US Army Corps of Engineers ®
Galveston District

Appendix G

Clean Air Act Compliance

for

Coastal Texas Protection and Restoration Feasibiliyt Study

August 2021

Contents

1. INTRODUCTION

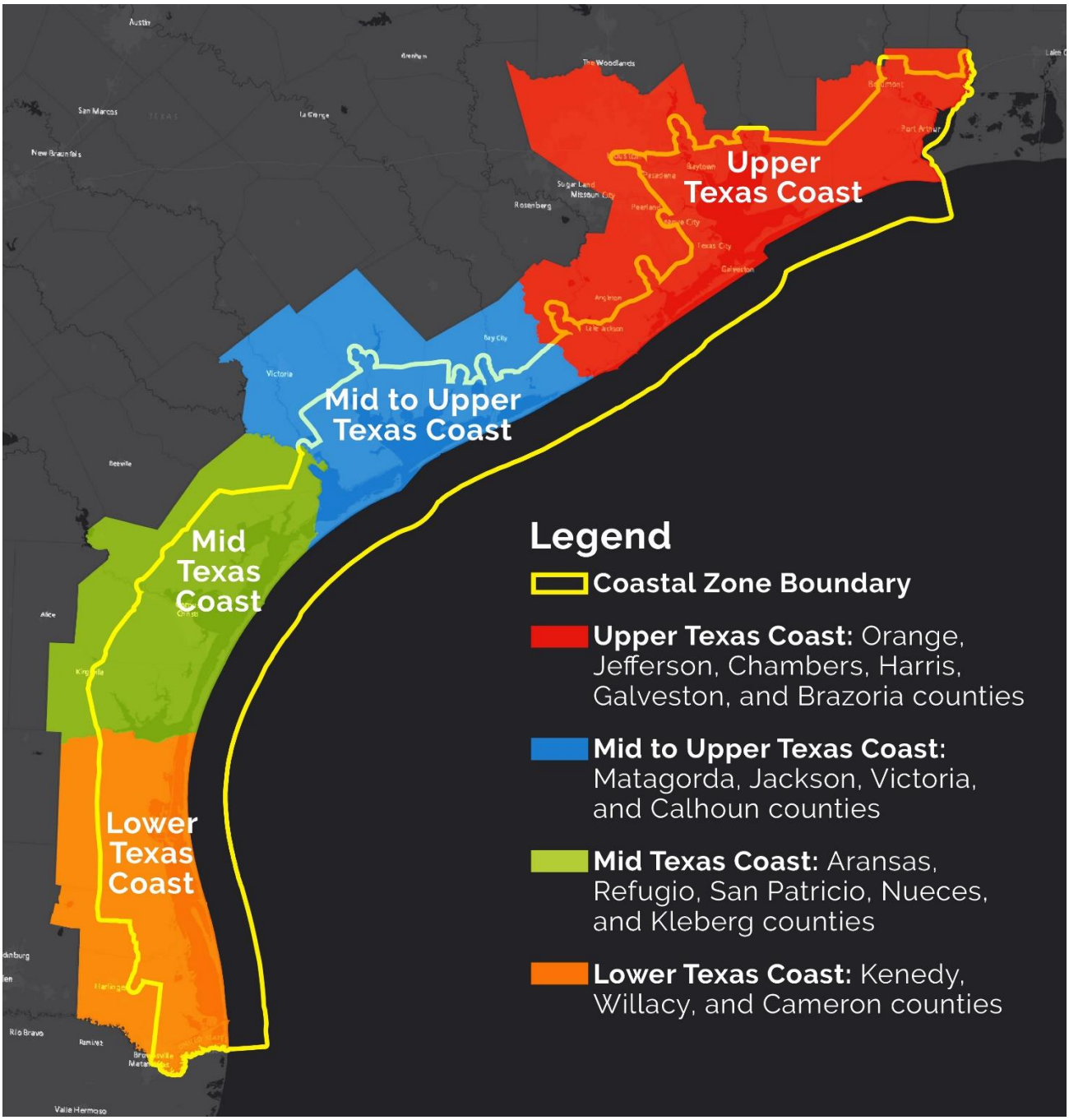
The US Army Corps of Engineers (USACE) in partnership with the Non-Federal Sponsor (NFS), the Texas General Land Office (GLO), are conducting the Coastal Texas Protection and Restoration Feasibility Study (Coastal Texas Study) to determine the feasibility of alternatives that would enhance, restore, and sustain the environment, economy, and culture along the Texas coast. The Coastal Texas Protection and Restoration Feasibility Study Draft Environmental Impact Statement (DEIS) selects a Recommended Plan (RP) to address Ecosystem Restoration (ER) and Coastal Storm Risk Management (CSRM) problems and opportunities. The DEIS is defined as a Tier One assessment that will analyze the project on a broad scale, while considering the full range of potential effects to both the human and natural environments from implementing proposed solutions. The purpose of the Tier One DEIS is to present the information considered in selecting a preferred alternative, describe the comprehensive list of measures, and identify data gaps and future plans to supplement the data needed to better understand the environmental effects of the proposed solutions. In accordance with the Clean Air Act (CAA) in 40 CFR Part 93 Subpart B, federal actions that result in direct and indirect emissions in exceedance of threshold values described in Table 1 are required to perform a General Conformity Determination (GCD). The scale and location of the Coastal Texas Study construction effort would indicate a potentially significant construction related emission output that would require a GCD. However, due to the phase of the project the information required to make a formal emissions estimate is not available at this time.

The purpose of this document is to analyze the potential emissions using the currently available information in order to determine if a formal General Conformity Determination is required and what the planning impacts would be. This document will give a rough order of magnitude to the potential emissions resulting from the project construction given the current information and what the potential resulting GCD process would entail.

1.1. Project Background

The RP is a combination of ER and CSRM features throughout the coastline. The study area has been divided into four areas the Upper, Mid to Upper, Mid and Lower Texas Coast as shown in Figure 1. A coast-wide ER plan was formulated to restore degraded habitats that buffer communities and industry on the Texas coast from erosion, subsidence, and storm losses. The ER features include barrier systems, estuarine bay systems and bayhead deltas. The CSRM features were developed to provide a primary line of defense to reduce storm surge as well as an interior line of defense. On the upper Texas coast, the Galveston Bay surge barrier was formulated as a system with multiple-lines-of-defense to reduce as a CSRM feature. On the lower Texas coast, a CSRM beach restoration project on South Padre Island was also developed. The RP is a large complex project that includes onshore construction activities using general construction equipment such as dozers, excavators, and off-road trucks as well as offshore dredging.

Figure 1. Coastal Texas Study Area and Regions



1.2. Regulatory Background

General Conformity is a Federal Clean Air Act (CAA) requirement that ensures actions taken by federal agencies do not cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS) and will not delay the states timely attainment of the NAAQS. The definition of a Federal action as specified in 40 CFR 93.152 includes "…any activity engaged in by a department, agency, or instrumentality of the Federal government, or any activity that a department, agency or instrumentality of the Federal government supports in any way, provides financial assistance for, licenses, permits, or approves, other than activities related to transportation plans, programs, and projects developed, funded, or approved under title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601et seq.)"

In 1993, the USEPA issued the initial General Conformity Rule (GCR). The GCR was substantially revised in 2010 to improve the process federal entities use to demonstrate that their actions would not contribute to a NAAQS violation. Under the GCR, certain actions are exempted from conformity determinations, while others are presumed to be in conformity if total project emissions are below *de minimis* levels established under 40 CFR Section 93.153. Total project emissions include both direct and indirect emissions that can be controlled by a federal agency. Any new project that may lead to nonconformance or to a violation of the NAAQS requires a conformity analysis before the project can begin.

The GCR establishes *de minimis*, emission levels for a project in tons per year based on the severity of an area's air quality problem. Before any action can be taken, Federal agencies must perform an applicability analysis to determine whether the total direct and indirect emissions from their action would be below or above the de minimis levels. The exceedance of a *de minimis* threshold requires a conformity determination for that pollutant, thresholds can be seen in Table 1. If the emissions are below all the *de minimis* levels, presumed to conform under the regulation or the activities are otherwise exempt (such as maintenance dredging) the agency does not have to conduct a conformity determination.

Table 1: Significant Action Thresholds in Nonattainment Areas

Ambient Pollutant	Nonattainment Status	De minimis Threshold Tons/yr
Ozone (VOCs or NOx):		
	Serious NAA's	**50**
	Severe NAA's	25
	Extreme NAA's	10
	Other ozone NAA's outside an ozone transport region	100
	Other ozone NAA's inside an ozone transport region	
	VOC	50
	NOx	100
Carbon monoxide:	All NAA's	100
SO2 or NO2	All NAA's	100
PM–10:		
	Moderate NAA's	100
	Serious NAA's	70
PM–2.5:		
	Direct emissions	100
	SO2	100
	NOx (unless determined not to be a significant precursor)	100
	VOC or ammonia (if determined to be significant precursors)	100
Pb:	All NAA's	25

Source of table: 40 CFR §93.153 Applicability. (Amended to include PM2.5)

1.1. Project Area Attainment Status

The Upper Texas Coast portion of the project study area includes several counties that are located within the Houston-Galveston-Brazoria (HGB) nonattainment area (NAA) as regulated under the CAA, consisting of Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties. The HGB NAA currently meets all the EPA NAAQS, except for ozone (Figure 2). HGB is designated as being in serious nonattainment for ozone, shown in Table 2. The current designation of serious nonattainment changed in September 2019 for the 2008 Eight-hour Ozone Standard. This designation brings the *de minimis* threshold down from 100 to 50 tons-per-year (tpy) for all ozone emissions. The Mid Upper, Mid and Lower Texas Coast are not located in nonattainment counties and are therefore the GCR does not apply. Based on their location in the nonattainment area only the features of the project that are in the HGB nonattainment areas will be included in this analysis, see Table 2.

Figure 2. Attainment status of Texas Counties, Drivecleantexas.org (2020)

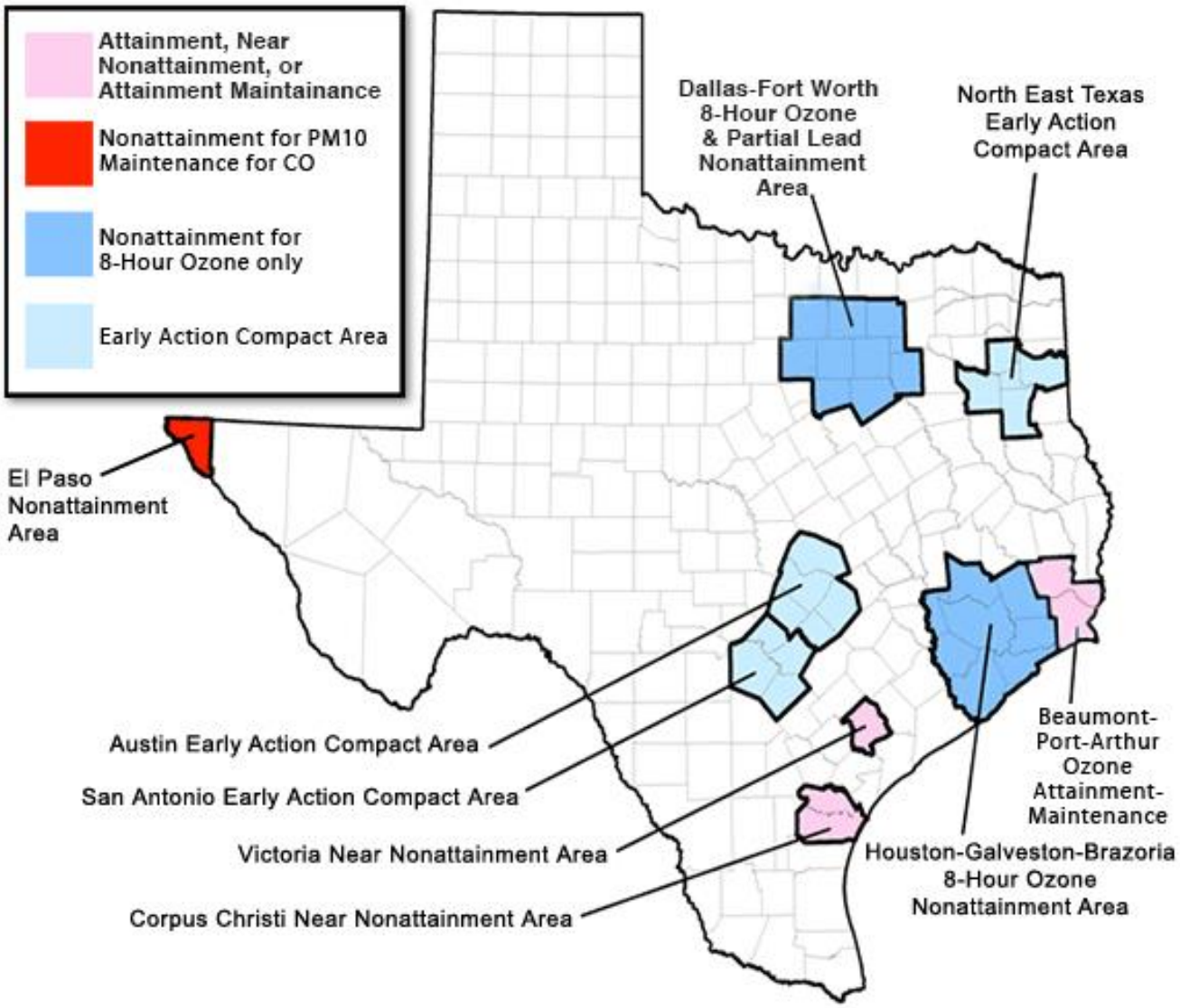


Table 2: Recommended Plan Features

Recommended Plan Component	Attainment Status
G-28 – Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection	HGB Nonattainment
B-2 – Follets Island Gulf Beach and Dune Restoration	HGB Nonattainment
B-12 – West Bay and Brazoria GIWW Shoreline Protection	HGB Nonattainment
CA-5 – Keller Bay Restoration	Attainment
CA-6 – Powderhorn Shoreline Protection and Wetland Restoration	Attainment
M-8 – East Matagorda Bay Shoreline Protection	Attainment
SP-1 – Redfish Bay Protection and Enhancement	Attainment
W-3 – Port Mansfield Channel, Island Rookery, and Hydrologic Restoration	Attainment
South Padre Island Beach Nourishment	Attainment
Bolivar Roads Gate System	HGB Nonattainment
Bolivar and West Galveston Beach and Dune System	HGB Nonattainment
Galveston Seawall Improvements	HGB Nonattainment
Galveston Ring Barrier System	HGB Nonattainment
Clear Lake Surge Gate	HGB Nonattainment
Dickinson Surge Gate	HGB Nonattainment
Non-structural Measures	NA

2. PROJECT CONSTRUCTION EMISSIONS ESTIMATE

An emissions estimate was preformed using the current information available in an effort to determine the potential emissions of the RP. The emissions estimate is based on draft schedule and equipment information provided by USACE Project Engineers and Estimators. The following assumptions were used in the estimate.

- The start year for most of the project features is 2027 with the exception of the Clear Lake and some Mitigation measures. A change in schedule would directly affect the yearly emissions estimate.
- The construction years for each component is weighted evenly. For example, G-28 has a 10-year projected schedule duration so the emissions from G-28 are divided into 10 years evenly. This allows for a general look at the potential impacts. The formal General

Conformity Analysis will likely include a more accurate schedule as the project planning progresses.

- At the time of this analysis the RP is considered one federal action as defined in 40 CFR 93.152. Because this project is funded as one federal project this estimate is analyzed accordingly however since it is so large in area and scope it might be more appropriate for the purpose of a General Conformity Determination to be divided into more than one project. Further discussions are required with the PDT, TCEQ and EPA for a better determination on policy. If the effort is considered multiple projects that would significantly change the General Conformity estimate and process.
- A portion of the Ecosystem Restoration Features, G-28, B-2 and B-12 will utilize the materials obtained as part of the USACE maintenance dredging schedule. The use of dredged material from dredging maintenance activities where the emissions are exempt from the GCR or otherwise accounted for including maintenance dredging. Section 40 CFR 93.153 states that "Maintenance dredging and debris disposal where no new depths are required, applicable permits are secured, and disposal will be at an approved disposal site." For these three features only the additional effort beyond the already scheduled maintenance dredging will be included in the calculations.
- The EPA's General Conformity Training states that "For coastal areas, EPA interprets the nonattainment or maintenance area boundary to extend to the state's seaward boundary, which for most of the United States, is 3 miles. The exceptions are Florida and Texas where the boundary is 3 leagues, approximately 9 miles. Federal agencies should consult with the state, tribal or local air quality agency about specific questions concerning the boundaries of the nonattainment or maintenance area." The Bolivar and West Galveston Beach and Dune and B-2 features utilize a dredging location approximately 25 miles from the coastline. As confirmed in discussions with EPA and TCEQ only the efforts within 9 miles of the coastline are included in the below estimate.

2.2 Emission Calculations

Emission estimates for each engine type have been calculated by multiplying horsepower by load factor by operating hours, multiplied by emission factors in units of grams per horsepower hour (g/hp hr). Emission factors have been chosen for marine and other nonroad engines to be relatively conservative as to calculate a maximum emission scenario. Emission factors for marine vessels were obtained from the *2013 Goods Movement Air Emissions Inventory GMEI* (Eastern Research Group, 2017) and can be seen in Table 3. The emission factors are based on the GMEI harbor vessel age distribution by regulatory tier. The bulk of the harbor vessels, particularly the dredging vessels are assumed to be Tier 0, this approach likely overestimates the emissions that would actually occur because of the introduction of Tier 1, Tier 2 and Tier 3 equipment that may be used on the project. The emission factors for the non-road equipment was generated from the EPA model MOVES2014a and is specific for each piece of equipment and horsepower rating. This generated list is not shown here due to the very large size of the MOVES2014a output table.

Table 3: Emission Factors used for Marine Vessels

Vessel Type	grams per hp-hr	
	NO_x	VOC

Dredging	9.34	0.10
Excursion	9.47	0.10
Government	9.99	0.11
Miscellaneous	9.13	0.11
Pilot	8.71	0.10
Tug	8.74	0.10

The years in which the respective pollutant exceed the *de minimis* threshold are highlighted in orange in Table 4. The large bulk, approximately 93% of the total emissions, is a result of dredging activities. The RP is expected to exceed the 50 tpy *de minimis* thresholds for NOx for 10 of the 15-year construction period with no VOC exceedances.

Table 4: Yearly Project Emissions (Exceedance years highlighted)

Year	CMV		NON-Road		Total Project	
	NOx (tpy)	VOC (tpy)	NOx (tpy)	VOC (tpy)	NOx (tpy)	VOC (tpy)
2027	1587.8	21.3	64.8	19.0	1641.0	36.6
2028	1425.1	19.6	62.0	18.2	1475.6	34.0
2029	1432.8	23.0	62.2	18.2	1532.5	35.9
2030	1432.8	23.0	62.2	18.2	1532.5	35.9
2031	1432.8	23.0	62.2	18.2	1532.5	35.9
2032	1432.8	23.0	62.0	18.2	1532.4	35.9
2033	1432.8	23.0	69.3	19.6	1539.6	37.3
2034	1432.8	23.0	55.9	13.9	1526.3	31.6
2035	172.7	6.9	48.9	7.3	270.7	12.5
2036	165.0	3.4	48.9	7.3	213.9	10.7
2037	22.3	1.4	21.0	2.8	43.4	4.2
2038	22.3	1.4	21.0	2.8	43.4	4.2
2039	0.0	0.0	21.0	2.8	21.0	2.8
2040	0.0	0.0	21.0	2.8	21.0	2.8
2041	0.0	0.0	21.0	2.8	21.0	2.8
Total	11992.2	192.2	703.8	172.1	12946.9	323.3

The emissions estimate is further broken down by emissions per feature in Table 5. As stated in the assumptions above the policy currently considers the Coastal Texas Project one project with regard to General Conformity, however the USACE PDT is currently in discussion EPA and TCEQ is this is appropriate given the scope of the project. In the event that the features are considered separate projects as shown in Table 5, five project features would surpass the *de minimis* threshold to a lesser degree. A full yearly breakdown of each feature can be seen in Attachment A. Again, the yearly amount listed is an average as specific construction schedule information is not available at this time. The Bolivar and West Galveston Beach and Dune

System is by far the largest contributor to the emissions estimate. This is due to the large quantity of dredge material required for the features.

Table 5: Project Emissions per Component in Tons

Feature	NOx Total Project Tons	VOC Total Project Tons	Yearly NOx	Yearly VOC
G-28 – Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection	1193.5	21.2	119.3	2.1
B-2 – Follets Island Gulf Beach and Dune Restoration	165.4	2.6	165.4	2.6
B-12 – West Bay and Brazoria GIWW Shoreline Protection	192.9	5.8	19.3	0.6
Bolivar Roads Gate System	3554.9	77.9	237.0	5.2
Bolivar and West Galveston Beach and Dune System	7113.7	144.6	889.2	18.1
Galveston Seawall Improvements and Galveston Ring Barrier System	156.6	22.8	15.7	2.3
Clear Lake Surge Gate	451.7	37.0	64.5	5.3
Dickinson Surge Gate	118.3	11.3	29.6	2.8
Total	12946.9	323.3		

Tier 2 emissions standards for the various categories of marine engines became effective in different years dependent on the size category of the engine, with Category 2 becoming effective as late as 2007, and Category 3 in 2011. Dredge main engines displacement and horsepower typically fall into either Category 2 or 3. With more than a decade since initial effective dates, Tier 2 dredges are becoming a more common part of the national large dredge fleet.

3. DEMONSTRATING CONFORMITY

3.1 Options to Demonstrate Conformity

Based on the current information there will be emissions in excess of the *de minimis* levels for the construction years 1 through 10, 2027 to 2036 respectively for the NAAQS criteria pollutant NOx. Therefore, to comply with the CAA, the USACE must show how the project conforms with State Implementation Plans (SIPs). There are six basic ways to demonstrate conformity;

1) Document that the emissions from the action are identified and accounted for in the SIP/TIP;

2) Obtain a statement from the applicable state, tribal, or local air quality agency that the emissions from the action along with all other emissions in the area do not exceed the budget for those emissions in the SIP/TIP;

3) Have the local Metropolitan Planning Organization (MPO) provide a statement that the emissions are included in transportation plan modeling;

4) Have the state or tribe agree to include the emissions in the SIP/TIP;

5) Conduct air quality modeling to demonstrate that the emissions will not cause or contribute to a violation of the NAAQS; this modeling option is not available for O_3, NO_2 and some PM 2.5 areas; or

6) Mitigate or offset the increase in emissions

Options 2 and 3 are not available since there is not currently any agreement with the state, local tribal entities or MPO to include the RP in any emission budgets and the RP is not applicable to transportation planning and would therefore not be included in that modeling. Using modeling to demonstrate conformity (Option 5) is typically reserved for areas without an approved SIP and the emissions for the RP plan are related to O_3 emissions which Option 5 indicates is not available to demonstrate conformity. That leaves only Option 1 and 6 as ways to demonstrate conformity.

3.1.1 Document that the emissions from the action are identified and accounted for in the SIP/TIP

The most common way to demonstrate conformity is to demonstrate that the emissions from the action in question are accounted for in the SIP. The latest approved revision to the SIP is the *HGB 2008 Eight-Hour Ozone RFP SIP Revision*, approved by EPA on February 13, 2019 (TCEQ 2016).

There will soon be a new applicable SIP revision for the HGB ozone nonattainment area. The EPA is expected to publish final approval of the HGB portion of the *Dallas-Fort Worth and Houston-Galveston-Brazoria Serious Classification Reasonable Further Progress State Implementation Plan Revision for the 2008 Eight-Hour Ozone National Ambient Air Quality Standard*, which was adopted by the TCEQ on March 4, 2020. Table 6 shows the Commercial Marine Vessel (CMV) Emissions inventory from both the approved and soon to be approved SIPs.

Table 6: Commercial Marine Emissions Inventory HGB Eight-Hour Ozone Nonattainment Area

Analysis Year	NO_x (tpd)		VOC (tpd)	
	Uncontrolled	Controlled	Uncontrolled	Controlled
2011	68.95	61.61	1.59	1.59
2017	38.16	28.77	1.15	1.15
2020*	40.84	26.08	1.31	1.19

*Pending EPA approval of 2020 SIP

The approved SIP was reviewed to determine how much of the total CMV emissions budget would be used by construction activities resulting from the RP (Table 7). The overall project emissions are significant compared to the currently approved SIP HGB CMV projections at 16% for the first year and 14% to 15% for the next 7 years. Because of the high percentage of the total budget that the RP would take, it is not reasonable to assume that the RP CMV emissions could be included in the currently approved SIP, especially given the significant number of other actions in the state, such as dredging operations and navigational commerce, that also rely on this budget. For this reason, Option 1 is not applicable to this project.

Table 7: CMV NOx Emissions Compared to SIP (tpy)

Year	RP		SIP		% of SIP	
	NOx	VOC	NOx	VOC	NOx	VOC
2027	1641.0	36.6	10501	-	16%	-
2028	1475.6	34.0	10501	-	14%	-
2029	1532.5	35.9	10501	-	15%	-
2030	1532.5	35.9	10501	-	15%	-
2031	1532.5	35.9	10501	-	15%	-
2032	1532.4	35.9	10501	-	15%	-
2033	1539.6	37.3	10501	-	15%	-
2034	1526.3	31.6	10501	-	15%	-
2035	270.7	12.5	10501	-	3%	-
2036	213.9	10.7	10501	-	2%	-

3.1.2 Have the state or tribe agree to include the emissions in the SIP/TIP

One of the methods of demonstrating conformity is to include the project in the SIP through a SIP revision. This process is significantly more complex and lengthier than a General Conformity Determination and as of yet the state of Texas has not completed a SIP revision strictly for the purpose of incorporating a new project. If inclusion in a SIP is pursued, it would be most appropriate and have the highest likelihood of being approved if project inclusion was requested when the state begins a SIP revision related to attainment deadlines or when standards are revised. The next SIP revision is in draft form for the 2020 EPA attainment deadline and the following anticipated revision would be for the next attainment deadline in 2026. Should it be determined that the method of conformity be to request the project be included in the SIP, the 2026 SIP revision would likely be the most appropriate version to incorporate the project.

Considering the multiple ways of reducing and mitigating the emissions of the project, the risk of needing a SIP revision to demonstrate conformity is low and should be pursued only after all other options to demonstrate conformity have been exhausted. While the likelihood of needing to request the project being included in a SIP revision is low, if inclusion in a SIP is pursued, the probability of schedule slips on the order of several months to several years and cost increases are probable. The extent of delay and cost is entirely dependent on how long the overall revision takes to be prepared and adopted by TCEQ and then approved by EPA, and if any challenges to the SIP arise that need to be addressed through modifications or even litigation actions.

3.1.3 Mitigate or offset the increase in emissions

Without mitigation or some reduction in emissions it is unlikely the project will be able to demonstrate conformity. The following are potential ways to reduce or mitigate the project emissions.

3.1.2.1 Schedule

As a single project following the draft schedule laid out in Attachment A, the magnitude of the emissions are in excess of the *de minimis* threshold. The GCR is based on yearly emissions, therefore extending, adjusting, or phasing the schedule to redistribute the yearly emissions could allow for the project to more easily fit within the SIP. This approach would be especially effective should the project be broken into features. Based on what is assumed in the current draft schedule, multiple measures will not realistically be able to proceed simultaneously due to funding, equipment, and seasonal timing restrictions for listed species or recreational resources that will initially help with reducing yearly emissions. Further phasing and extending of the schedule would further contribute to overall yearly reductions. For example, the Dickinson Bayou and Clear Lake Gates will only function as designed once the Bolivar Roads Surge Gate is constructed, so there is potential here to not begin construction of these gates until the emissions rates go down for construction of the Bolivar Roads Surge Gate. However, the extent to which schedule modifications will help to reduce the overall yearly emissions is too speculative at this time to determine whether or not it would be low enough to conform to the approved SIP. Based on best professional judgement and experience with non-routine dredging projects such as the recently approved Houston Ship Channel and the high dredging emission rates, schedule modifications alone are not likely to reduce yearly emissions to be in conformance with the SIP in all years.

3.1.2.2 Emission Credits

The TCEQ Discrete Emissions Credit (DEC) Program allows participants to generate and trade emissions credits for temporary (i.e. descrete) emission reductions from point, area, and mobile sources as per 30 TAC Chapter 101, Sub H, Division 4. Emissions are traded by the ton and the cost varies based on the current market. The 2013 TCEQ DEC Program audit detailed that in the HGB area the average cost for NOx credit was $1,645 per ton with a minimum of $70 and a maximum of $14,000 per ton. The TCEQ DEC trade report for 2020 showed mostly interagency trades at no cost and one trade of 2.7 tons of NOx for $3,333.33 for an average cost of $1,234.57 per ton (TCEQ, 2020). Below is an estimated cost for Year 1 based on the 2020 average cost per ton. Due to the magnitude of the emissions for the first 10 years of the RP this method of mitigation would likely need to be combined with other mitigation efforts to be considered acceptable by TCEQ and EPA. For purposes of cost estimating, the cost of DEC trading has been included in the costs of the project; however there is a risk that DECs may not being available in 10+ years, since the emission credits must be available for trade during the appropriate time period to use this approach. The risk of DECs not being available and the likelihood of TCEQ and EPA requiring a combination of mitigation methods, indicates that the USACE should not rely on DECs alone as a means to show conformance with the SIP.

Exceeding *De Minimis* Year 1 (tpy)	Average Cost per ton	Approximate Emission Credit Cost Year 1
1,591.02	$1,234.57	$2MIL

3.1.2.3 Equipment Usage

The major contributor to the emissions estimate in the RP plan is the dredging efforts. As stated above the emission factors used were based on the *2013 Goods Movement Air Emissions Inventory GMEI* factors in Table 3. Those emission factors were calculated based on the average age of Harbor Vessels in the Port of Houston at the time of the report, and at that time the large majority of dredging vessels were Tier 0. It is highly likely that newer equipment will be utilized for this project considering that the project start year is currently slated in 2027, but more realistically could be closer to 2035. Using newer equipment with more stringent emission regulations specifically for the dredging vessels, will positively impact the total emissions of the project. The emission factors shown in Table 8 are also taken from the *2013 Goods Movement Air Emissions Inventory GMEI* and are applied to the emissions estimates in Tables 9 and 10 to show how the overall emissions estimate is affected by the use of newer Tier 1, 2 and 3 harbor vessel equipment.

Table 8: Harbor Vessel Emission Factors Tier 1 – 3

Tier	g/hp-hr					
	NOx	CO	VOC	PM25	SO2	CO2
0	9.987	1.854	0.105	0.232	0.004	484.500
1	7.886	1.854	0.105	0.232	0.004	484.500

2	6.227	1.495	0.105	0.232	0.004	484.500
3	4.463	1.495	0.055	0.080	0.004	484.500

Table 9: Project Emissions per Component in Tons Totals, Harbor Vessel Emission Factors Tier 1 – 3

	Tier 1		Tier 2		Tier 3	
Feature	**Nox Total Project Tons**	**VOC Total Project Tons**	**Nox Total Project Tons**	**VOC Total Project Tons**	**Nox Total Project Tons**	**VOC Total Project Tons**
G-28 – Bolivar Peninsula and West Bay GIWW Shoreline and Island Protection	1023.5	21.2	816.9	21.2	597.0	15.6
B-2 – Follets Island Gulf Beach and Dune Restoration	141.8	2.6	112.6	2.6	81.4	1.8
B-12 – West Bay and Brazoria GIWW Shoreline Protection	167.0	5.8	133.6	5.8	98.1	4.9
Bolivar Roads Gate System	3072.8	77.9	2494.2	77.9	1878.6	62.2
Bolivar and West Galveston Beach and Dune System	6103.7	144.6	4859.4	144.6	3535.5	110.9
Galveston Seawall Improvements and Galveston Ring Barrier System	144.2	22.8	129.1	22.8	112.9	22.4
Clear Lake Surge Gate	394.0	37.0	324.4	37.0	250.2	35.1
Dickinson Surge Gate	106.0	11.3	90.8	11.3	74.6	10.9
Total	11153.0	323.3	8960.8	323.3	6628.4	263.8

Table 10: Project Emissions per Component in Tons Yearly Averages, Harbor Vessel Emission Factors Tier 1 – 3

	Tier 1		Tier 2		Tier 3	
Feature	**Yearly Average Nox**	**Yearly Average VOC**	**Yearly Average Nox**	**Yearly Average VOC**	**Yearly Average Nox**	**Yearly Average VOC**
G-28 – Bolivar Peninsula and West Bay	102.4	2.1	81.7	2.1	59.7	1.6

GIWW Shoreline and Island Protection						
B-2 – Follets Island Gulf Beach and Dune Restoration	141.8	2.6	112.6	2.6	81.4	1.8
B-12 – West Bay and Brazoria GIWW Shoreline Protection	16.7	0.6	13.4	0.6	9.8	0.5
Bolivar Roads Gate System	204.9	5.2	166.3	5.2	125.2	4.1
Bolivar and West Galveston Beach and Dune System	763.0	18.1	607.4	18.1	441.9	13.9
Galveston Seawall Improvements and Galveston Ring Barrier System	14.4	2.3	12.9	2.3	11.3	2.2
Clear Lake Surge Gate	56.3	5.3	46.3	5.3	35.7	5.0
Dickinson Surge Gate	26.5	2.8	22.7	2.8	18.7	2.7

By using newer Tier 1, 2 and 3 dredging and harbor craft equipment, there is a significant decrease in emissions. Table 10 shows that there will still be an exceedance of the de minimis threshold of 50 tpy of emissions but to a much lesser degree. Table 11 shows a comparison of the total emissions reductions considering the project as a whole, with a reduction ranging from 13.9% to 48.8% in project emissions.

Table 11: Project Emissions Reduction with, Harbor Craft Emission Factors Tier 1 – 3

	Total Project Emissions	% Reduction
Average Tier	12950.7	
Tier 1	11152.9	13.9%
Tier 2	8960.7	30.8%
Tier 3	6628.3	48.8%

Given the length of time that will pass between this analysis and the PED/construction phase and the concerted effort by non-governmental organizations, federal agencies, USACE, and dredge equipment operators to retrofit older equipment with more efficient engines, the likelihood that the RP plan would utilize Tier 1 equipment is more realistic. While using the Tier 2 and 3 dredging and harbor craft equipment is shown to be valuable in reducing the overall yearly emissions rates, there is some risk to mandating the use of these equipment that could adversely affect the project. Impacts could include: higher costs for the more specialized and/or newer equipment, lengthening of the construction schedule due to less equipment availability, and contracting limitations that target specialized equipment. The trade-off of requiring higher tier

equipment with these potential impacts will need to be weighed once revised emissions calculations are completed taking into account the refined measures and schedule. As shown, using higher tier equipment alone will not reduce emissions to be in conformance with the SIP.

3.2 Path Forward

Compliance with the CAA has been deferred until PED, when more realistic emissions estimates can be made. The TCEQ and EPA support deferring until more information is available to minimize the potential for having under- or over-estimating emission and to more accurately account for the emissions in the years that they will actually be emitted. This is especially true since the exact timing of the emissions in any given year is likely to change. If emissions are overestimated, there is a potential that other projects, such as dredging actions, could not be implemented in that year because the emissions budget has been completely accounted for when in reality those emissions weren't needed or vice versa. If we underestimate, although unlikely given all the contingencies built into the draft schedule and design, or the schedule is delayed because of funding or redesign and assessment, there may not be enough remaining budget when the time comes that we have to delay the project completely for that year and delay the overall schedule. Under either situation (over- or under-estimating) a revised General Conformity Analysis and determination would need to be completed to account for the revisions.

The Coastal Texas Project is so large in scale and scope that it is undergoing a tiered NEPA approach where NEPA evaluations and construction will occur in phases. Due to this tiered approach it is highly unlikely that a finalized schedule for the entire project will be available in a practical timeline with respect to a General Conformity Analysis. In the EPA's published *General Conformity Guidance for Airports, Questions and Answers, September 25, 2002*, the tiered NEPA approach is discussed in the form of an airport construction example, "It is up to the airport operator, in consultation with FAA, to decide whether to seek a single FAA approval for an entire plan, which eliminates the need to go back and do additional conformity analyses as each project is implemented according to the plan, to proceed with a tiered process, or to proceed with individual projects having independent utility and go through a separate conformity evaluation for each one." Considering that portions of the Coastal Texas project can operate independently of each other, such as the ER measures, this approach of separating independent actions into their own General Conformity Analysis is practical for this project and is supported by TCEQ and EPA. B-2 is considered a Tier One measure already so general conformity can be shown once this measure is further refined.

With respect to G-28, general conformity with the SIP is possible but mitigation would need to be implemented. The risk of not being able to demonstrate general conformity is low. Realistically, there are many components of G-28 that rely on the use of maintenance dredging to complete the marsh nourishment and island restoration actions. Once this measure goes to PED, the schedule can more realistically be updated to account for the coordination with the maintenance dredging cycles, which is expected to modify the years with higher emissions related to dredging than is projected now. In years were dredging is occurring, oyster reef or breakwater construction could be paused so as to not incrementally add to the yearly emissions. By modifying the schedule, it is reasonable to expect that the project would be in conformance and may even demonstrate *de minimus* in more years than currently projected.

The Bolivar Roads Surge Gate, Galveston Ring Barrier, Seawall Improvements, Bolivar and West Galveston Island Beach and Dune System, Dickinson Bayou, and Clear Lake Surge Gates would likely all be included under the same General Conformity Analysis since all of these actions are dependent on each other to complete the system to function as designed. As the project moves to PED, the emissions can be recalculated based on more realistic schedules, quantity of dredging and types of equipment that would be needed. Once the emissions have been recalculated, the schedule should be considered first to determine if there are ways to phase the project more to reduce yearly emissions in high emission years. The next mitigation option that should be considered would be to require higher tier equipment. If these two mitigation options have not sufficiently reduced the yearly emissions to show conformity, DEC should be considered.

For any of these actions, a General Conformity Analysis would be completed to show the action is in conformance with the SIP. Once the General Conformity Determination is made a draft version will be reviewed by TCEQ who has requested a minimum of 30 days for review. After the TCEQ comments and issues have been addressed, the TCEQ requests a final, revised version of the documentation for review, after which, the TCEQ's letter of concurrence is routed through management and signed. After the letter of concurrence has been signed and incorporated into the Draft General Conformity, a minimum of a 30-day public review and comment period is required under general conformity regulations, and it is often linked with the public review requirement under NEPA. The federal agency is responsible for conducting the 30-day public review period and responding to any comments that are received in the Final General Conformity Determination. After that, the Final General Conformity Determination is complete and a public notice is issued notifying the public of the final determination.

4. CONCLUSION

The RP is a large construction effort spanning the entire Texas coastline with portions of it in a nonattainment area for ozone. Those portions of the project were analyzed to determine what the resulting emissions would be specifically with respect to NOx and VOCs, the precursors to ozone. It was found that the potential project emissions resulting from the construction efforts indicates that the project will be subject to the GCR based on estimated NOx emissions for 10 of the 15 project construction years. The dredging emissions are the large bulk, at approximately 93% of the projected emissions, and were intentionally conservative to show the total potential emissions in a maximum emissions scenario. Based on a comparison to the currently approved SIP the project will not be able to demonstrate conformity at this time without some mitigation.

There are still unknown factors that could significantly impact the emissions estimate. The schedule analyzed in this report assumes that all project features will be funded and begin at the same time. This is unlikely and spreading out the project construction schedule will directly impact the yearly emissions estimate, thus making a General Conformity Determination at this time difficult. The project is currently considered one federally funded project. However due to the Tiered NEPA approach and guidance set forth by EPA it would be appropriate to treat the independent portions of the project as separate with regards to a General Conformity Analysis and Determination. This would also have a significant impact on which portions of the project

are subject to the GCR and their respective total and yearly emissions. Including the project in the next SIP revision is also a possible path forward but would be unlikely considering the potential for mitigation measures to further reduce yearly emission and the possibility of separating the independent portions of the project.

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Yearly Emissions by Feature			2027		2028		2029		2030		2031		2032		20
			Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Yea
			Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox
G-28	1170.20	20.61	117.020008	2.06070954	117.02	2.06071	117.02	2.06071	117.02	2.06071	117.02	2.06071	117.02	2.06071	117.02
Oyster Reef	22.66	0.32													
Estuarine	0.52	0.26					0.173363	0.086634	0.173363	0.086634	0.173363	0.086634			
Palustrine	0.08	0.04	0.07928035	0.0411858											
B-2	118.09	6.47	118.087047	6.47097862											
B-12	192.88	5.85	19.2878096	0.58470261	19.28781	0.584703	19.28781	0.584703	19.28781	0.584703	19.28781	0.584703	19.28781	0.584703	19.28781
Bolivar Rd Gates	315.59	41.90	21.039058	2.79347456	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475	21.03906
Bolivar Gates Hopper Dredging	3106.94	33.52	388.367077	4.19057701	388.3671	4.190577	388.3671	4.190577	388.3671	4.190577	388.3671	4.190577	388.3671	4.190577	388.3671
Bolivar Gates Pipline Dredging	132.35	2.45	16.54346	0.3068546	16.54346	0.306855	16.54346	0.306855	16.54346	0.306855	16.54346	0.306855	16.54346	0.306855	16.54346
Bolivar	54.06	24.22	6.75735704	3.02707571	6.757357	3.027076	6.757357	3.027076	6.757357	3.027076	6.757357	3.027076	6.757357	3.027076	6.757357
Bolivar Beach & Dune	2488.77	140.00	311.096815	17.4994213	311.0968	17.49942	311.0968	17.49942	311.0968	17.49942	311.0968	17.49942	311.0968	17.49942	311.0968
West Glav	39.39	15.75	5.62728811	2.25069251	5.627288	2.250693	5.627288	2.250693	5.627288	2.250693	5.627288	2.250693	5.627288	2.250693	5.627288
West Galveston Beach & Dune	2482.58	138.02	310.322923	17.2525261	310.3229	17.25253	310.3229	17.25253	310.3229	17.25253	310.3229	17.25253	310.3229	17.25253	310.3229
Galveston Ring Barrier	67.34	17.20	6.73435841	1.71988833	6.734358	1.719888	6.734358	1.719888	6.734358	1.719888	6.734358	1.719888	6.734358	1.719888	6.734358
Offatts and Crash Basin Dredgi	89.28	5.58	8.92801964	0.55832154	8.92802	0.558322	8.92802	0.558322	8.92802	0.558322	8.92802	0.558322	8.92802	0.558322	8.92802
Clear Creek	54.06	24.22	7.72269376	3.4595151	7.722694	3.459515	7.722694	3.459515	7.722694	3.459515	7.722694	3.459515	7.722694	3.459515	7.722694
Clear Creek Dredging	397.67	12.76					56.81005	1.822914	56.81005	1.822914	56.81005	1.822914	56.81005	1.822914	56.81005
Dickinson Dreding	89.28	5.58													
Dickenson	29.06	5.76													7.265724
Total	10850.80	500.52	1337.61319	62.2159233	1219.447	55.70376	1276.43	57.61331	1276.43	57.61331	1276.43	57.61331	1276.257	57.52667	1283.523

33	2034		2035		2036		2037		2038		2039		2040		2041	
ar 7	Year 8		Year 9		Year 10		Year 11		Year 12		Year 13		Year 14		Year 15	
VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC	Nox	VOC
2.06071	117.02	2.06071	117.02	2.06071	117.02	2.06071										
			11.32923	0.159877	11.32923	0.159877										
0.584703	19.28781	0.584703	19.28781	0.584703	19.28781	0.584703										
2.793475	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475	21.03906	2.7934746	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475
4.190577	388.3671	4.190577														
0.306855	16.54346	0.306855														
3.027076	6.757357	3.027076														
17.49942	311.0968	17.49942														
2.250693																
17.25253	310.3229	17.25253														
1.719888	6.734358	1.719888	6.734358	1.719888	6.734358	1.719888										
0.558322	8.92802	0.558322	8.92802	0.558322	8.92802	0.558322										
3.459515																
1.822914	56.81005	1.822914	56.81005	1.822914												
			22.32005	1.395804	22.32005	1.395804	22.32005	1.3958038	22.32005	1.395804						
1.440351	7.265724	1.440351	7.265724	1.440351	7.265724	1.440351										
58.96702	1270.173	53.25682	270.7343	12.53604	213.9243	10.71313	43.35911	4.1892784	43.35911	4.189278	21.03906	2.793475	21.03906	2.793475	21.03906	2.793475