THE TIOGA GROUP

INLAND PORT FEASIBILITY STUDY
RFP 06-023

The Tioga Group, Inc.
Railroad Industries, Inc.
Meyer, Mohaddes Associates

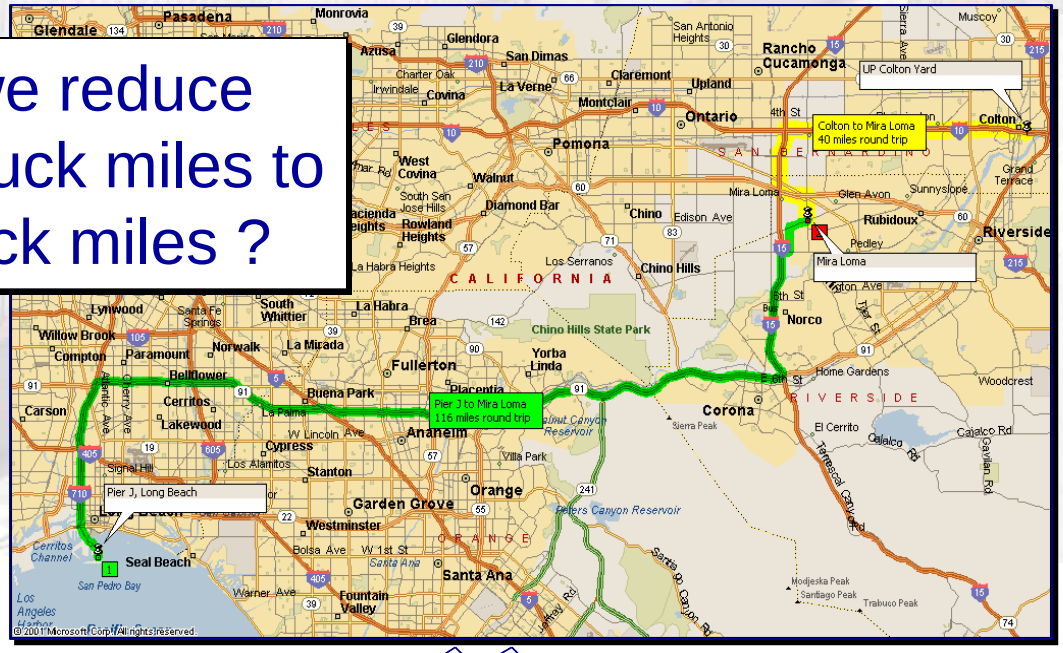
Presentation to the

SOUTHERN CALIFORNIA ASSOCIATION of GOVERNMENTS

Project Objectives

- **Determine the purpose and benefits of an Inland Port and the various functions it might include**
- **Identify the potential utility of an Inland Port to users and stakeholders in the goods movement system**
- **Identify the potential freight traffic congestion relief**

Can we reduce 116 truck miles to 40 truck miles ?



Study Team Expertise and Clients

The Tioga Group -- Intermodal Operations, Logistics, and Economics

Rail Intermodal	Marine	Trucking & Logistics	Policy
BNSF Railway Canadian National Railway CSX Intermodal Maglev, Inc. Mass Central Railroad Amtrak Intermodal Assn of NA	Maersk-Sealand Port of Los Angeles Port of Long Beach Port of Oakland Port of Seattle Port of Tacoma Port of NYNJ	Burlington Motor Carriers Interstate Consolidation National Highway Institute CenterPoint Properties Majestic Realty Riverside County City of San Bernardino	SCAG MTA SF MTC Indiana DOT NY City EDC SANBAG SJCOG

Railroad Industries, Inc. -- Rail Costing, Operations, and Capacity

Railroad Costing	Railroad Operations	Railroad Capacity
BNSF Railway Port of Oakland Amtrak Canadian National Proctor & Gamble	Port of Long Beach Port of Tacoma Rail Port of Los Angeles *Alameda Corridor* *Rail Operations Command Center*	Montana DOT San Joaquin COG Washington State DOT Sierra Northern Railroad Santa Clara Valley Transit

Meyer, Mohaddes Assoc. -- Traffic Impacts, Planning, and Site Analysis

Traffic Impacts	Planning	Site Analysis
Alameda Corridor East SCAG FHWA San Bernardino County Gateway Cities COG	BNSF Railway Ontario Airport OCTA Port of Long Beach Port of Los Angeles	Gateway Cities Cog ACTA SJVAG Riverside County IVAG

Task Structure and Approach

- Task 1: Define the concept and purpose of an Inland Port facility
- Task 2: Describe existing Inland Port concepts in the SCAG region
- Task 3: Conduct interviews and surveys to determine feasibility and demand
- Task 4: Estimate the costs and benefits of the proposed Inland Port concepts
- Task 5: Final Report - Evaluate the feasibility of alternative Inland Port sites

Task 1 & 2 - Purpose & Concepts		Task 3 - Interviews, Stakeholders, Data Collection			Task 4 - Analysis		Task 5 - Sites & Evaluation			
Function	Purpose & Benefits	Operational Feasibility	Commercial & Economic Feasibility	Institutional Feasibility	Cost - Benefit Analysis	Cost - Effectiveness Analysis	Site Selection	Community & Environmental Feasibility	Performance Measures	Concept Evaluation
Inland Port										
Container Depot										
Empty Reuse Staging										
Air cargo consolidation										
Marine/Domestic Transloading										
Rail/Truck Transloading										
Foreign Trade Zone										
LCV Staging										
Truck Parking										
Agile Port Container Sort										
Other _____										
Other _____										

FY 05-06						FY 06-07											
January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
Task 1 - Concept						*											
Task 2 - Existing/Planned						*											
Task 3 - Concept				Task 3 Feasibility							Task 3 - Feedback					*	
						Task 4 - Cost/Benefit Analysis								*			
* Deliverables									Task 5 - Sites & Evaluation								*

Inland Port Concept & Primary Purpose

LOCAL TRUCKING

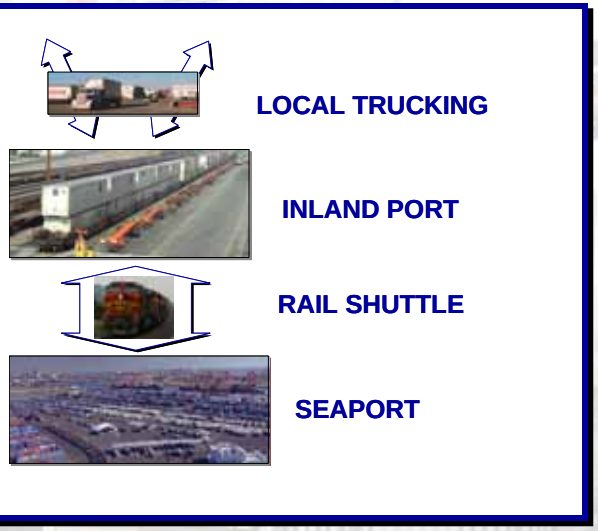
INLAND PORT

RAIL SHUTTLE

SEAPORT

Inland Port Concept & Purpose

Primary Purpose



Additional Functions

- Container depot & empty reuse?
- Air cargo consolidation?
- Transloading & FTZ?
- LCV staging or truck parking?
- Agile port container sorting?

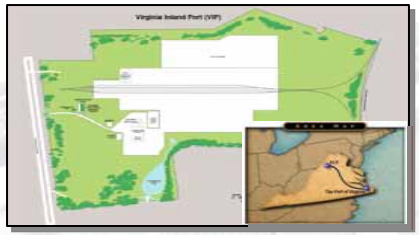
Which functions are desirable?

Which functions are feasible?

Which functions are cost–beneficial?

Inland Port Concepts - Examples

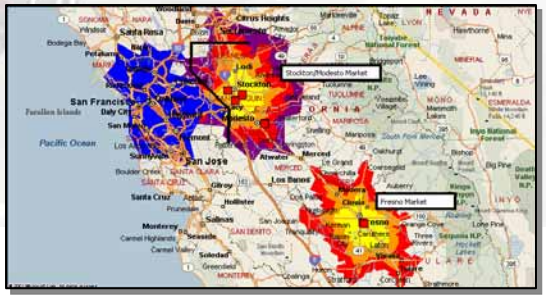
- **Virginia Inland Port is 220 miles west of the seaport and handles containers if it were an actual marine terminal.**



- **Shippers Express Container Yard stages empty & loaded marine containers for San Pedro Bay ports.**

- **Alliance Texas Logistics Park is a 15,000 acre industrial park with air, rail, and truck service.**

- **The California Inter-Regional Intermodal System, now in implementation planning, would connect the Port of Oakland with Central Valley Markets.**



Operational, Commercial, and Economic Feasibility

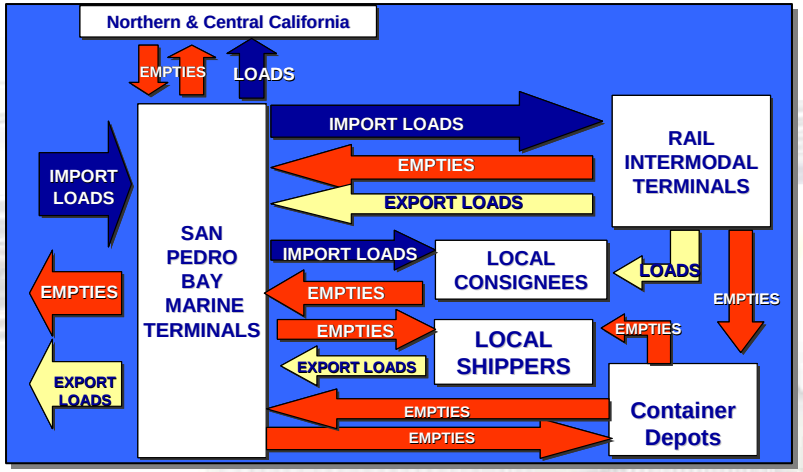
Operational feasibility – will it work?

- Establish customer service requirements
- Determine functional compatibility of Inland Port concepts
- Investigate physical connectivity, capacity, and VCY potential
- Analyze truck, rail, and terminal operating options

Commercial & economic feasibility – will they use it?

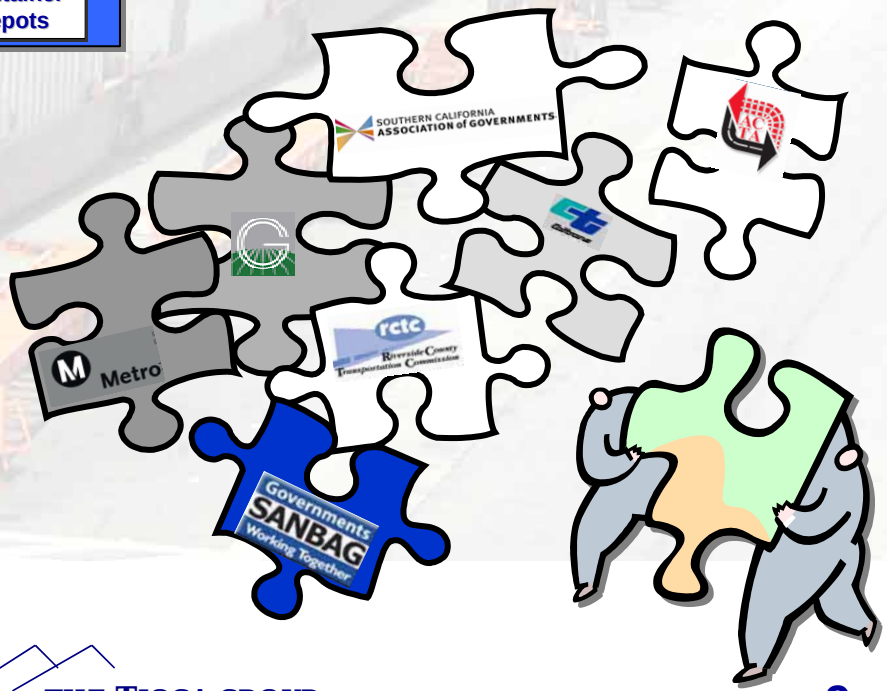
- Establish customer rate expectations
- Determine market access and potential cargo volumes
- Analyze impact of PierPass and fuel cost increases
- Match potential freight volumes with operating scenarios and alternative Inland Port concepts

Institutional Feasibility – It Has to Fit



- **An Inland Port <u>facility</u> must function as part of a complex container logistics system.**

- **An Inland Port <u>strategy</u> must function as part of a complex public transportation planning system.**



Cost/Benefit and Cost/Effectiveness Analysis

The study team will conduct both cost/benefit analysis and cost/effectiveness analysis to:

- ***Rank Inland Port alternatives***
- ***Facilitate comparison with other goods movement strategies***

Costs	Benefits
• Capital costs	• Net truck VMT reduction
• Operating costs	• Emissions reduction
• Community/environmental costs	• Traffic peaking/timing
• Short-term vs. long-term costs	• Highway capacity
• Scale economics	• Port capacity
• Mitigation costs	• Economic development
• Subsidy costs	• Regional competitiveness
	• Land use

Cost & Benefit Approaches

Tioga Intermodal Terminal & Intermodal Drayage Cost Models

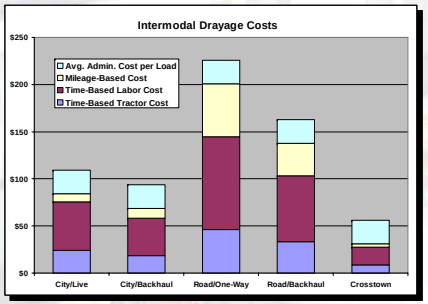
Port of Oakland JIT Landside Labor Cost Model

Inputs

	Input	Default
Labor - $/hr		(read only)
Driver Wage Rate	$ 18.66	$ 18.66
Clerical Wage Rate	$ 18.66	$ 18.66
Foreman Wage rate	$ 18.66	$ 18.66
Fringes	$ 9.33	$ 9.33
Capital		
Startup/Phase 1 Capital	$ 21,000,000	$ 21,000,000
Phase 2 Capital	$ 41,000,000	$ 41,000,000
Port Interest Rate	6.20%	6.20%
Port Debt Coverage	60%	60%
Contractor's Cost of Capital	12.00%	12.00%
Land		
Startup/Phase 1 Acres	60	60
Phase 2 Acres	150	150
Land Value ($/sq. ft)	$ 11.00	$ 11.00
Return on Land	0%	0%
Operations		
Fuel Cost per Gallon	$ 1.23	$ 1.23

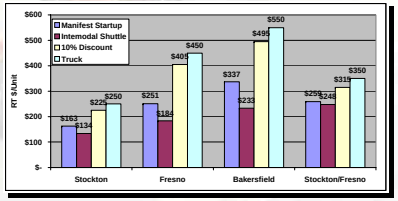
Outputs

	Start-Up	Phase 1	Phase 2
Annual Lifts	29,314	93,541	216,364
Cost Per Lift			
Port Costs			
Terminal Capital Costs	$ 75.04	$ 23.52	$ 19.85
Land Costs	$ -	$ -	$ -
Terminal Overhead	$ 3.83	$ 2.44	$ 1.59
Terminal Maintenance	$ 0.50	$ 0.50	$ 0.50
Port Subtotal	$ 79.37	$ 26.45	$ 21.94
Contractor's Costs	$ -	$ -	$ -
Lift Cost	$ 36.83	$ 23.93	$ 22.63
Gate Cost	$ 11.58	$ 8.82	$ 8.89
Contractor Subtotal	$ 48.41	$ 32.74	$ 31.51
JIT Operations Cost	$ 127.78	$ 59.20	$ 53.46
(Port + Contractor)	$ -	$ -	$ -
Railroad Costs	$ -	$ -	$ -
Switching Cost	$ 16.73	$ 7.89	$ 3.41
Railroad Subtotal	$ 16.73	$ 7.89	$ 3.41
Total Cost per Lift	$ 144.52	$ 67.08	$ 56.86

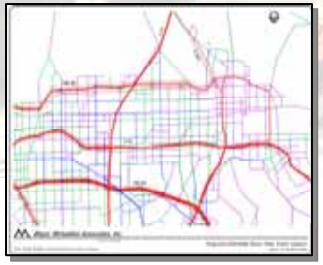


Railroad Industries Rail Costing Models

Daily Containers	******* Manifest Trains ******** Linehaul & Locomotive	Flat Cars (a)	Total	******Class I Shuttle ******** Linehaul & Locomotive	Flat Cars	Total	********** San Joaquin Shuttle ********** Linehaul	Flat Cars	Locomotive	Total
10	$ 251	n/a	$ 251	$ 2,054	$ 26	$ 2,080	$ 1,946	$ 26	$ 120	$ 2,092
20	$ 251	n/a	$ 251	$ 1,075	$ 26	$ 1,101	$ 1,021	$ 26	$ 90	$ 1,137
50	$ 233	n/a	$ 233	$ 493	$ 26	$ 519	$ 442	$ 26	$ 36	$ 504
100	$ 228	n/a	$ 228	$ 274	$ 26	$ 300	$ 220	$ 26	$ 18	$ 264



Meyer Mohaddes/SCAG HDT Model & Emissions Models



I-710 Scenario & Emissions Type	2000 Annual Tons	2000 Peak Day Tons	2010 Annual Tons	2010 Peak Day Tons	2015 Annual Tons	2015 Peak Day Tons	2020 Annual Tons	2020 Peak Day Tons
Base Case								
Carbon Monoxide	333	1.43	620	2.67	895	3.85	1,322	5.69
Total Organic Gases	76	0.33	141	0.61	204	0.88	301	1.30
Reactive Organic Gases	74	0.32	138	0.59	199	0.86	294	1.27
Oxides of Nitrogen	281	1.21	524	2.26	757	3.26	1,119	4.82
Exhaust Particulates	59	0.11	59	0.21	79	0.30	104	0.45
Tier I - 5% Reuse								
Carbon Monoxide	321	1.38	599	2.58	865	3.72	1,276	5.50
Reduction	11	0.05	21	0.09	31	0.13	46	0.20
Total Organic Gases	73	0.32	136	0.58	197	0.85	291	1.25
Reduction	3	0.01	5	0.02	7	0.03	10	0.05
Reactive Organic Gases	71	0.31	133	0.57	192	0.83	284	1.22
Reduction	3	0.01	5	0.02	7	0.03	10	0.04
Oxides of Nitrogen	272	1.17	507	2.18	731	3.15	1,080	4.65
Reduction	10	0.04	18	0.08	26	0.11	39	0.17
Exhaust Particulates	25	0.11	47	0.20	68	0.29	100	0.43
Reduction	1	0.00	2	0.01	2	0.01	4	0.02
Tier II - 10% Reuse								
Carbon Monoxide	302	1.30	564	2.43	813	3.50	1,200	5.17
Reduction	30	0.13	56	0.24	82	0.35	123	0.53
Total Organic Gases	69	0.30	129	0.55	185	0.80	273	1.18
Reduction	7	0.03	13	0.05	19	0.08	28	0.12
Reactive Organic Gases	67	0.29	126	0.54	181	0.78	267	1.15
Reduction	7	0.03	13	0.05	18	0.08	27	0.12
Oxides of Nitrogen	256	1.10	477	2.05	688	2.96	1,015	4.37
Reduction	26	0.11	47	0.20	69	0.30	104	0.45
Exhaust Particulates	24	0.10	44	0.19	64	0.27	94	0.41
Reduction	2	0.01	4	0.02	6	0.03	10	0.04

Tioga Intermodal Terminal Cost Model

PORT OF OAKLAND

Port of Oakland JIT Landside Labor Cost Model

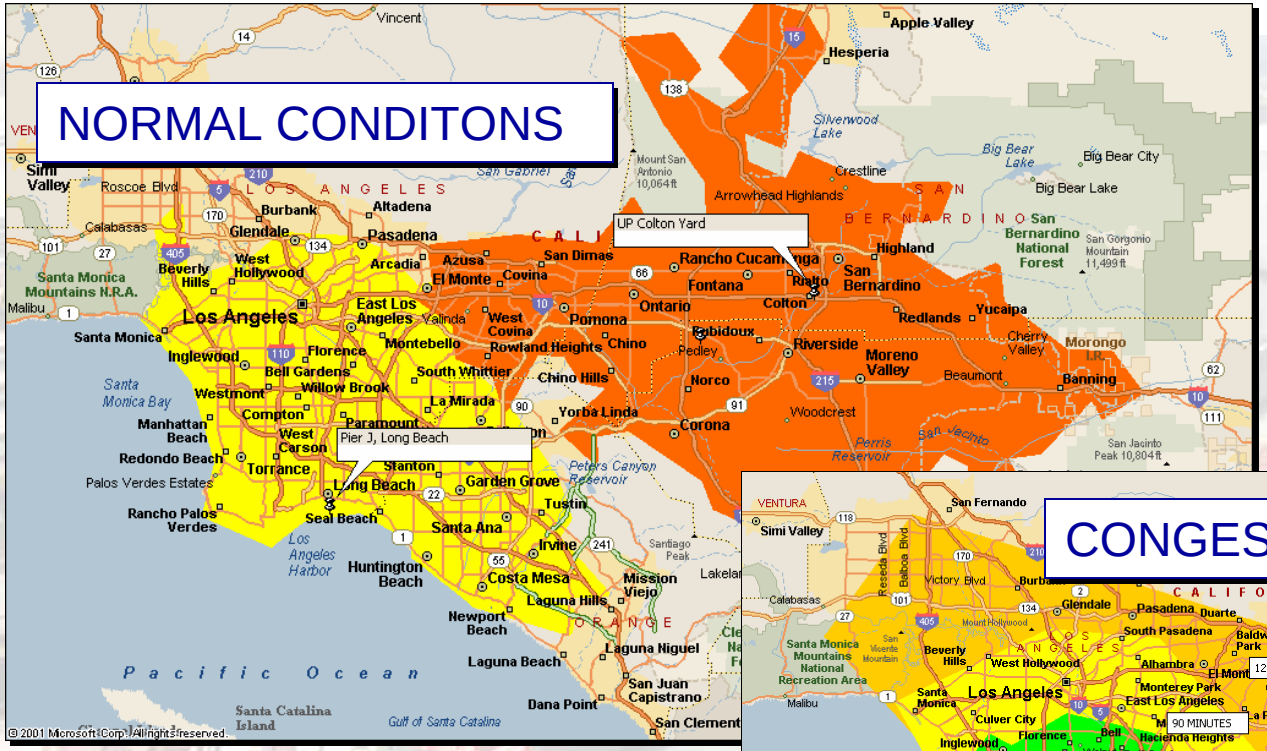
Inputs

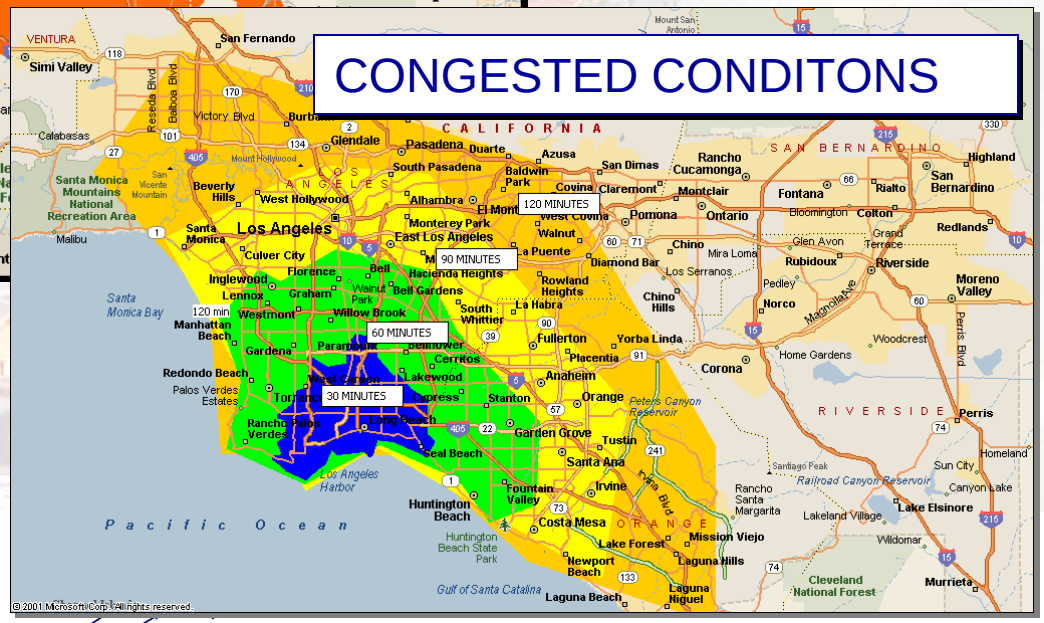
	Input	Default
Labor - $/hr		**(read only)**
Driver Wage Rate	$ 18.66	**$ 18.66**
Clerical Wage Rate	$ 18.66	**$ 18.66**
Foreman Wage rate	$ 18.66	**$ 18.66**
Fringes	$ 9.33	**$ 9.33**
Capital		
Startup/Phase 1 Capital	$ 21,000,000	**$ 21,000,000**
Phase 2 Capital	$ 41,000,000	**$ 41,000,000**
Port Interest Rate	6.20%	**6.20%**
Port Debt Coverage	60%	**60%**
Contractor's Cost of Capital	12.00%	**12.00%**
Land		
Startup/Phase 1 Acres	60	**60**
Phase 2 Acres	150	**150**
Land Value ($/sq. ft)	$ 11.00	**$ 11.00**
Return on Land	**0%**	**0%**
Operations		
Fuel Cost per Gallon	$ 3.00	**$ 1.23**

Outputs

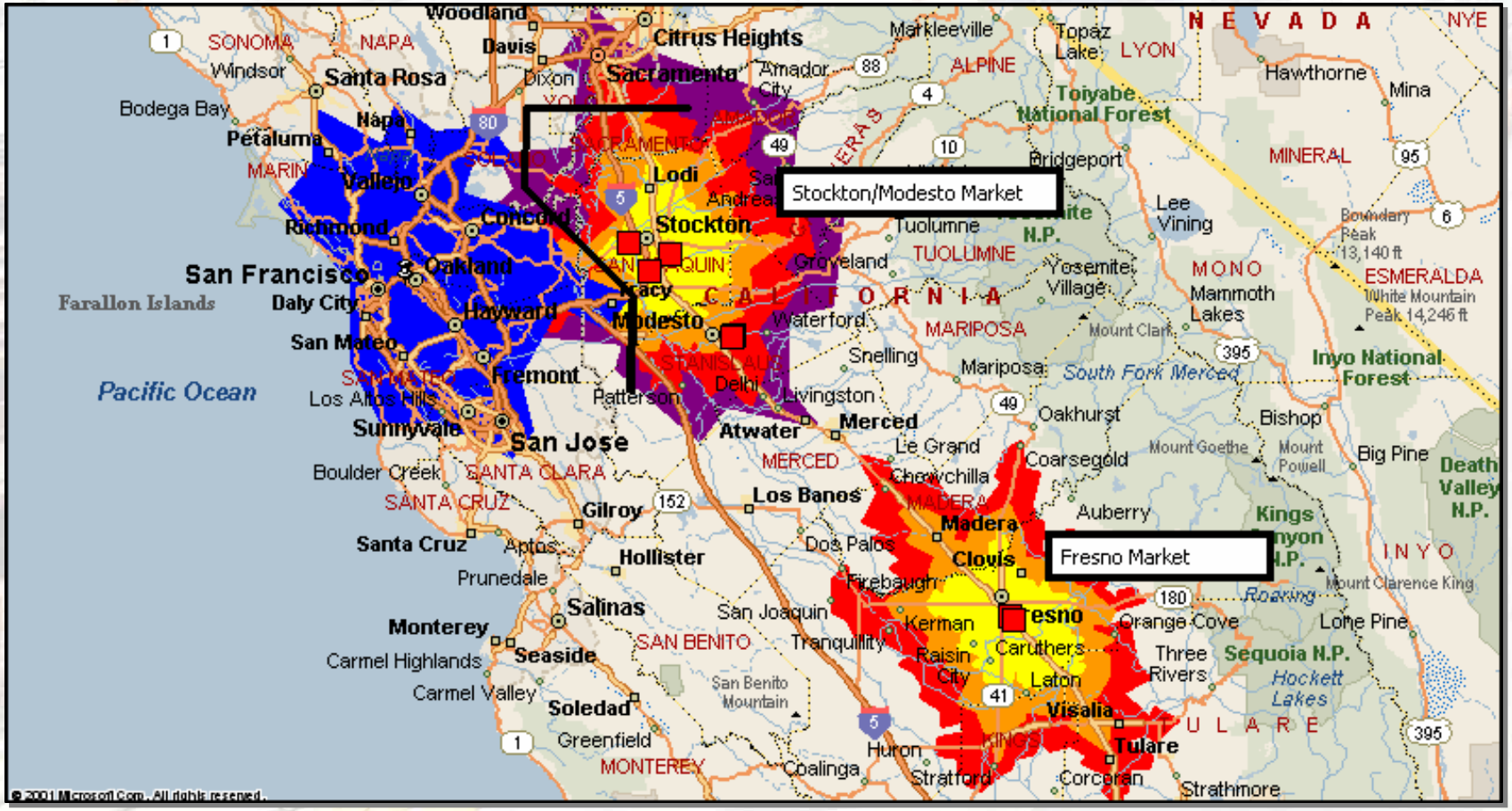
	Start-Up	Phase 1	Phase 2
Annual Lifts	**29,314**	**93,541**	**216,364**
Cost Per Lift			
Port Costs			
Terminal Capital Costs	$ 75.04	$ 23.52	$ 19.85
Land Costs	$ -	$ -	$ -
Terminal Overhead	$ 3.83	$ 2.44	$ 1.59
Terminal Maintenance	$ 0.50	$ 0.50	$ 0.50
Port Subtotal	**$ 79.37**	**$ 26.45**	**$ 21.94**
Contractor's Costs	$ -	$ -	$ -
Lift Cost	$ 38.40	$ 25.42	$ 24.33
Gate Cost	$ 11.58	$ 8.82	$ 8.89
Contractor Subtotal	**$ 49.98**	**$ 34.24**	**$ 33.21**
JIT Operations Cost	**$ 129.36**	**$ 60.69**	**$ 55.16**
(Port + Contractor)	$ -	$ -	$ -
Railroad Costs	$ -	$ -	$ -
Switching Cost	$ 19.38	$ 9.19	$ 3.97
Railroad Subtotal	**$ 19.38**	**$ 9.19**	**$ 3.97**
Total Cost per Lift	**$ 148.74**	**$ 69.88**	**$ 59.13**

Drayage Reach and Market Access



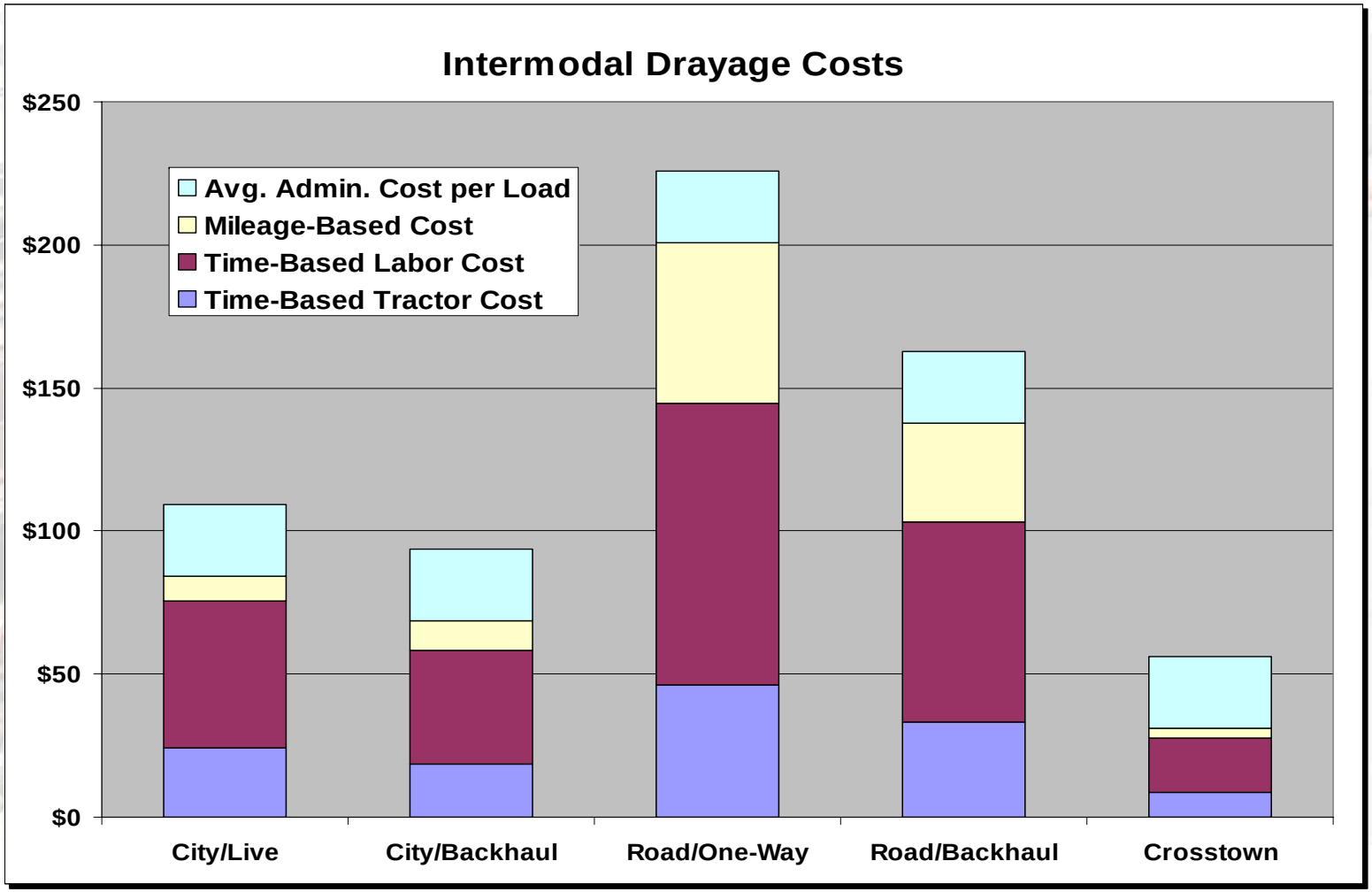


CIRIS Project



RETURN

Tioga Intermodal Drayage Cost Model



Railroad Industries Rail Costing Models

Rail Operations from Fresno, California to Port of Oakland, includes stop at Lathrop/Stockton

UP Round Trip Costs per Container (via Altamont Pass)

Daily Containers	******* Manifest Trains ********			******Class I Shuttle ********			********** San Joaquin Shuttle **********			
	Linehaul & Locomotive	Rail Cars (a)	Total	Linehaul & Locomotive	Rail Cars	Total	Linehaul	Rail Cars	Locomotive	Total
10	$ 280	n/a	$ 280	$ 1,309	$ 12	$ 1,321	$ 1,261	$ 12	$ 30	$ 1,303
20	$ 279	n/a	$ 279	$ 702	$ 12	$ 714	$ 678	$ 12	$ 30	$ 720
50	$ 250	n/a	$ 250	$ 344	$ 12	$ 356	$ 320	$ 12	$ 12	$ 344
100	$ 252	n/a	$ 252	$ 220	$ 12	$ 232	$ 196	$ 12	$ 6	$ 214

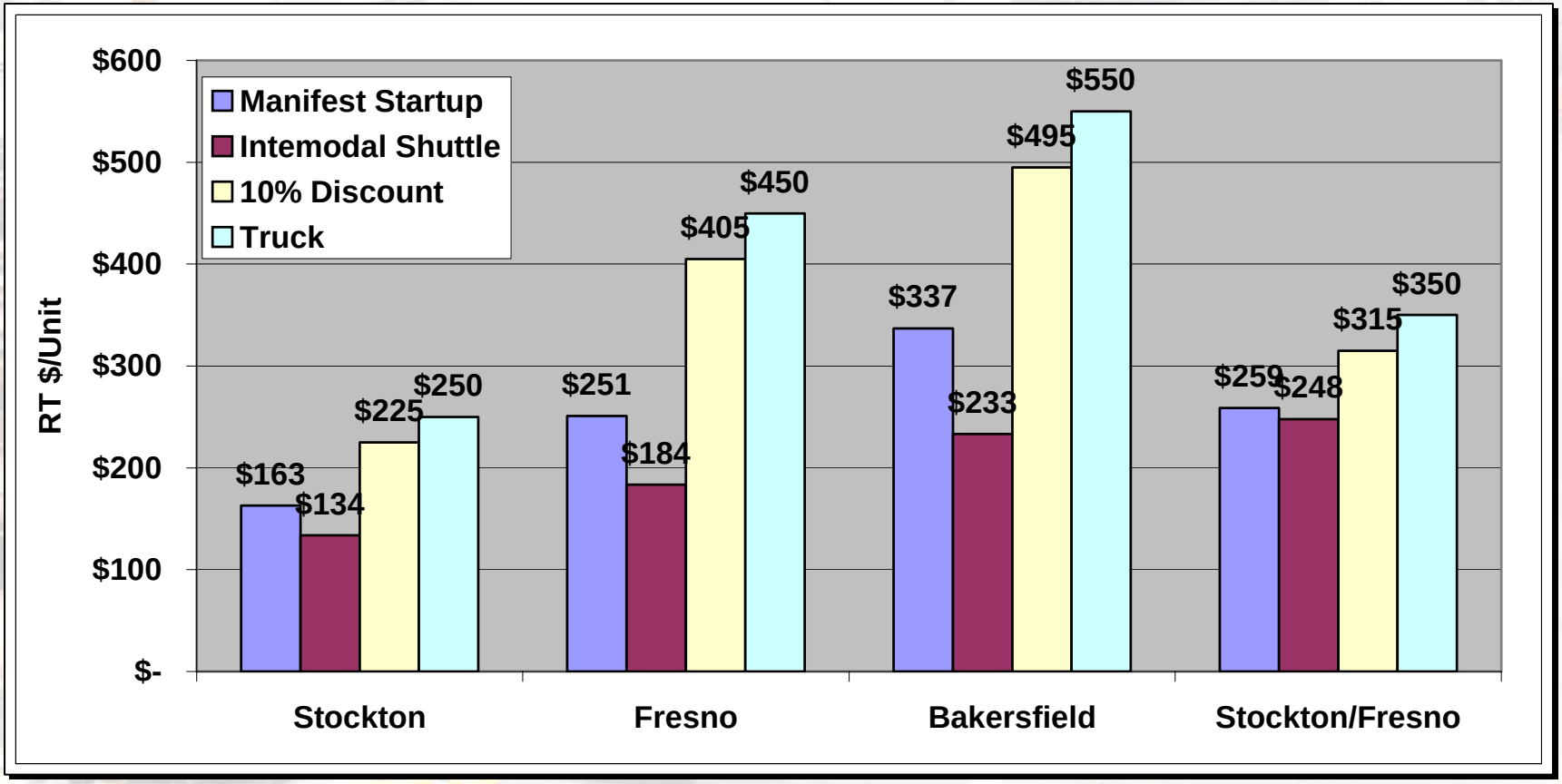
a) included in linehaul and locomotive costs
b) assumes two crews must operate a roundtrip due to transit times.

BNSF Round Trip Costs per Container (via Richmond)

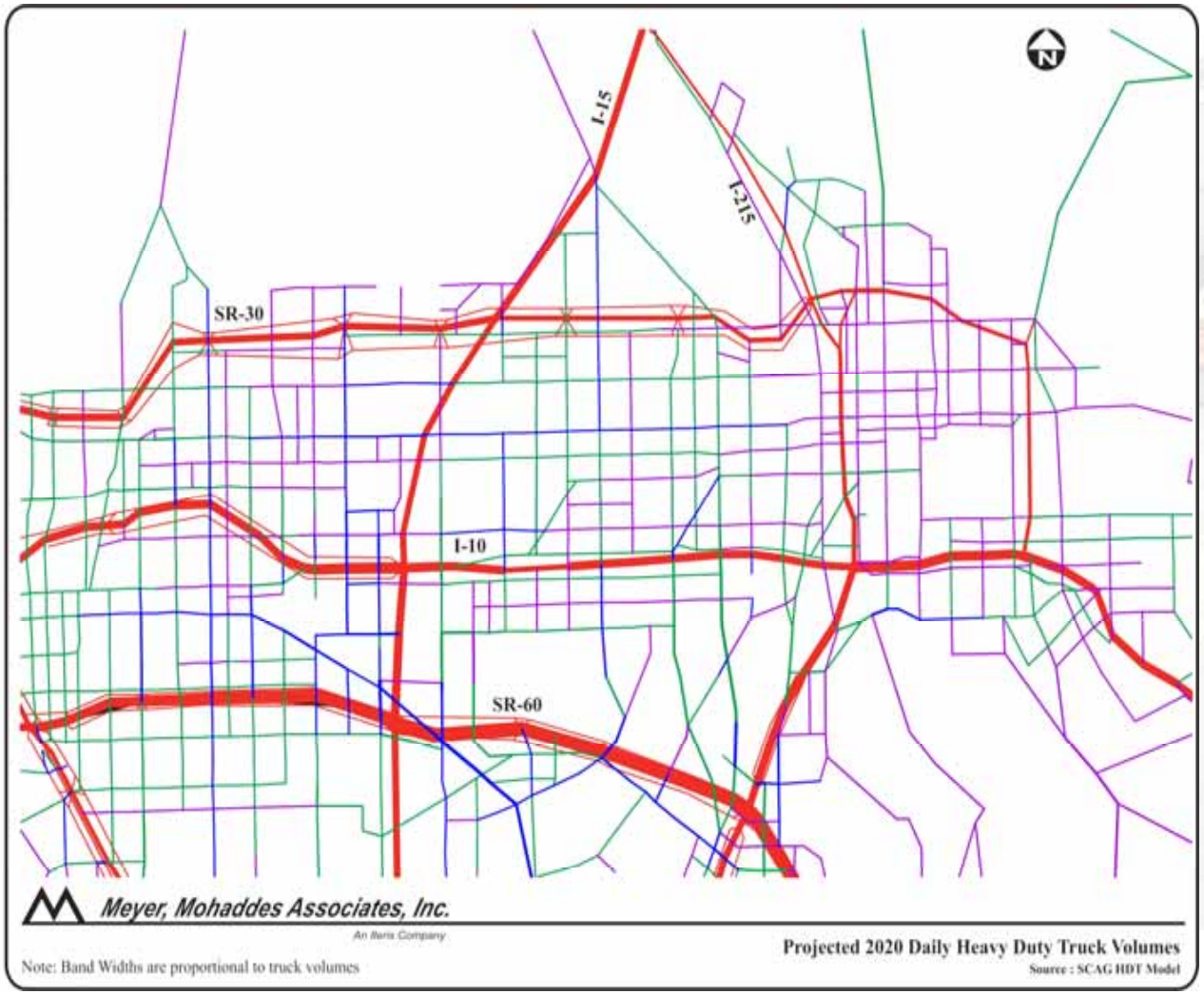
Daily Containers	******* Manifest Trains ********			******Class I Shuttle ********			********** San Joaquin Shuttle **********			
	Linehaul & Locomotive	Rail Cars (a)	Total	Linehaul & Locomotive	Rail Cars	Total	Linehaul	Rail Cars	Locomotive	Total
10	$ 251	n/a	$ 251	$ 901	$ 12	$ 913	$ 847	$ 12	$ 30	$ 889
20	$ 251	n/a	$ 251	$ 506	$ 12	$ 518	$ 479	$ 12	$ 30	$ 521
50	$ 233	n/a	$ 233	$ 275	$ 12	$ 287	$ 248	$ 12	$ 12	$ 272
100	$ 228	n/a	$ 228	$ 193	$ 12	$ 205	$ 166	$ 12	$ 6	$ 184

a) included in linehaul and locomotive costs
b) assumes two crews must operate a roundtrip due to transit times.

Railroad Industries Rail Costing Models



Meyer, Mohaddes/SCAG Heavy Duty Truck Model



Meyer, Mohaddes Emissions Models

Empty Container Reuse Scenarios – Emissions Impacts

I-710 Scenario & Emissions Type	2000		2010		2015		2020	
	Annual Tons	Peak Day Tons	Annual Tons	Peak Day Tons	Annual Tons	Peak Day Tons	Annual Tons	Peak Day Tons
Base Case								
Carbon Monoxide	333	1.43	620	2.67	895	3.85	1,322	5.69
Total Organic Gases	76	0.33	141	0.61	204	0.88	301	1.30
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Exhaust Particulates	26	0.11	49	0.21	70	0.30	104	0.45
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Carbon Monoxide	321	1.38	599	2.58	865	3.72	1,276	5.50
Reduction	11	0.05	21	0.09	31	0.13	46	0.20
Total Organic Gases	73	0.32	136	0.59	197	0.85	291	1.25
Reduction	3	0.01	5	0.02	7	0.03	10	0.05
Reactive Organic Gases	71	0.31	133	0.57	192	0.83	284	1.22
Reduction	3	0.01	5	0.02	7	0.03	10	0.04
Oxides of Nitrogen	272	1.17	507	2.18	731	3.15	1,080	4.65
Reduction	10	0.04	18	0.08	26	0.11	39	0.17
Exhaust Particulates	25	0.11	47	0.20	68	0.29	100	0.43
Reduction	1	0.00	2	0.01	2	0.01	4	0.02
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Carbon Monoxide	302	1.30	564	2.43	813	3.50	1,200	5.17
Reduction	30	0.13	56	0.24	82	0.35	123	0.53
Total Organic Gases	69	0.30	129	0.55	185	0.80	273	1.18
Reduction	7	0.03	13	0.05	19	0.08	28	0.12
Reactive Organic Gases	67	0.29	126	0.54	181	0.78	267	1.15
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Reduction	26	0.11	47	0.20	69	0.30	104	0.45
Exhaust Particulates	24	0.10	44	0.19	64	0.27	94	0.41
Reduction	2	0.01	4	0.02	6	0.03	10	0.04

RETURN

Site Selection & Concept Evaluation

Site Selection: Community & Environmental Feasibility

- Matching sites with Inland Port alternatives
- Community fit and acceptance
- Land use impacts
- Environmental impacts
- Mitigation needs

Concept Evaluation

- Selection of performance measures
- Choice of evaluation criteria
- Consistency with RTP, Goods Movement Action Plan, ACTA strategy, and other key initiatives
- Ranking of Inland Port alternatives and sites
- Comparisons with other goods movement and traffic congestion strategies.

Task 1 & 2 - Purpose & Concepts	Task 5 - Sites & Evaluation			
Function	Site Selection	Community & Environmental Feasibility	Performance Measures	Concept Evaluation
Alternative 1: Primary Inland Port Facility				
Alternative 2: Inland Port & Container Depot				
Alternative 3: Inland Port & Transloading				
Alternative 4: Separate Container & Air Cargo Facilities				
Alternative 5: ___?____				
Alternative 6: ___?____				