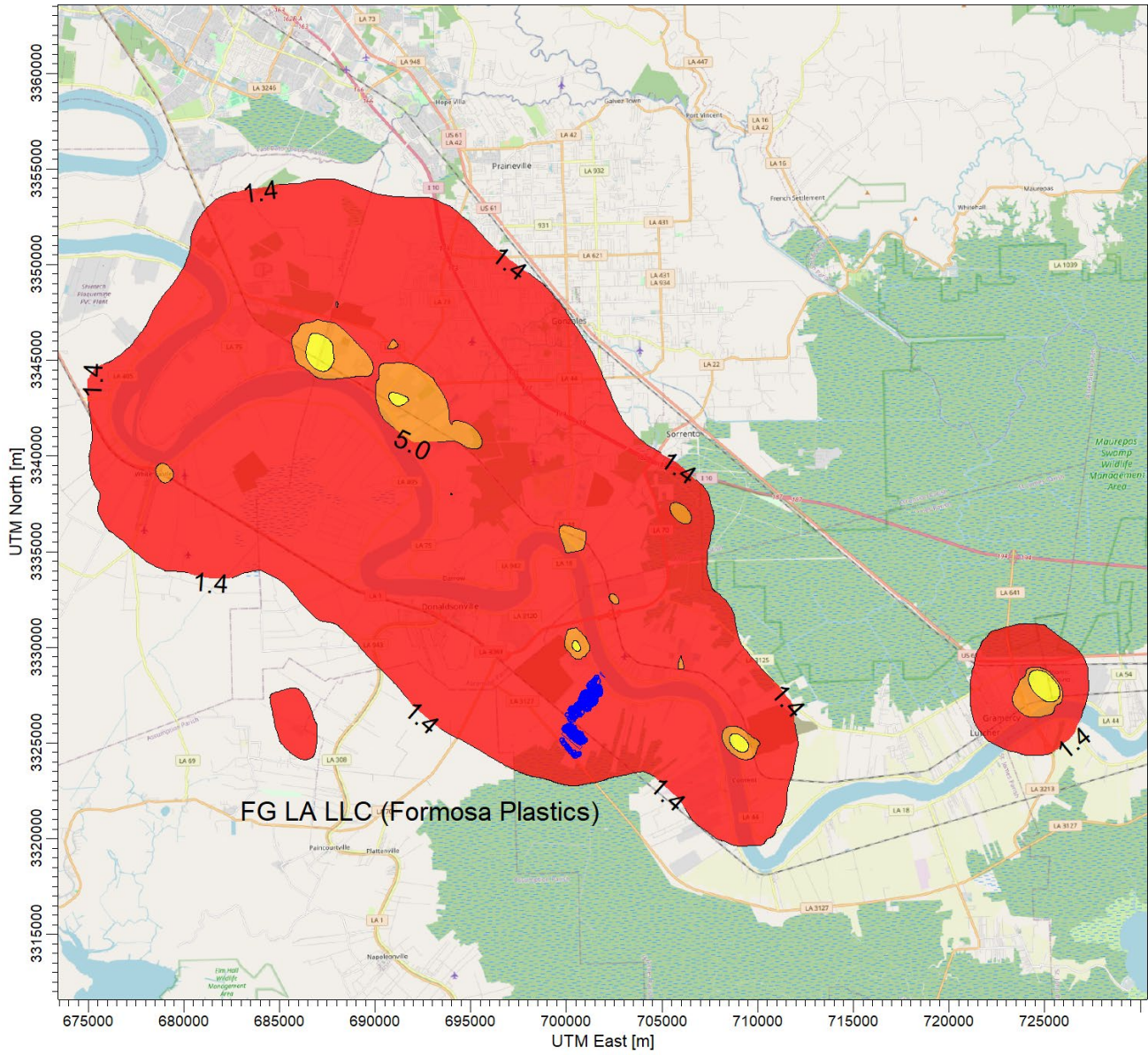
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Figure 5 presents the modeling results for the annual average NAAQS of $9 \mu\text{g}/\text{m}^3$ as concentration contours. All colored areas represent predicted exceedances of the NAAQS. The background concentration is $7.6 \mu\text{g}/\text{m}^3$, so NAAQS exceedances begin at $1.4 \mu\text{g}/\text{m}^3$. All areas in red, orange and yellow have predicted exceedances. There are 3 separate areas. The largest area of exceedances includes the Formosa Plastics facility. The size of the largest area is 28 kilometers (17 miles) long and 15 kilometers (9 miles) wide. The predicted exceedances of the NAAQS occur in the following Louisiana parishes: St. James, Assumption, Iberville, Ascension, and St. John the Baptist. The blue areas represent the buildings of the Formosa Plastics facility which is identified in the figure.

Figure 6 repeats the modeling results for the annual average NAAQS of $9 \mu\text{g}/\text{m}^3$ as concentration contours. However, a black-lined circle is shown around Formosa Plastics that includes all the locations where the facility exceeds the annual average Significant Impact Level or SIL for PM_{2.5} of $0.13 \mu\text{g}/\text{m}^3$. This circle is 8.3 kilometers at its greatest size. All receptor locations that exceed the NAAQS were reviewed to determine if Formosa Plastics also exceeded the SIL. Of the total 11,488 receptors used for the analysis, there were 1,903 receptors or 17% where the SIL was exceeded and Formosa Plastics is considered culpable or responsible for the predicted NAAQS violation.

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Annual Average Modeling Results for PM_{2.5} (All colored areas exceed the NAAQS)



Figure 5 - Regional Results for Annual Average NAAQS of 9 $\mu\text{g}/\text{m}^3$

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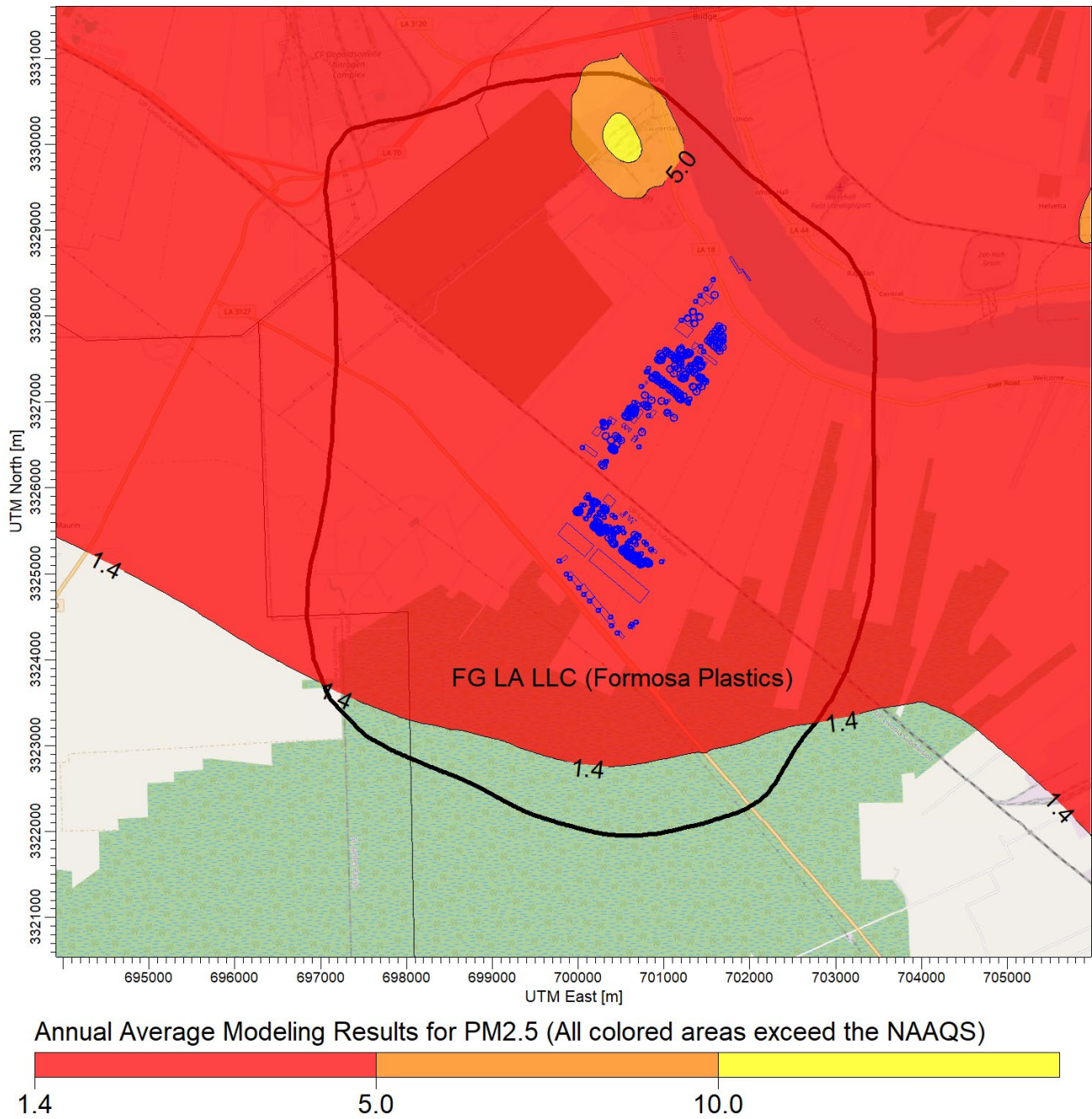


Figure 6 - Regional Results for Annual Average NAAQS and Area that FG LA LLC Exceeds SIL