Appendix D

Air Quality

Quantitative Hot-Spot Analysis

$PM_{2.5}$ Quantitative Hot-Spot Analysis

US 49 Interconnecting Gulfport BUILD Grant

City of Gulfport, Mississippi

September 18, 2020

Table of Contents

1.0 Purpose of the Document....1
2.0 Project Description....1
General Overview....1
$PM_{2.5}$ Quantitative Hot-Spot Analysis Methodology....2
3.0 Background....2
What is Particulate Matter (PM)?....2
4.0 Quantitative Air Quality Assessment....3
Background Concentration....3
5.0 Conclusion....4
Appendix....5

1.0 Purpose of the Document

Transportation conformity is required for federally funded or approved transportation projects in areas that have been designated by the U.S. Environmental Protection Agency (EPA) as not meeting a NAAQS. These areas are called *nonattainment areas* if they currently do not meet air quality standards or *maintenance areas* if they have previously violated air quality standards, but currently meet them and have an approved *Clean Air Act section 175A* maintenance plan. Gulfport is designated as an *attainment area*. Coordination with the Mississippi Department of Transportation (MDOT) and the City of Gulfport determined that a $PM_{2.5}$ hot-spot analysis was necessary for this project due to public concern even though this project is located in the Gulfport County $PM_{2.5}$ which is designated as an attainment area.

2.0 Project Description

General Overview

This document presents a qualitative $PM_{2.5}$ hot-spot analysis for the Interconnecting BUILD Grant Roadway Project. The City of Gulfport was awarded a 2019 USDOT BUILD Grant for a roadway project interconnecting Gulfport. The transportation project will provide an alternative route for travel from the Airport Road-Poole Street and Creosote Road intersections with US 49 south of I-10 interchange and Landon Road which intersects US 49 as the western approach to the Landon Road-Crossroads Parkway intersection north of I-10 interchange. **Figure 1** shows the study area of the project.

For this effort, four intersections were identified through coordination with MDOT as intersections of interest to be studied for air quality impacts related to $PM_{2.5}$. The intersections of interests are:

- US 49 and Airport Road
- US 49 and Creosote Road
- US 49 and Crossroads Parkway
- Old Magnolia Road and Landon Road

The region is in attainment for all pollutants; however, due to concern surrounding increased impacts of heavy vehicles a qualitative $PM_{2.5}$ air quality analysis was performed for all four of the intersections of interest.

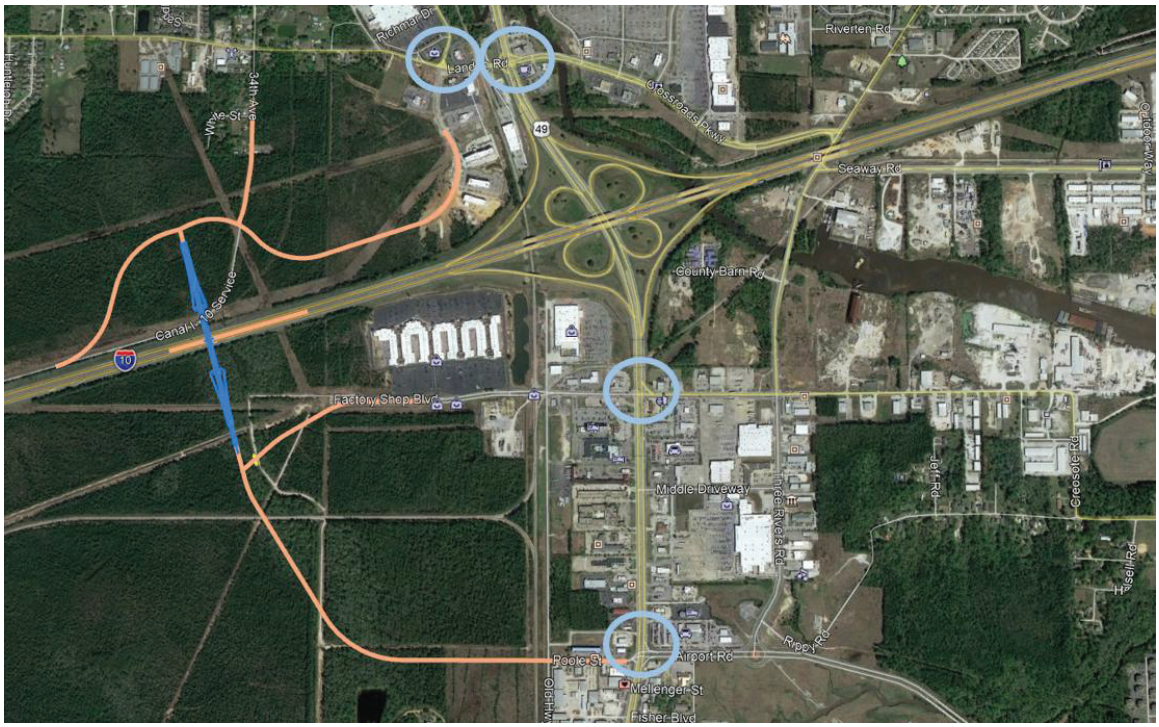


Figure 1. Project Study Area and Intersections of Interest

$PM_{2.5}$ Quantitative Hot-Spot Analysis Methodology

Following the guidance provided by the Environmental Protection Agency (EPA) on $PM_{2.5}$ hotspot analysis, the future condition was analyzed to determine if it would meet the threshold of $PM_{2.5}$ set forth by the National Ambient Air Quality Standards (NAAQS). Should the build future condition meet the threshold it can then be inferred that all scenarios for the project will meet the standards. Future conditions were assessed for the project design year 2045.

3.0 Background

What is Particulate Matter (PM)?

Motor vehicles (*i.e.*, cars, trucks, and buses) emit direct PM from their tailpipes, as well as from normal brake and tire wear. In addition, vehicles cause dust from paved and unpaved roads to be re-entrained, or re-suspended, in the atmosphere. In addition, highway and transit project construction may cause dust. Finally, gases in vehicle exhaust may react in the atmosphere to form PM. Particles come in a wide variety of sizes and have been historically assessed based on size, typically measured by the diameter of the

particle in micrometers. $PM_{2.5}$, or fine particulate matter, refers to particles that are 2.5 micrometers in diameter or less. (*Note*: A human hair is about 70 micrometers in diameter and a grain of sand is about 90 micrometers in diameter). The National Ambient Air Quality Standards (NAAQS) for fine particulate matter include an annual standard (12.0 micrograms per cubic meter ($\mu g/m^3$)) and a 24-hour standard (35 $\mu g/m^3$). The annual standard is based on a 3-year average of annual mean $PM_{2.5}$ concentrations; the 24-hour standard is based on a 3-year average of the 98th percentile of 24-hour concentrations.

4.0 Quantitative Air Quality Assessment

A microscale hotspot air quality analysis was performed to determine future $PM_{2.5}$ concentrations resulting from the proposed highway improvements. A hot-spot analysis is defined in 40 CFR 93.101 as an estimation of likely future localized pollutant concentrations and a comparison of those concentrations to the relevant NAAQS. MOVES and CAL3QHC along with EPA guidance – "Transportation Conformity Guidance for Quantitative Hot-spot Analysis in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas" were used to predict the $PM_{2.5}$ concentration near sensitive receptors at all intersections of interest. Parameters and variables for inclusion in this program were consistence with EPA guidance.

MOVES was run for all approach and departure links at the intersections of interest to determine the emission factor for each link to be used in CAL3QHC for the design year of 2045. Age distribution and estimated traffic volumes for links were obtained from the travel demand model. Default data for county was utilized for the meteorological data along with fuel inputs needed to execute a model run. A post processing script was run to extract the needed emission factors. Following EPA guidance MOVES was run to four months out of the (January, April, July and October) for four different time of days (AM, midday, PM, and overnight). To provide a worse case scenario the maximum emission rates were utilized for each scenario in the CAL3QHC model. MOVES result files are found in the Appendix. The background concentration was applied within the CAL3QHC program. The PM microscale modeling analysis assessed the study intersection conditions for the 2045 Build conditions. Receptors were placed at the study intersections near sensitive facilities in accordance with accepted air quality standards and EPA guidance.

The maximum predicted $PM_{2.5}$ concentrations for the evaluation year of 2045 Build conditions for all study intersections was determined to be 0.50 ppm. None of the identified receptors experienced an exceedance of the NAAQ standards. See the Appendix for output data.

Background Concentration

The background concentration for $PM_{2.5}$ for Gulfport, Mississippi was obtained for the local monitoring site for the most recent full year of data (2019) that is available. The yearly average concentration was reported as 9.220386 $\mu g/m^3$ and the 24-Hour maximum value was found to be 28.4 $\mu g/m^3$. When applying the maximum modeled concentration for the project to both the average and maximum $PM_{2.5}$ concentrations the results were

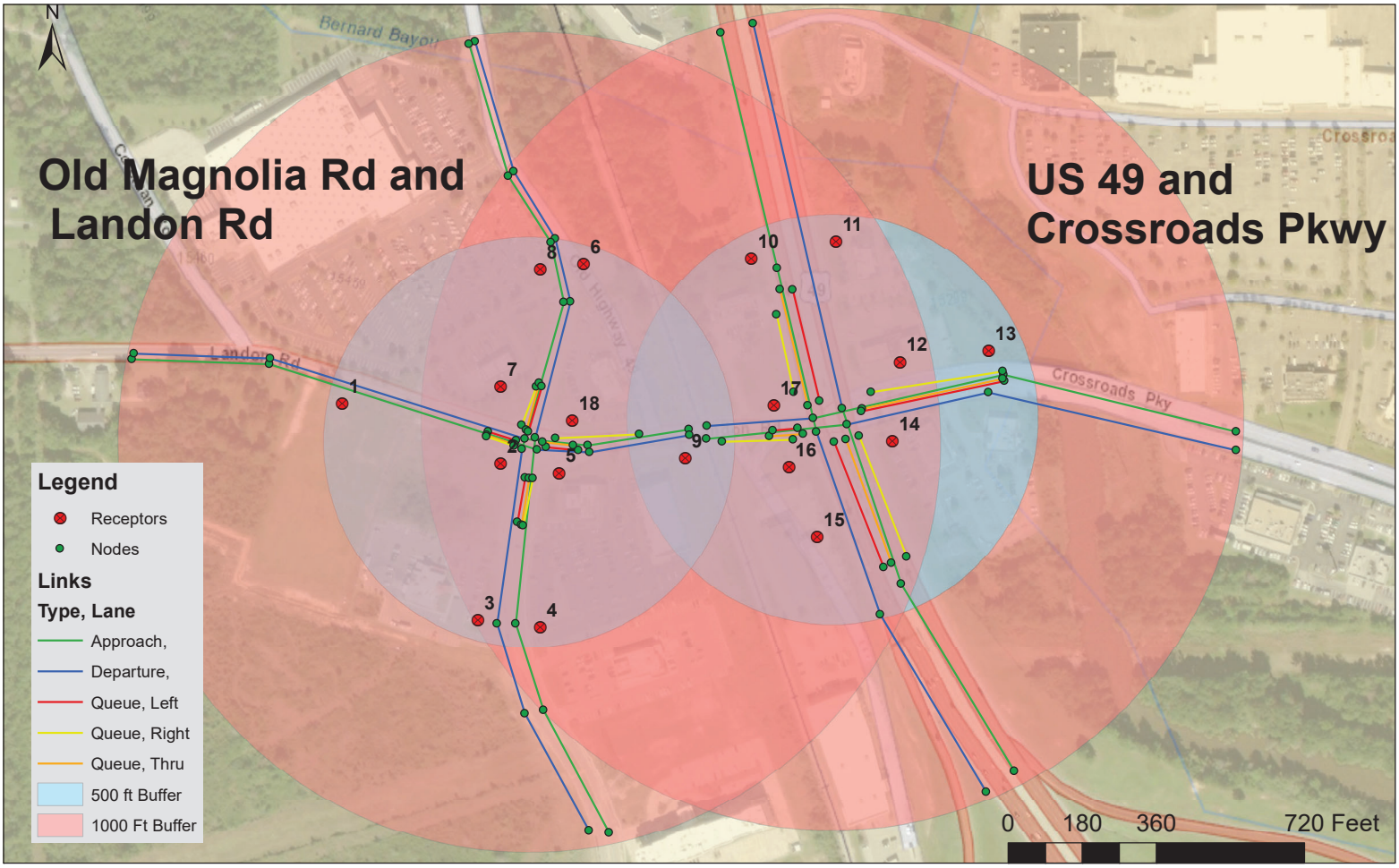
determined to be 9.220886 μg/m^3 and 28.4 μg/m^3, respectively. Both are well below of NAAQ standard and it is determined that the proposed roadway project is expected to have a negligible impact on $PM_{2.5}$.

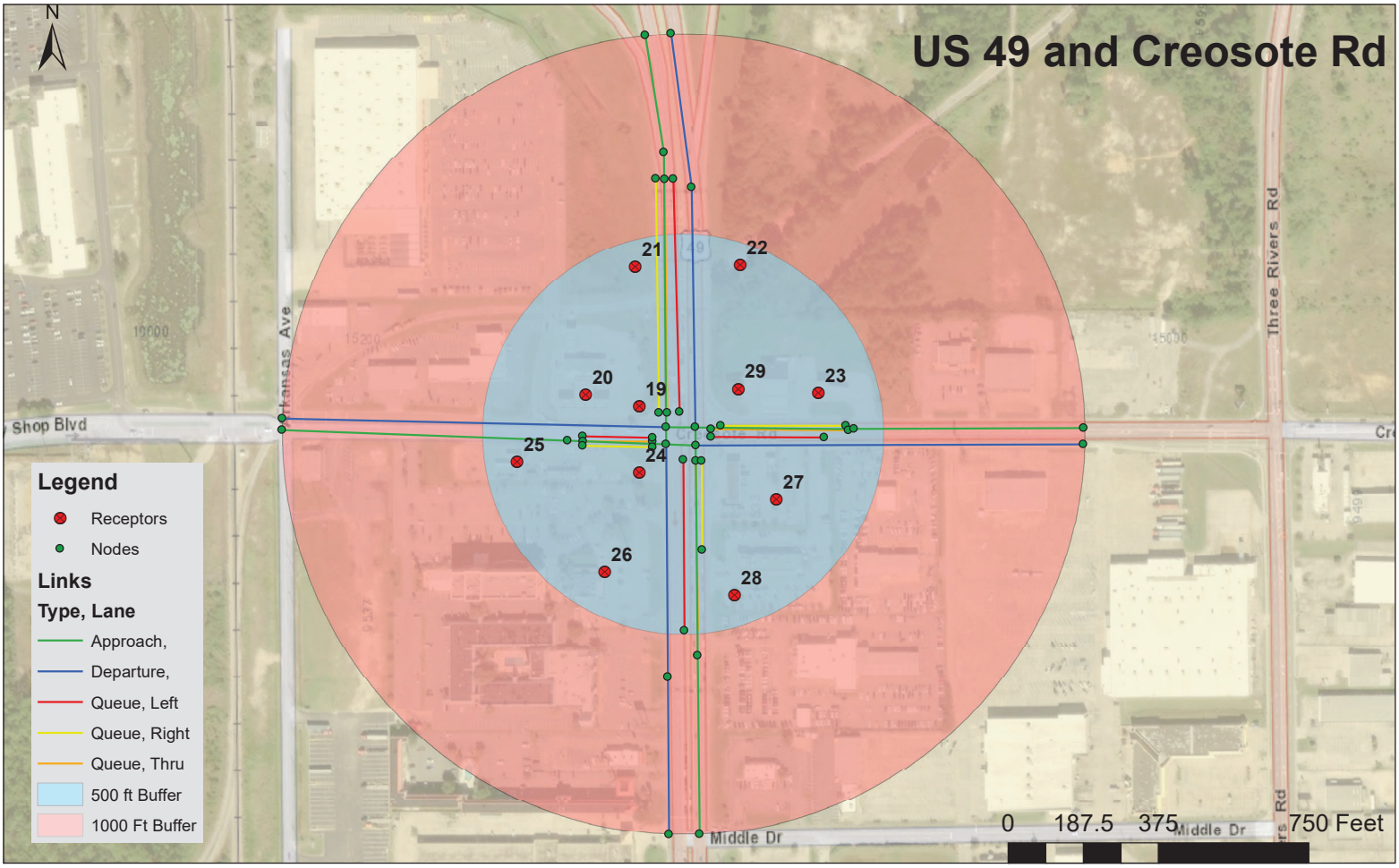
5.0 Conclusion

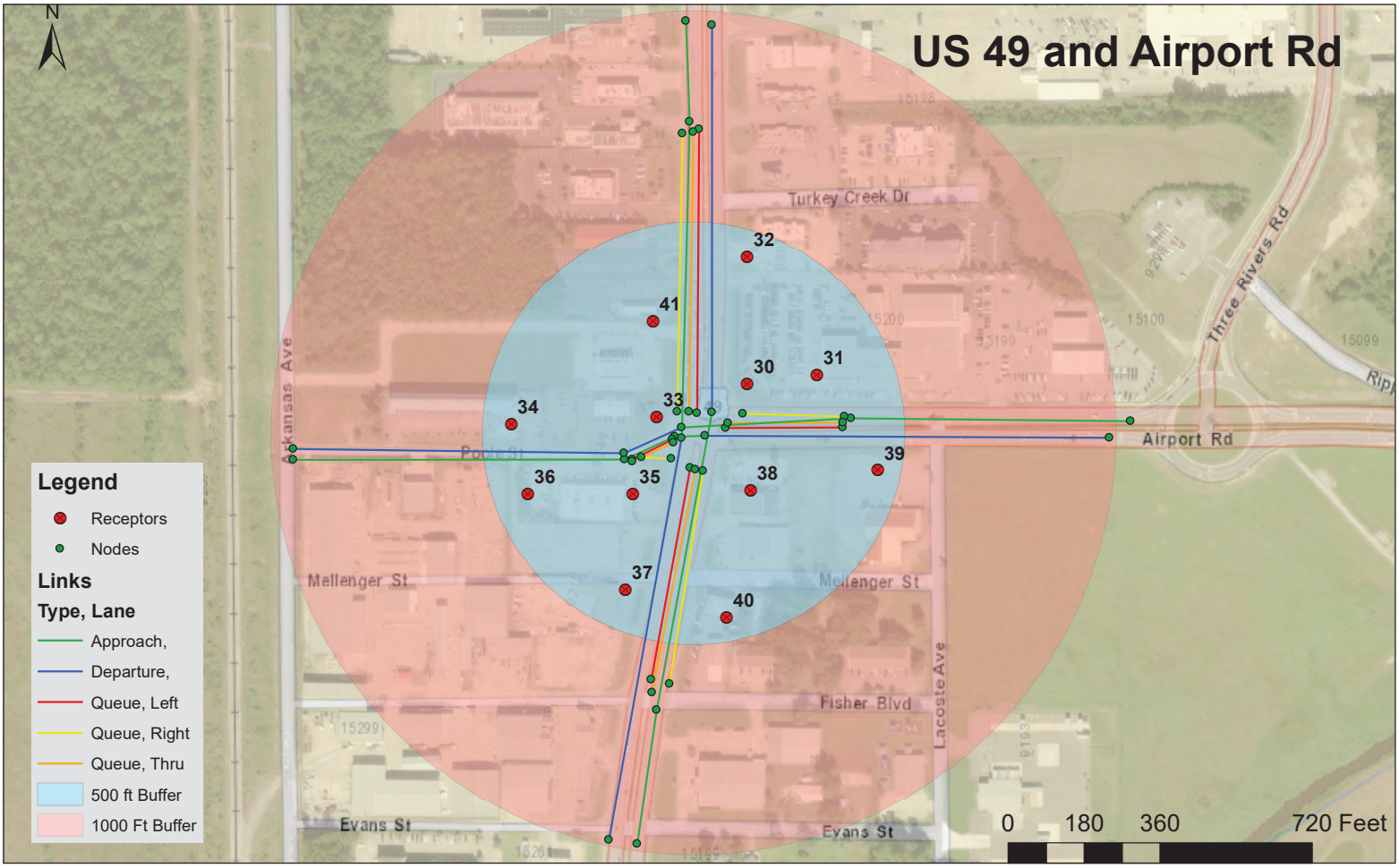
Based on the microscale model results it was determined that the Interconnecting BUILD Grant Roadway Project is not a project of air quality concern. Based on the regional conditions and surrogate site analysis conducted for proposed roadway, it has been determined that the intersections of interest meet all the project level conformity requirements relating to the annual $PM_{2.5}$ standard. Further, it has been extrapolated based on the analyzed data that the completion of the roadway project will not cause or contribute to a new violation of the $PM_{2.5}$ NAAQS or increase the frequency or severity of a violation or interfere with any interim milestones. The annual $PM_{2.5}$ design values for the monitors considered in this analysis are well below the annual $PM_{2.5}$ standard of 15.0 μg/m^3.

Appendix

Studied Intersections and Moves Model Results


Old Magnolia Rd and
Landon Rd
US 49 and
Crossroads Pkwy
N
Legend
Receptors
Nodes
Links
Type, Lane
Approach,
Departure,
Queue, Left
Queue, Right
Queue, Thru
500 ft Buffer
1000 Ft Buffer
0
180
360
720 Feet
Landon Rd
Crossroads Pky
Bernard Bayou
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18


US 49 and Creosote Rd
N
Legend
Receptors
Nodes
Links
Type, Lane
Approach,
Departure,
Queue, Left
Queue, Right
Queue, Thru
500 ft Buffer
1000 Ft Buffer
19
20
21
22
23
24
25
26
27
28
29
Arkansas Ave
Three Rivers Rd
Middle Dr
Shop Blvd
0 187.5 375 750 Feet


US 49 and Airport Rd
N
Legend
Receptors
Nodes
Links
Type, Lane
Approach,
Departure,
Queue, Left
Queue, Right
Queue, Thru
500 ft Buffer
1000 Ft Buffer
Turkey Creek Dr
Three Rivers Rd
Airport Rd
Arkansas Ave
Mellenger St
Fisher Blvd
Lacoste Ave
Evans St
Evans St
32
41
30
31
34
33
39
36
35
38
37
40
0
180
360
720 Feet

linkID	countyID	zoneID	roadTypeID	linkLength	linkVolume	linkAvgSpeed	Speed Adjustment	linkDescription	January				April				July		
									AM	MD	PM	ON	AM	MD	PM	ON	AM	MD	PM
1	28047	280470	5	0.14862165573	29	35.00		AEA1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.4519293582	0.4519293582	0.455281869	0.455281869	0.455281869
2	28047	280470	5	0.02483133330	29	35.00		AEA2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281841	0.455281841	0.455281841
3	28047	280470	5	0.01356959407	29	35.00	5.00	AEA3	2.229791400419340	2.229791400419340	0.451304977	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
4	28047	280470	5	0.18146388646	1527	40.00		AED1	0.387605676587555	0.387605676587555	0.387605677	0.387605677	0.388249676	0.388249676	0.388249676	0.388249676	0.39170819	0.39170819	0.39170819
5	28047	280470	5	0.06082273986	7265	50.00		ANA1	0.288611872906586	0.288611872906586	0.288611873	0.288611873	0.289294942	0.289294942	0.289294942	0.289294942	0.292963495	0.292963495	0.292963495
6	28047	280470	5	0.13595754166	7265	50.00	10.00	ANA2	1.336904592930300	1.336904592930300	0.288611873	1.336904593	1.337878023	1.337878023	1.337878023	1.337878023	1.343103643	1.343103643	1.343103643
7	28047	280470	5	0.17384352352	4333	50.00		AND1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.28929496	0.28929496	0.28929496	0.28929496	0.292963476	0.292963476	0.292963476
8	28047	280470	5	0.04533968637	4386	50.00		ASA1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495	0.292963495	0.292963495
9	28047	280470	5	0.14209149555	4386	50.00	10.00	ASA2	1.336904602243520	1.336904602243520	0.288611873	1.336904602	1.337878032	1.337878032	1.337878032	1.337878032	1.343103652	1.343103652	1.343103652
10	28047	280470	5	0.18329512299	7203	50.00		ASD1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.28929494	0.28929494	0.28929494	0.28929494	0.292963495	0.292963495	0.292963495
11	28047	280470	5	0.12536446568	1541	40.00		AWA1	0.387605674026418	0.387605674026418	0.387605674	0.387605674	0.388249647	0.388249647	0.388249647	0.388249647	0.39170819	0.39170819	0.39170819
12	28047	280470	5	0.07614806641	1541	40.00	10.00	AWA2	1.336904592930300	1.336904592930300	0.387605674	1.336904593	1.337878023	1.337878023	1.337878023	1.337878023	1.343103643	1.343103643	1.343103643
13	28047	280470	5	0.02835556504	25	35.00		AWD1	0.451304980249915	0.451304980249915	0.45130498	0.45130498	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
14	28047	280470	5	0.14838760089	25	35.00		AWD2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871	0.455281871	0.455281871
15	28047	280470	5	0.13491553668	648	35.00		CEA1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871	0.455281871	0.455281871
16	28047	280470	5	0.06062821685	648	35.00	5.00	CEA2	2.229791400419340	2.229791400419340	0.451304977	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
17	28047	280470	5	0.18320271024	648	35.00		CED1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
18	28047	280470	5	0.08448015545	13339	50.00		CNA1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495	0.292963495	0.292963495
19	28047	280470	5	0.10800638257	13339	50.00	10.00	CNA2	1.336904583151410	1.336904583151410	0.288611873	1.336904583	1.337877922	1.337877922	1.337877922	1.337877922	1.343103643	1.343103643	1.343103643
20	28047	280470	5	0.11338835309	1530	50.00		CND1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495	0.292963495	0.292963495
21	28047	280470	5	0.07323536199	1530	50.00		CND2	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.28929494	0.28929494	0.28929494	0.28929494	0.292963495	0.292963495	0.292963495
22	28047	280470	5	0.06510831816	386	35.00	5.00	CREA1	2.229791400419340	2.229791400419340	0.451304974	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
23	28047	280470	5	0.06689847305	558	35.00		CRED1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929355	0.451929355	0.451929355	0.451929355	0.455281896	0.455281896	0.455281896
24	28047	280470	5	0.11734278448	558	35.00		CRED2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
25	28047	280470	5	0.08541859995	3547	50.00		CRNA	0.288611872906586	0.288611872906586	0.288611873	0.288611873	0.289294963	0.289294963	0.289294963	0.289294963	0.292963495	0.292963495	0.292963495
26	28047	280470	5	0.10086870224	3547	50.00	10.00	CRNA1	1.336904592930300	1.336904592930300	0.288611873	1.336904593	1.337878023	1.337878023	1.337878023	1.337878023	1.343103643	1.343103643	1.343103643
27	28047	280470	5	0.18223329804	12236	50.00		CRND	0.288611872906586	0.288611872906586	0.288611873	0.288611873	0.289294963	0.289294963	0.289294963	0.289294963	0.292963476	0.292963476	0.292963476
28	28047	280470	5	0.11171030818	12027	50.00		CRSA1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495	0.292963495	0.292963495
29	28047	280470	5	0.07763985161	12027	50.00	10.00	CRSA2	1.336904602243520	1.336904602243520	0.288611873	1.336904602	1.337878032	1.337878032	1.337878032	1.337878032	1.343103652	1.343103652	1.343103652
30	28047	280470	5	0.08915030917	3776	50.00		CRSD1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.28929498	0.28929498	0.28929498	0.28929498	0.292963495	0.292963495	0.292963495
31	28047	280470	5	0.09532808073	3776	50.00		CRSD2	0.288611872906586	0.288611872906586	0.288611873	0.288611873	0.289294962	0.289294962	0.289294962	0.289294962	0.292963495	0.292963495	0.292963495
32	28047	280470	5	0.11045193501	397	35.00		CRWA1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
33	28047	280470	5	0.08994763950	397	35.00	5.00	CRWA2	2.229791400419340	2.229791400419340	0.451304974	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
34	28047	280470	5	0.04912585770	630	35.00		CRWD1	0.451304980249915	0.451304980249915	0.45130498	0.45130498	0.451929355	0.451929355	0.451929355	0.451929355	0.455281896	0.455281896	0.455281896
35	28047	280470	5	0.05613002769	1452	50.00		CSA1	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.28929498	0.28929498	0.28929498	0.28929498	0.292963495	0.292963495	0.292963495
36	28047	280470	5	0.13799890206	1452	50.00	10.00	CSA2	1.336904592930300	1.336904592930300	0.288611873	1.336904593	1.337878023	1.337878023	1.337878023	1.337878023	1.343103643	1.343103643	1.343103643
37	28047	280470	5	0.10991795281	13184	50.00		CSD1	0.288611872906586	0.288611872906586	0.288611873	0.288611873	0.289294963	0.289294963	0.289294963	0.289294963	0.292963495	0.292963495	0.292963495
38	28047	280470	5	0.07443249065	13184	50.00		CSD2	0.288611872887486	0.288611872887486	0.288611873	0.288611873	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495	0.292963495	0.292963495
39	28047	280470	5	0.10845902027	551	35.00		CWA1	0.451304980249915	0.451304980249915	0.45130498	0.45130498	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
40	28047	280470	5	0.08849497973	551	35.00	5.00	CWA2	2.229791400419340	2.229791400419340	0.451304977	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
41	28047	280470	5	0.18133900890	852	35.00		CWD1	0.451304948817778	0.451304948817778	0.451304949	0.451304949	0.45192933	0.45192933	0.45192933	0.45192933	0.455281871	0.455281871	0.455281871
42	28047	280470	5	0.06350184833	2336	35.00		LEA1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929355	0.451929355	0.451929355	0.451929355	0.455281839	0.455281839	0.455281839
43	28047	280470	5	0.12943761197	2336	35.00	5.00	LEA2	2.229791400419340	2.229791400419340	0.451304974	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
44	28047	280470	5	0.02419889030	450	35.00		LED1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
45	28047	280470	5	0.04678578068	450	35.00		LED2	0.451304974312734	0.451304974312734	0.451304974	0.451304974	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
46	28047	280470	5	0.06413712826	452	35.00		LNA1	0.451304974429149	0.451304974429149	0.451304974	0.451304974	0.451929355	0.451929355	0.451929355	0.451929355	0.455281867	0.455281867	0.455281867
47	28047	280470	5	0.04180143061	452	35.00		LNA2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
48	28047	280470	5	0.08622825487	452	35.00	5.00	LNA3	2.229791400419340	2.229791400419340	0.451304977	2.2297914	2.231155083	2.231155083	2.231155083	2.231155083	2.238477891	2.238477891	2.238477891
49	28047	280470	5	0.06484095634	2746	35.00		LND1	0.451304980249915	0.451304980249915	0.45130498	0.45130498	0.451929355	0.451929355	0.451929355	0.451929355	0.455281839	0.455281839	0.455281839
50	28047	280470	5	0.02989482710	2746	35.00		LND2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
51	28047	280470	5	0.03637225350	2746	35.00		LND3	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929355	0.451929355	0.451929355	0.451929355	0.455281868	0.455281868	0.455281868
52	28047	280470	5	0.06255176263	2746	35.00		LND4	0.451305005162794	0.451305005162794	0.451305005	0.451305005	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
53	28047	280470	5	0.06346097389	2643	35.00		LSA1	0.451304974429149	0.451304974429149	0.451304974	0.451304974	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
54	28047	280470	5	0.03639099342	2643	35.00		LSA2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871	0.455281871	0.455281871
55	28047	280470	5	0.02824696390	2643	35.00		LSA3	0.451304974312734	0.451304974312734	0.451304974	0.451304974	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
56	28047	280470	5	0.07039387301	2643	35.00	5.00	LSA4	2.229791400419340	2.229791400419340	0.451304974	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
57	28047	280470	5	0.08137605660	532	35.00		LSD1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
58	28047	280470	5	0.04336913654	532	35.00		LSD2	0.451304980249915	0.451304980249915	0.45130498	0.45130498	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
59	28047	280470	5	0.06151100148	532	35.00		LSD3	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869	0.455281869	0.455281869
60	28047	280470	5	0.04716392955	450	35.00		LWA1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
61	28047	280470	5	0.02924967448	450	35.00	5.00	LWA2	2.229791400419340	2.229791400419340	0.451304977	2.2297914	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891	2.238477891	2.238477891
62	28047	280470	5	0.12302161847	2324	35.00		LWD1	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899
63	28047	280470	5	0.06284466712	2324	35.00		LWD2	0.451304977223117	0.451304977223117	0.451304977	0.451304977	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899	0.455281899	0.455281899

	October				Average				Max
ON	AM	MD	PM	ON	AM	MD	PM	ON	GramsPerVehMile
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281841	0.451929358	0.451929358	0.451929358	0.451929358	0.455281841368560	0.455281841368560	0.455281841368560	0.455281841368560	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.39170819	0.388249676	0.388249676	0.388249676	0.388249676	0.391708190014469	0.391708190014469	0.391708190014469	0.391708190014469	0.392
0.292963495	0.289294942	0.289294942	0.289294942	0.289294942	0.292963495232470	0.292963495232470	0.292963495232470	0.292963495232470	0.293
1.343103643	1.337878023	1.337878023	1.337878023	1.337878023	1.343103642668210	1.343103642668210	1.343103642668210	1.343103642668210	1.343
0.292963476	0.28929496	0.28929496	0.28929496	0.28929496	0.292963475653778	0.292963475653778	0.292963475653778	0.292963475653778	0.293
0.292963495	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
1.343103652	1.337878032	1.337878032	1.337878032	1.337878032	1.343103651981440	1.343103651981440	1.343103651981440	1.343103651981440	1.343
0.292963495	0.28929494	0.28929494	0.28929494	0.28929494	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
0.39170819	0.388249647	0.388249647	0.388249647	0.388249647	0.391708190014469	0.391708190014469	0.391708190014469	0.391708190014469	0.392
1.343103643	1.337878023	1.337878023	1.337878023	1.337878023	1.343103642668210	1.343103642668210	1.343103642668210	1.343103642668210	1.343
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281871	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871170882	0.455281871170882	0.455281871170882	0.455281871170882	0.455
0.455281871	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871170882	0.455281871170882	0.455281871170882	0.455281871170882	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
0.292963495	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
1.343103643	1.337877922	1.337877922	1.337877922	1.337877922	1.343103642668210	1.343103642668210	1.343103642668210	1.343103642668210	1.343
0.292963495	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
0.292963495	0.28929494	0.28929494	0.28929494	0.28929494	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281896	0.451929355	0.451929355	0.451929355	0.451929355	0.455281896316592	0.455281896316592	0.455281896316592	0.455281896316592	0.455
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.292963495	0.289294963	0.289294963	0.289294963	0.289294963	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
1.343103643	1.337878023	1.337878023	1.337878023	1.337878023	1.343103642668210	1.343103642668210	1.343103642668210	1.343103642668210	1.343
0.292963476	0.289294963	0.289294963	0.289294963	0.289294963	0.292963475653778	0.292963475653778	0.292963475653778	0.292963475653778	0.293
0.292963495	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
1.343103652	1.337878032	1.337878032	1.337878032	1.337878032	1.343103651981440	1.343103651981440	1.343103651981440	1.343103651981440	1.343
0.292963495	0.28929498	0.28929498	0.28929498	0.28929498	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
0.292963495	0.289294962	0.289294962	0.289294962	0.289294962	0.292963495232470	0.292963495232470	0.292963495232470	0.292963495232470	0.293
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281896	0.451929355	0.451929355	0.451929355	0.451929355	0.455281896316592	0.455281896316592	0.455281896316592	0.455281896316592	0.455
0.292963495	0.28929498	0.28929498	0.28929498	0.28929498	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
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0.292963495	0.289294963	0.289294963	0.289294963	0.289294963	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
0.292963495	0.289294961	0.289294961	0.289294961	0.289294961	0.292963495211552	0.292963495211552	0.292963495211552	0.292963495211552	0.293
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477891110960	2.238477891110960	2.238477891110960	2.238477891110960	2.238
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0.455281839	0.451929355	0.451929355	0.451929355	0.451929355	0.455281838545488	0.455281838545488	0.455281838545488	0.455281838545488	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
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0.455281867	0.451929355	0.451929355	0.451929355	0.451929355	0.455281866514269	0.455281866514269	0.455281866514269	0.455281866514269	0.455
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
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0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
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0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281871	0.451929358	0.451929358	0.451929358	0.451929358	0.455281871170882	0.455281871170882	0.455281871170882	0.455281871170882	0.455
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
0.455281869	0.451929358	0.451929358	0.451929358	0.451929358	0.455281869308237	0.455281869308237	0.455281869308237	0.455281869308237	0.455
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
2.238477891	2.231155064	2.231155064	2.231155064	2.231155064	2.238477890914510	2.238477890914510	2.238477890914510	2.238477890914510	2.238
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455
0.455281899	0.451929358	0.451929358	0.451929358	0.451929358	0.455281899110560	0.455281899110560	0.455281899110560	0.455281899110560	0.455

CAL3QHC Input File

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'3'     7052.25 10262.93  6
'4'     7033.91 10414.24  6
'5'     7409.89 10460.09  6
'6'     7918.83 10519.70  6
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'8'     7905.08 10414.24  6
'9'     7446.57 10767.29  6
'10'    7932.59 10927.77  6
'11'    7973.86 11134.10  6
'12'    7680.41 11290.00  6
'13'    7707.92 11505.50  6
'14'    7487.83 11271.66  6
'15'    7253.99 11088.25  6
'16'    7423.64 11019.47  6
'17'    7574.95 10982.79  6
'18'    7538.27 10492.19  6
'19'    3978.36 12456.27  6
'20'    4006.91 12323.01  6
'21'    4325.76 12446.75  6
'22'    4330.52 12708.49  6
'23'    4011.67 12903.61  6
'24'    3811.79 12456.27  6
'25'    3840.34 12151.69  6
'26'    3564.32 12370.60  6
'27'    3745.16 12798.91  6
'28'    3507.21 12694.22  6
'29'    4021.19 12703.73  6
'30'    1272.36 12690.70  6
'31'    1294.18 12856.55  6
'32'    1573.50 12690.70  6
'33'    1193.80 12476.84  6
'34'    1176.34 12132.05  6
'35'    1010.49 12420.10  6
'36'    1010.49 12171.33  6
'37'    783.54  12402.64  6
'38'    1019.22 12699.43  6
'39'    1067.23 13000.57  6
'40'    718.07  12642.69  6
'41'    1420.75 12468.11  6
'10 Degree Increments   '                63  1  0  'C'
  1
'Airport EB App1'  'AG'   1091.40 11615.91  1091.83 12400.63 29.  0.455 0.  32
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'Airport EB App2'  'AG'   1091.83 12400.63  1146.08 12519.99 29.  0.455 0.  44
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'Airport EB App3'  'AG'   1146.08 12519.99  1148.25 12591.60 29.  2.238 0.  44
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'Airport EB Dep1'  'AG'   1148.25 12591.60  1143.26 13549.72 1527.  0.392 0.  44
  1
'Airport NB App1'  'AG'   180.54 12430.53  498.35 12476.66 7265.  0.293 0.  53
  1
'Airport NB App2'  'AG'   498.35 12476.66  1204.10 12607.95 7265.  1.343 0.  80
  1
'Airport NB Dep1'  'AG'   1204.10 12607.95  2122.99 12607.88 4333.  0.293 0.  53
  1
'Airport SB App1'  'AG'   2131.85 12546.47  1892.61 12555.15 4386.  0.293 0.  53
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'Airport SB App2'  'AG'   1892.61 12555.15  1142.61 12536.05 4386.  1.343 0.  68
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'Airport SB Dep1'  'AG'   1142.61 12536.05  190.35 12363.31 7203.  0.293 0.  53
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'Airport WB App1'  'AG'   1183.09 13599.70  1189.60 12937.81 1541.  0.392 0.  44
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'Airport WB App2'  'AG'   1189.60 12937.81  1167.89 12536.33 1541.  1.343 0.  53
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  1
'Airport WB Dep2'  'AG'   1107.02 12399.55  1117.22 11616.13 25.  0.455 0.  32
  1
'Creosote EB App1'  'AG'   3917.58 11565.79  3890.87 12277.64 648.  0.455 0.  44
  1
'Creosote EB App2'  'AG'   3890.87 12277.64  3878.87 12597.53 648.  2.238 0.  56
  1
'Creosote EB Dep1'  'AG'   3878.87 12597.53  3881.84 13564.84 648.  0.455 0.  44
  1
'Creosote NB App1'  'AG'   2908.65 12606.94  3354.69 12602.42 13339.  0.293 0.  56
  1
'Creosote NB App2'  'AG'   3354.69 12602.42  3924.93 12596.63 13339.  1.343 0.  80
  1
'Creosote NB Dep1'  'AG'   3924.93 12596.63  4523.55 12587.26 1530.  0.293 0.  56
  1
'Creosote NB Dep2'  'AG'   4523.55 12587.26  4906.75 12535.46 1530.  0.293 0.  36
  1
'Crossroads EB App1'  'AG'   7492.12 10818.89  7526.84 11160.90 386.  2.238 0.  56
  1
'Crossroads EB Dep1'  'AG'   7526.84 11160.90  7604.94 11505.39 558.  0.455 0.  44
  1
'Crossroads EB Dep2'  'AG'   7604.94 11505.39  7463.88 12108.68 558.  0.455 0.  44
  1
'Crossroads NB App1'  'AG'   6682.63 11568.32  7138.36 11292.71 3547.  0.293 0.  68
  1
'Crossroads NB App'  'AG'   7138.36 11292.71  7565.87 11149.05 3547.  1.343 0.  104
  1
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'Crossroads NB Dep1'  'AG'   7565.87 11149.05  8503.37 10932.47 12236.  0.293 0.
68
  1
'Crossroads SB App1'  'AG'   8480.72 10853.87  7907.09 10991.18 12027.  0.293 0.
56
  1
'Crossroads SB App2'  'AG'   7907.09 10991.18  7508.42 11086.62 12027.  1.343 0.
92
  1
'Crossroads SB Dep1'  'AG'   7508.42 11086.62  7064.05 11241.89 3776.  0.293 0.  56
  1
'Crossroads SB Dep2'  'AG'   7064.05 11241.89  6631.76 11499.70 3776.  0.293 0.  56
  1
'Crossroads WB App1'  'AG'   7509.45 12108.68  7648.34 11542.28 397.  0.455 0.  44
  1
'Crossroads WB App2'  'AG'   7648.34 11542.28  7542.47 11079.31 397.  2.238 0.  68
  1
'Crossroads WB Dep1'  'AG'   7542.47 11079.31  7523.37 10820.63 630.  0.455 0.  44
  1
'Creosote SB App1'  'AG'   4902.90 12471.35  4610.25 12518.09 1452.  0.293 0.  56
  1
'Creosote SB App2'  'AG'   4610.25 12518.09  3881.64 12523.72 1452.  1.343 0.  80
  1
'Creosote SB Dep1'  'AG'   3881.64 12523.72  3301.28 12528.05 13184.  0.293 0.  56
  1
'Creosote SB Dep2'  'AG'   3301.28 12528.05  2908.29 12530.99 13184.  0.293 0.  80
  1
'Creosote WB App1'  'AG'   3922.24 13564.98  3920.71 12992.32 551.  0.455 0.  44
  1
'Creosote WB App2'  'AG'   3920.71 12992.32  3924.81 12523.39 551.  2.238 0.  68
  1
'Creosote WB Dep1'  'AG'   3924.81 12523.39  3925.81 11566.15 852.  0.455 0.  44
  1
'Landon Rd EB App1'  'AG'   7185.80 9420.75  7173.64 9755.82 2336.  0.455 0.  44
  1
'Landon Rd EB App2'  'AG'   7173.64 9755.82  6965.74 10406.86 2336.  2.238 0.  32
  1
'Landon Rd EB Dep1'  'AG'   6965.74 10406.86  6959.23 10534.46 450.  0.455 0.  44
  1
'Landon Rd EB Dep2'  'AG'   6959.23 10534.46  7000.90 10777.95 450.  0.455 0.  32
  1
'Landon Rd NB App1'  'AG'   6033.02 10582.21  6331.63 10422.48 452.  0.455 0.  32
  1
'Landon Rd NB App2'  'AG'   6331.63 10422.48  6541.70 10354.77 452.  0.455 0.  32
  1
'Landon Rd NB App3'  'AG'   6541.70 10354.77  6994.53 10401.94 452.  2.238 0.  44
  1
'Landon Rd NB Dep1'  'AG'   6994.53 10401.94  7325.93 10487.89 2746.  0.455 0.  32
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  1
'Landon Rd NB Dep2'  'AG'   7325.93 10487.89  7479.41 10451.03 2746.  0.455 0.  32
  1
'Landon Rd NB Dep3'  'AG'   7479.41 10451.03  7642.92 10350.30 2746.  0.455 0.  32
  1
'Landon Rd NB Dep4'  'AG'    7642.92 10350.30  7959.48 10256.12 2746.  0.455 0.  32
  1
'Landon Rd SB App1'  'AG'   7953.03 10241.13  7631.85 10336.62 2543.  0.455 0.  32
  1
'Landon Rd SB App2'  'AG'   7631.85 10336.62  7470.40 10440.79 2543.  0.455 0.  32
  1
'Landon Rd SB App3'  'AG'   7470.40 10440.79  7324.56 10472.04 2543.  0.455 0.  32
  1
'Landon Rd SB App4'  'AG'   7324.56 10472.04  6967.05 10370.40 2543.  2.238 0.  44
  1
'Landon Rd SB Dep1'  'AG'   6967.05 10370.4  6541.70 10309.64 532.  0.455 0.  32
  1
'Landon Rd SB Dep2'  'AG'   6541.70 10309.64  6322.95 10377.34 532.  0.455 0.  32
  1
'Landon Rd SB Dep3'  'AG'   6322.95 10377.34  6038.23 10533.60 532.  0.455 0.  32
  1
'Landon Rd WB App1'  'AG'   7015.22 10776.65  6976.16 10530.56 450.  0.455 0.  44
  1
'Landon Rd WB App2'  'AG'   6976.16 10530.56  6991.79 10376.91 450.  2.238 0.  44
  1
'Landon Rd WB Dep1'  'AG'   6991.79 10376.91  7187.52 9757.55 2324.  0.455 0.  32
  1
'Landon Rd WB Dep2'  'AG'   7187.52 9757.55  7199.68 9425.96 2324.  0.455 0.  32
1.0 00. 4 1000. 0 'Y' 10  0 35
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CAL3QHC Results

↟ CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221 PAGE 1

JOB: Gulf Port Grant Air Quality 2045 Build P RUN: 10 Degree Increments

DATE : 9/ 3/20
TIME : 18:57:24

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 175. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 0.0 PPM

LINK VARIABLES

LINK DESCRIPTION	*	LINK COORDINATES (FT)				*	LENGTH	BRG	TYPE	VPH	EF	H	W	V/C	QUEUE
	*	X1	Y1	X2	Y2	*	(FT)	(DEG)		(G/MI)	(FT)	(FT)		(VEH)	
1. Airport EB App1	*	1091.4	11615.9	1091.8	12400.6	*	785.	0.	AG	29.	0.5	0.0	32.0		
2. Airport EB App2	*	1091.8	12400.6	1146.1	12520.0	*	131.	24.	AG	29.	0.5	0.0	44.0		
3. Airport EB App3	*	1146.1	12520.0	1148.3	12591.6	*	72.	2.	AG	29.	2.2	0.0	44.0		
4. Airport EB Dep1	*	1148.3	12591.6	1143.3	13549.7	*	958.	360.	AG	1527.	0.4	0.0	44.0		
5. Airport NB App1	*	180.5	12430.5	498.4	12476.7	*	321.	82.	AG	7265.	0.3	0.0	53.0		
6. Airport NB App2	*	498.4	12476.7	1204.1	12608.0	*	718.	79.	AG	7265.	1.3	0.0	80.0		
7. Airport NB Dep1	*	1204.1	12608.0	2123.0	12607.9	*	919.	90.	AG	4333.	0.3	0.0	53.0		
8. Airport SB App1	*	2131.9	12546.5	1892.6	12555.2	*	239.	272.	AG	4386.	0.3	0.0	53.0		
9. Airport SB App2	*	1892.6	12555.2	1142.6	12536.1	*	750.	269.	AG	4386.	1.3	0.0	68.0		
10. Airport SB Dep1	*	1142.6	12536.1	190.4	12363.3	*	968.	260.	AG	7203.	0.3	0.0	53.0		
11. Airport WB App1	*	1183.1	13599.7	1189.6	12937.8	*	662.	179.	AG	1541.	0.4	0.0	44.0		

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     12. Airport WB App2     *   1189.6   12937.8    1167.9   12536.3 *     402.
183. AG   1541.   1.3   0.0 53.0
     13. Airport WB Dep1     *   1167.9   12536.3    1107.0   12399.6 *     150.
204. AG     25.   0.5   0.0 32.0
     14. Airport WB Dep2     *   1107.0   12399.6    1117.2   11616.1 *     783.
179. AG     25.   0.5   0.0 32.0
     15. Creosote EB App1    *   3917.6   11565.8    3890.9   12277.6 *     712.
358. AG    648.   0.5   0.0 44.0
     16. Creosote EB App2    *   3890.9   12277.6    3878.9   12597.5 *     320.
358. AG    648.   2.2   0.0 56.0
     17. Creosote EB Dep1    *   3878.9   12597.5    3881.8   13564.8 *     967.
  0. AG    648.   0.5   0.0 44.0
     18. Creosote NB App1    *   2908.7   12606.9    3354.7   12602.4 *     446.
 91. AG  13339.   0.3   0.0 56.0
     19. Creosote NB App2    *   3354.7   12602.4    3924.9   12596.6 *     570.
 91. AG  13339.   1.3   0.0 80.0
     20. Creosote NB Dep1    *   3924.9   12596.6    4523.5   12587.3 *     599.
 91. AG   1530.   0.3   0.0 56.0
     21. Creosote NB Dep2    *   4523.5   12587.3    4906.8   12535.5 *     387.
 98. AG   1530.   0.3   0.0 36.0
     22. Crossroads EB App1  *   7492.1   10818.9    7526.8   11160.9 *     344.
  6. AG    386.   2.2   0.0 56.0
     23. Crossroads EB Dep1  *   7526.8   11160.9    7604.9   11505.4 *     353.
 13. AG    558.   0.5   0.0 44.0
     24. Crossroads EB Dep2  *   7604.9   11505.4    7463.9   12108.7 *     620.
347. AG    558.   0.5   0.0 44.0
     25. Crossroads NB App1  *   6682.6   11568.3    7138.4   11292.7 *     533.
121. AG   3547.   0.3   0.0 68.0
     26. Crossroads NB App   *   7138.4   11292.7    7565.9   11149.1 *     451.
109. AG   3547.   1.3   0.0 ****
     27. Crossroads NB Dep1  *   7565.9   11149.1    8503.4   10932.5 *     962.
103. AG  12236.   0.3   0.0 68.0
     28. Crossroads SB App1  *   8480.7   10853.9    7907.1   10991.2 *     590.
283. AG  12027.   0.3   0.0 56.0
     29. Crossroads SB App2  *   7907.1   10991.2    7508.4   11086.6 *     410.
283. AG  12027.   1.3   0.0 92.0
     30. Crossroads SB Dep1  *   7508.4   11086.6    7064.0   11241.9 *     471.
289. AG   3776.   0.3   0.0 56.0
     31. Crossroads SB Dep2  *   7064.0   11241.9    6631.8   11499.7 *     503.
301. AG   3776.   0.3   0.0 56.0
     32. Crossroads WB App1  *   7509.5   12108.7    7648.3   11542.3 *     583.
166. AG    397.   0.5   0.0 44.0
     33. Crossroads WB App2  *   7648.3   11542.3    7542.5   11079.3 *     475.
193. AG    397.   2.2   0.0 68.0
     34. Crossroads WB Dep1  *   7542.5   11079.3    7523.4   10820.6 *     259.
184. AG    630.   0.5   0.0 44.0
     35. Creosote SB App1    *   4902.9   12471.3    4610.3   12518.1 *     296.
279. AG   1452.   0.3   0.0 56.0
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      36. Creosote SB App2    *   4610.3   12518.1    3881.6   12523.7 *     729.
270. AG   1452.   1.3   0.0 80.0
      37. Creosote SB Dep1    *   3881.6   12523.7    3301.3   12528.0 *     580.
270. AG  13184.   0.3   0.0 56.0
      38. Creosote SB Dep2    *   3301.3   12528.0    2908.3   12531.0 *     393.
270. AG  13184.   0.3   0.0 80.0
      39. Creosote WB App1    *   3922.2   13565.0    3920.7   12992.3 *     573.
180. AG    551.   0.5   0.0 44.0
      40. Creosote WB App2    *   3920.7   12992.3    3924.8   12523.4 *     469.
179. AG    551.   2.2   0.0 68.0
      41. Creosote WB Dep1    *   3924.8   12523.4    3925.8   11566.2 *     957.
180. AG    852.   0.5   0.0 44.0
      42. Landon Rd EB App1   *   7185.8    9420.8    7173.6    9755.8 *     335.
358. AG   2336.   0.5   0.0 44.0
      43. Landon Rd EB App2   *   7173.6    9755.8    6965.7   10406.9 *     683.
342. AG   2336.   2.2   0.0 32.0
      44. Landon Rd EB Dep1   *   6965.7   10406.9    6959.2   10534.5 *     128.
357. AG    450.   0.5   0.0 44.0
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JOB: Gulf Port Grant Air Quality 2045 Build P RUN: 10 Degree Increments

DATE : 9/ 3/20
TIME : 18:57:24

LINK VARIABLES

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         LINK DESCRIPTION     *         LINK COORDINATES (FT)          *    LENGTH
BRG TYPE   VPH    EF      H   W    V/C QUEUE
                               *   X1        Y1        X2        Y2     *     (FT)
(DEG)            (G/MI)  (FT) (FT)       (VEH)

------------------------*-----------------------------------------*----------------
---------------------------------------
      45. Landon Rd EB Dep2   *   6959.2   10534.5    7000.9   10778.0 *     247.
 10. AG    450.   0.5   0.0 32.0
      46. Landon Rd NB App1   *   6033.0   10582.2    6331.6   10422.5 *     339.
118. AG    452.   0.5   0.0 32.0
      47. Landon Rd NB App2   *   6331.6   10422.5    6541.7   10354.8 *     221.
108. AG    452.   0.5   0.0 32.0
      48. Landon Rd NB App3   *   6541.7   10354.8    6994.5   10401.9 *     455.
 84. AG    452.   2.2   0.0 44.0
      49. Landon Rd NB Dep1   *   6994.5   10401.9    7325.9   10487.9 *     342.
 75. AG   2746.   0.5   0.0 32.0
      50. Landon Rd NB Dep2   *   7325.9   10487.9    7479.4   10451.0 *     158.
104. AG   2746.   0.5   0.0 32.0
      51. Landon Rd NB Dep3   *   7479.4   10451.0    7642.9   10350.3 *     192.
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122. AG   2746.   0.5   0.0 32.0
      52. Landon Rd NB Dep4   *   7642.9   10350.3    7959.5   10256.1 *     330.
107. AG   2746.   0.5   0.0 32.0
      53. Landon Rd SB App1   *   7953.0   10241.1    7631.9   10336.6 *     335.
287. AG   2543.   0.5   0.0 32.0
      54. Landon Rd SB App2   *   7631.9   10336.6    7470.4   10440.8 *     192.
303. AG   2543.   0.5   0.0 32.0
      55. Landon Rd SB App3   *   7470.4   10440.8    7324.6   10472.0 *     149.
282. AG   2543.   0.5   0.0 32.0
      56. Landon Rd SB App4   *   7324.6   10472.0    6967.1   10370.4 *     372.
254. AG   2543.   2.2   0.0 44.0
      57. Landon Rd SB Dep1   *   6967.1   10370.4    6541.7   10309.6 *     430.
262. AG    532.   0.5   0.0 32.0
      58. Landon Rd SB Dep2   *   6541.7   10309.6    6323.0   10377.3 *     229.
287. AG    532.   0.5   0.0 32.0
      59. Landon Rd SB Dep3   *   6323.0   10377.3    6038.2   10533.6 *     325.
299. AG    532.   0.5   0.0 32.0
      60. Landon Rd WB App1   *   7015.2   10776.7    6976.2   10530.6 *     249.
189. AG    450.   0.5   0.0 44.0
      61. Landon Rd WB App2   *   6976.2   10530.6    6991.8   10376.9 *     154.
174. AG    450.   2.2   0.0 44.0
      62. Landon Rd WB Dep1   *   6991.8   10376.9    7187.5    9757.6 *     650.
162. AG   2324.   0.5   0.0 32.0
      63. Landon Rd WB Dep2   *   7187.5    9757.6    7199.7    9426.0 *     332.
178. AG   2324.   0.5   0.0 32.0
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DATE : 9/ 3/20
TIME : 18:57:24

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	*	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE

RECEPTOR LOCATIONS

	*	COORDINATES (FT)	*

RECEPTOR	X	Y	Z
1. 1	7079.5	9932.8	6.0
2. 2	7432.8	10318.0	6.0
3. 3	7052.3	10262.9	6.0
4. 4	7033.9	10414.2	6.0
5. 5	7409.9	10460.1	6.0
6. 6	7918.8	10519.7	6.0
7. 7	7620.8	10318.0	6.0
8. 8	7905.1	10414.2	6.0
9. 9	7446.6	10767.3	6.0
10. 10	7932.6	10927.8	6.0
11. 11	7973.9	11134.1	6.0
12. 12	7680.4	11290.0	6.0
13. 13	7707.9	11505.5	6.0
14. 14	7487.8	11271.7	6.0
15. 15	7254.0	11088.3	6.0
16. 16	7423.6	11019.5	6.0
17. 17	7574.9	10982.8	6.0
18. 18	7538.3	10492.2	6.0
19. 19	3978.4	12456.3	6.0
20. 20	4006.9	12323.0	6.0
21. 21	4325.8	12446.8	6.0
22. 22	4330.5	12708.5	6.0
23. 23	4011.7	12903.6	6.0
24. 24	3811.8	12456.3	6.0
25. 25	3840.3	12151.7	6.0
26. 26	3564.3	12370.6	6.0
27. 27	3745.2	12798.9	6.0
28. 28	3507.2	12694.2	6.0
29. 29	4021.2	12703.7	6.0
30. 30	1272.4	12690.7	6.0
31. 31	1294.2	12856.6	6.0
32. 32	1573.5	12690.7	6.0
33. 33	1193.8	12476.8	6.0
34. 34	1176.3	12132.1	6.0
35. 35	1010.5	12420.1	6.0
36. 36	1010.5	12171.3	6.0
37. 37	783.5	12402.6	6.0
38. 38	1019.2	12699.4	6.0
39. 39	1067.2	13000.6	6.0
40. 40	718.1	12642.7	6.0
41. 41	1420.8	12468.1	6.0

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-350.

WIND ANGLE (DEGR)	* CONCENTRATION (PPM)											
	* REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12
REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20					
0.	* 0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0					
10.	* 0.2	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.1	0.0	0.0					
20.	* 0.2	0.1	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.1	0.0	0.0					
30.	* 0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.1	0.0	0.0					
40.	* 0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0					
50.	* 0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0					
60.	* 0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0
0.0	0.0	0.1	0.2	0.3	0.0	0.1	0.0					
70.	* 0.1	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0
0.0	0.0	0.1	0.3	0.4	0.0	0.1	0.0					
80.	* 0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
0.0	0.0	0.1	0.3	0.3	0.0	0.0	0.0					
90.	* 0.1	0.0	0.0	0.4	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
0.0	0.0	0.2	0.3	0.2	0.0	0.0	0.0					
100.	* 0.1	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0
0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0					
110.	* 0.1	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0
0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0					
120.	* 0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0					
130.	* 0.2	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0
0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0					
140.	* 0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0					
150.	* 0.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1

```
0.0   0.3   0.0   0.0   0.0   0.0   0.0   0.0
 160.  *   0.1   0.0   0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0
 170.  *   0.0   0.0   0.1   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0
 180.  *   0.0   0.0   0.3   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0
 190.  *   0.0   0.0   0.2   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 200.  *   0.0   0.0   0.1   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1
0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 210.  *   0.0   0.0   0.1   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 220.  *   0.0   0.0   0.1   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.3   0.1
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 230.  *   0.0   0.0   0.1   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.3   0.0
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 240.  *   0.0   0.0   0.1   0.4   0.0   0.0   0.0   0.0   0.0   0.0   0.3   0.1
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 250.  *   0.0   0.0   0.1   0.3   0.2   0.0   0.0   0.0   0.0   0.0   0.3   0.1
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
 260.  *   0.0   0.0   0.1   0.3   0.2   0.0   0.0   0.0   0.0   0.0   0.3   0.1
0.0   0.1   0.0   0.0   0.0   0.1   0.0   0.0
 270.  *   0.0   0.0   0.1   0.0   0.2   0.0   0.0   0.0   0.0   0.1   0.2   0.0
0.0   0.1   0.0   0.0   0.0   0.0   0.1   0.0
 280.  *   0.0   0.0   0.1   0.0   0.3   0.0   0.0   0.0   0.0   0.2   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.0
 290.  *   0.0   0.1   0.1   0.0   0.2   0.0   0.0   0.0   0.0   0.4   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.3   0.1
 300.  *   0.0   0.1   0.1   0.0   0.1   0.0   0.0   0.0   0.0   0.5   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.4   0.1
 310.  *   0.0   0.0   0.1   0.0   0.1   0.0   0.0   0.0   0.0   0.4   0.0   0.0
0.0   0.0   0.0   0.0   0.2   0.0   0.3   0.2
 320.  *   0.0   0.0   0.1   0.0   0.1   0.0   0.1   0.0   0.0   0.4   0.0   0.0
0.0   0.0   0.0   0.0   0.3   0.0   0.2   0.1
 330.  *   0.0   0.0   0.1   0.0   0.0   0.1   0.0   0.0   0.0   0.4   0.0   0.0
0.0   0.0   0.0   0.1   0.3   0.0   0.2   0.1
 340.  *   0.1   0.0   0.1   0.0   0.0   0.1   0.0   0.1   0.0   0.2   0.0   0.0
0.0   0.0   0.1   0.1   0.4   0.0   0.1   0.1
 350.  *   0.1   0.0   0.1   0.0   0.0   0.1   0.0   0.1   0.0   0.2   0.0   0.0
0.0   0.0   0.1   0.1   0.3   0.0   0.1   0.0

------*-------------------------------------------------------------------------
-----------------------------------------
 MAX   *   0.2   0.1   0.3   0.4   0.3   0.1   0.1   0.1   0.1   0.5   0.3   0.1
0.1   0.3   0.2   0.3   0.4   0.1   0.4   0.2
 DEGR. *    0    20   180    80   280   330     0   340    10   300   220   140
160   130    90    70    70    10   300   310
```

JOB: Gulf Port Grant Air Quality 2045 Build P RUN: 10 Degree Increments

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-350.

WIND ANGLE (DEGR)	*	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33	REC34	REC35	REC36	REC37	REC38	REC39	REC40
0.	*	0.0	0.0	0.0	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.1	0.0	0.0	0.0
10.	*	0.0	0.0	0.0	0.3	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0
20.	*	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
30.	*	0.0	0.0	0.0	0.3	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
40.	*	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.0	0.0	0.0
50.	*	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.0	0.1	0.0	0.0	0.0
60.	*	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0
70.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.0	0.1	0.0	0.0	0.0
80.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
90.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
100.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
110.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2
120.	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.2

```
0.0   0.0   0.0   0.0   0.0   0.2   0.0   0.2
 130.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.4   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.2   0.0   0.1
 140.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.1
 150.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.1
 160.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.1
 170.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.1
 180.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1
 190.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1
 200.  *   0.0   0.0   0.1   0.0   0.0   0.0   0.2   0.3   0.0   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1
 210.  *   0.0   0.0   0.1   0.0   0.0   0.0   0.2   0.3   0.1   0.2   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1
 220.  *   0.0   0.0   0.1   0.0   0.0   0.0   0.2   0.3   0.1   0.1   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.2   0.0   0.1
 230.  *   0.0   0.0   0.1   0.0   0.0   0.0   0.2   0.3   0.2   0.2   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.2   0.0   0.1
 240.  *   0.0   0.0   0.1   0.0   0.0   0.0   0.1   0.2   0.3   0.2   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.1
 250.  *   0.0   0.1   0.1   0.0   0.0   0.0   0.1   0.2   0.3   0.2   0.0   0.2
0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.0
 260.  *   0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
 270.  *   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.0   0.1
0.1   0.0   0.1   0.0   0.0   0.0   0.0   0.0
 280.  *   0.1   0.0   0.0   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.0   0.1   0.0   0.2   0.0   0.0   0.0
 290.  *   0.1   0.0   0.0   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.0   0.1   0.0   0.1   0.0   0.0   0.0
 300.  *   0.1   0.0   0.0   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.0   0.1   0.0   0.1   0.0   0.0   0.0
 310.  *   0.0   0.0   0.0   0.4   0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0
 320.  *   0.0   0.0   0.0   0.3   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0
 330.  *   0.0   0.0   0.0   0.3   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0
 340.  *   0.0   0.0   0.0   0.3   0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0
 350.  *   0.0   0.0   0.0   0.3   0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0
0.3   0.0   0.1   0.1   0.1   0.0   0.0   0.0
```

```
------*-----------------------------------------------------------------------
-----------------------------------------
 MAX   *   0.1   0.1   0.1   0.4   0.1   0.2   0.2   0.4   0.3   0.2   0.1   0.2
0.3   0.1   0.2   0.1   0.2   0.2   0.1   0.2
 DEGR. *  270   250   200   310     0     0   150   120   240   210   210   250
0   310    50     0    40   110   180   110
```


JOB: Gulf Port Grant Air Quality 2045 Build P RUN: 10 Degree Increments

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-350.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC41
0.	0.1
10.	0.1
20.	0.1
30.	0.1
40.	0.1
50.	0.1
60.	0.1
70.	0.1
80.	0.1
90.	0.0
100.	0.0
110.	0.0
120.	0.0
130.	0.0
140.	0.0
150.	0.0
160.	0.0
170.	0.0
180.	0.0
190.	0.0
200.	0.0
210.	0.0

```
220.  *   0.0
230.  *   0.0
240.  *   0.0
250.  *   0.0
260.  *   0.0
270.  *   0.1
280.  *   0.2
290.  *   0.2
300.  *   0.2
310.  *   0.1
320.  *   0.1
330.  *   0.1
340.  *   0.1
350.  *   0.1
------*------
MAX   *   0.2
DEGR. *  280
```

THE HIGHEST CONCENTRATION OF   0.50 PPM OCCURRED AT RECEPTOR REC10.