The Gateway Cities
Air Quality Action Plan

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September 2011

I-710 Construction Phasing and Staging Emissions

Technical and Advisory Roundtables

September 14 & 15, 2011

This AQAP study is not part of the I-710 Corridor Project studies, but upon completion, it will be submitted to Caltrans for review and consideration for use in preparing the I-710 Corridor Project EIR/EIS.

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Objectives

Estimate emissions for a reasonable foreseeable concept of construction staging and phasing of the I-710 corridor improvements (2018 – 2034)

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Key Assumptions

- Criteria and MSAT air pollutants
- Alternative 6 – 4 freight corridor and 10 general purpose lanes were evaluated.
- Daily and monthly emissions at location of activity
- GHG (on-site and tailpipe only – not life cycle)
- Construction fleet changes every year
- Freight corridor is constructed first

Key Assumptions cont.

- Freight corridor built first – funding available as one project
  - Start north and south segment at same time
- Average of 20 working days per month
- Construction phases are sequential within segment
- Construction schedule follows late finish
- LACMTA “Green” Construction Policy not included in analysis
- No onsite concrete or asphalt batch plants

Approach

1. Use construction data from GCCOG Construction Staging/Phasing concept report for each segment
   a. Area disturbed, project length and/or area, project duration, soil hauling, acres disturbed per day,
   b. duration of each stage and phase within segment
2. Input construction data into the enhanced Roadway Construction Emissions Model
3. Output daily emissions on a month by month basis for each of seven construction phases

Approach cont.

4. Develop monthly emissions for each segment
5. Sum daily and monthly emissions across all segments over entire project time frame (2018-2034)
6. Also report peak daily emissions for each segment (2018-2034)

Methodology: Overview

- Based on GCCOGs concept report (April 2011) for information on:
  - Location (segment) and duration (phases) of construction activity
  - Type of construction activity (%roadways, %bridge)
- Enhanced version of Roadway Construction Emissions Model (originally developed for Sacramento AQMD)
  - OFFROAD emission factors extended to 2035
  - Now includes mobile source air toxic and all GHG's
  - For EMFAC, uses South Coast air basin fleet

Methodology: Overview

- On-road Activity (e.g., watering trucks)
  - CARB EMFAC2007 model – South Coast Air Basin
- Off-road Activity
  - Current CARB OFFROAD2007 - statewide fleet
  - Update with new CARB model (August 2011)
    - Equipment population post recession and growth
    - Updated average load factors by equipment type
- MSAT speciated from VOC and PM via CARB speciation database

Methodology: Modifications to Inputs

Activity Data provided by GCCOG

- Data Organization
  - Segment→ Subsegment → Multiple stages and Multiple phases
  - Model timeline and location provided on a stage/phase level
- Bridge and Roadway Data
  - Data combined both bridge and roadway construction data on Sub-Segment level

Methodology: Roadway Construction Emission Model Output

- Four outputs are given in mass per day.
  - By type of construction activity
    - Grubbing/land clearing
    - Grading/excavation
    - Drainage/utilities/sub-grade
    - Paving
- Since inputs are by sub-segment, outputs from model apply to the entire sub-segment
  - Daily emissions applied to the stage-phases within each sub-segment.

Methodology: RCEM Output (continued)

Allocation of emission factors by construction phase

SEGMENT 2										
Year	2018									
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Stage 1 Phase 1										
Construction Phase	GLC	GEX	GEX	DUS	DUS	DUS	Pav	Pav	Pav	
ROG (lbs/month)	8.5	10.5	10.5	11.5	11.5	11.5	9	9	9	
NOX (lbs/month)	2.5	2.5	2.5	3	3	3	2	2	2	
Stage 2 Phase 1										
Construction Phase						GEX	DUS	DUS	Pav	Pav
ROG (lbs/month)						10.5	11.5	11.5	9	9
NOX (lbs/month)						2.5	3	3	2	2
TOTAL										
ROG (lbs/month)	8.5	10.5	10.5	11.5	11.5	22	20.5	20.5	18	9
NOX (lbs/month)	2.5	2.5	2.5	3	3	5.5	5	5	4	2

GLC = Grubbing/Land Clearing
GEX = Grading/ Excavation
DUS = Drainage/Utilities/Sub-Grade
Pav = Paving

Methodology: Roadway Construction Emission Model Output (continued)

- Apply either bridge or roadway daily emission factors to individual stage-phases.
- Allocation of daily emission factors to construction schedule
- Daily emissions are multiplied by 20 for monthly emissions

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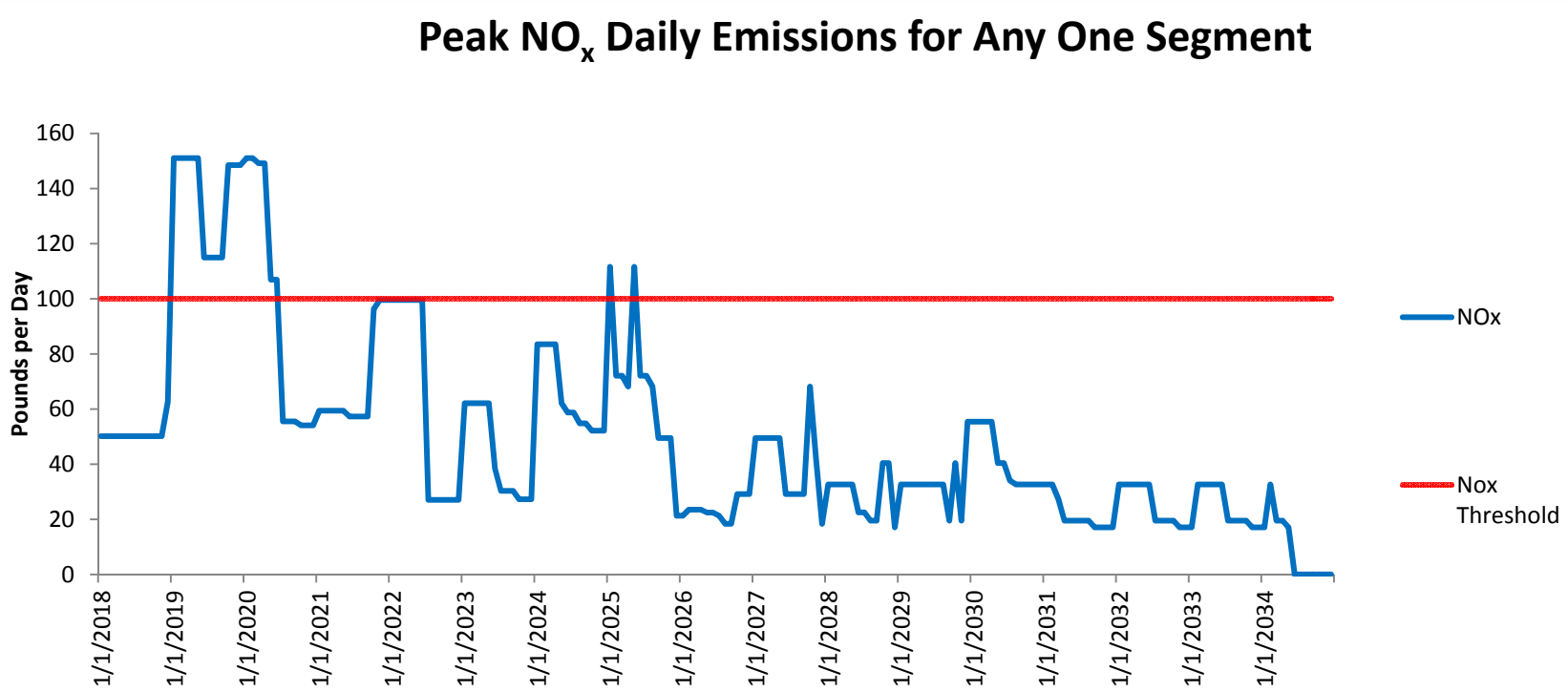
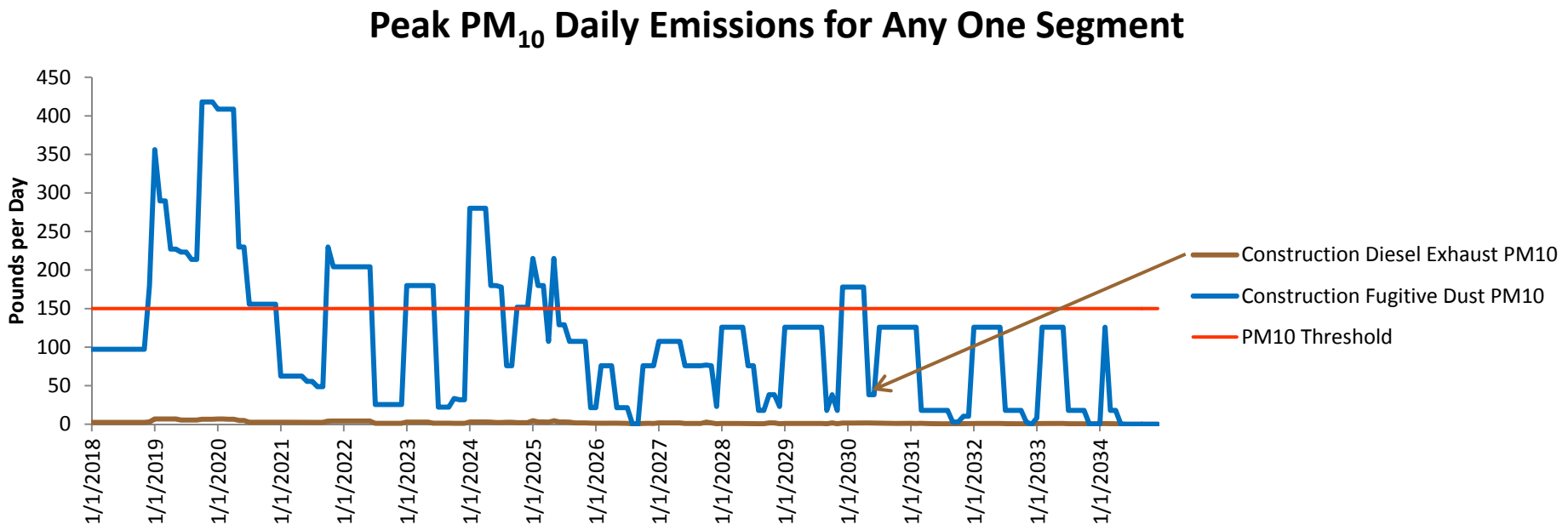
Preliminary Findings

Peak NO_x Emissions (lbs/day)



Preliminary Findings cont.

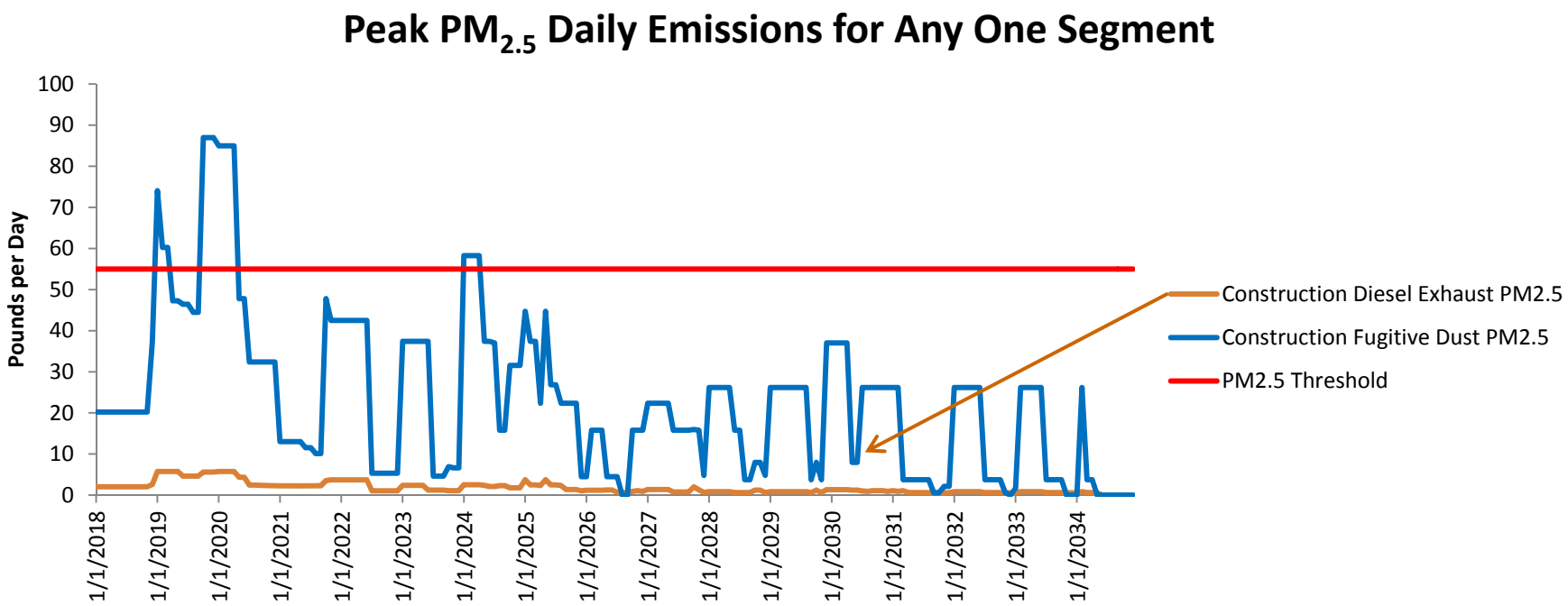
Peak PM_{10} Emissions (lbs/day)



Most PM_{10} generated from construction fugitive dust

Preliminary Findings cont.

Peak $PM_{2.5}$ Emissions (lbs/day)



Most $PM_{2.5}$ generated from construction fugitive dust

Preliminary Findings cont.

- As shown in previous slides, $PM_{2.5}$ and PM_{10} from diesel emissions (associated with construction equipment exhaust) do not exceed the AQMD thresholds of significance.

- Exceedances are generated primarily by fugitive dust from construction activities.

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Preliminary Findings cont.

Segment	Total Months of Construction (per Segment)	Total Months the Emissions Threshold is Exceeded				
		CO	ROG	NOx	PM10	PM2.5
1	123	none	none	none	none	none
2	108	none	none	none	none	none
3	131	none	none	none	**13**	none
4	108	none	none	14	**11**	none
5	118	none	none	none	**15**	none
6	132	none	none	18	**24**	**10**
7	60	none	none	none	none	none

Note: Bold values indicate exceedances are due primarily from fugitive dust

Conclusions

NO_x, PM_{10} and $PM_{2.5}$

- Only segments 3-7 show exceedance of significance threshold, but only 10-20% of the construction period
- Analysis is developed for each segment and changes at the local scale (geometry, interchanges) will not impact the emission findings

Robust analysis is useful for air quality modeling

- Detailed info for specific times and locations

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Next Steps

- Updating now with revised CARB OFFROAD model information
  - Update to equipment population and load factors
- Health risk of the toxics addressed in HRA

Recommendations

Emission reductions for PM_{10} and $PM_{2.5}$ fugitive dust

- Smaller disturbance areas
- More frequent water (> 50% efficiency)
- Possible use of surfactants

Emission reductions for NO_x

- Detailed info for specific times and locations
- Newer equipment (lower emitting) 2019-2020 for segment 4 & 6
- Modify construction duration to manage emissions