

**Response to March 27, 2015, Questions from the Legislative Analyst's Office  
Air Resources Board's Proposed Southern California Consolidation Project**

1. Overall Testing Capabilities: Please clarify the differences in overall testing capabilities (e.g., number of test cells, number of operational dynamometers, number of SHEDs) that would be possible under the following alternatives:
- ARB Proposal (Preferred Alternative).
  - LAO Alternative 1—build new heavy duty testing facility, maintain HSL and make upgrades/renovations necessary to allow light-duty testing to continue at current levels, replace one SHED with an Environmental Chamber.
  - LAO Alternative 2—build new facility that includes heavy duty and some additional light duty capabilities, maintain HSL and make minor upgrades that do not allow testing at current levels.
  - LAO Alternative 3—build new facility that includes heavy duty and some additional light duty (including an Environmental Chamber), maintain HSL and make upgrades/renovations necessary to allow HSL testing to continue at current levels (not including an Environmental Chamber).

Response: The first step in responding to this question is to clarify the scope of each alternative, as they differ somewhat from the description provided above. The scope includes the category of testing that is to be accomplished at a new facility, at the existing El Monte facilities, or at both facilities.

For the ARB Preferred Alternative, all of the functions are housed at a new facility. The existing facilities are not used in any capacity. For the other three LAO Alternatives, all of the heavy-duty vehicle testing occurs at a new facility. LAO Alternative 1 maintains essentially all of the light-duty testing, motorcycle testing, and small off-road equipment testing at the existing El Monte facilities. In LAO Alternative 1, an Environmental Chamber is constructed at the El Monte facilities. In LAO Alternative 2, a new facility is constructed that provides testing for all of the testing categories. Limited light-duty vehicle exhaust and evaporative emissions testing, all portable emissions monitoring systems (PEMS), and limited chemistry laboratory functions are maintained at the existing El Monte facilities. In LAO Alternative 3, the light-duty vehicle exhaust and evaporative emissions testing operations are maintained at the existing El Monte facilities, together with supporting chemistry laboratory functions. All of the motorcycle and small off-road equipment, OBD system, and PEMS testing are moved to the new facility. In addition, the Environmental Chamber is constructed at the new facility. In all three alternatives, only staff directly associated with the testing operations and limited administrative staff is moved to the new facility.

Table 1 summarizes the scope of the ARB Preferred Alternative and each of the three LAO Alternatives. Table 1 also includes the location of staffing and the chemistry laboratory functions.

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**Table 1  
Scope of the ARB’s Preferred Alternative and LAO Alternatives**

Program Area	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
	New Facility	Existing Facility	New Facility	Existing Facility	New Facility	Existing Facility	New Facility	Existing Facility
Light-Duty Vehicles Exhaust Emissions	X	-	-	X	X	X	-	X
Light-Duty Vehicles Evaporative Emissions	X	-	-	X	X	X	-	X
Motorcycles and Small Off-Road Equipment – Exhaust Emissions	X	-	-	X	X	-	X	-
Motorcycles and Small Off-Road Equipment – Evaporative Emissions	X	-	-	X	X	-	X	-
Environmental Chamber LD Vehicles, Motorcycles, SORE	X	-	-	X	X	-	X	-
Heavy-Duty Vehicles Exhaust and Evaporative Emissions	X	-	X	-	X	-	X	-
Onboard Diagnostic Systems	X	-	X	-	X	-	X	-
Portable Emissions Monitoring Systems	X	-	X	-	-	X	X	-
Chemistry Laboratory	X	-	X	X	X	X	X	X
Staffing	X	-	X	X	X	X	X	X

The testing capabilities can now be assessed for ARB’s Preferred Alternative and the three LAO Alternatives. In general, the testing capabilities are a function of the space, equipment, and staffing available. To define terms, “current testing” means that ARB will continue to test at the levels that are currently conducted at the El Monte facilities. Note that current testing levels are inadequate to meet today’s needs, let alone future needs. “Future testing” means that ARB can test at the levels identified in the Capital Outlay Budget Change Proposal (COBCP), which will enable ARB to conduct testing that meets both our needs today and in the future. In general, ARB’s Preferred Alternative allows ARB to meet its future testing needs. LAO Alternative 1 allows ARB to meet its future needs for heavy-duty vehicles, OBD systems, and PEMS testing, but only allows ARB to continue to test light-duty vehicles, motorcycles, and small off-road equipment at current levels. LAO Alternative 2 allows ARB to meet its future testing needs for all categories, as well as provide some limited additional testing for light-duty vehicles. LAO Alternative 3 allows ARB to meet its future needs for heavy-duty vehicles, motorcycles, small off-road equipment, OBD systems, and PEMS. In LAO Alternative 3, light-duty testing would remain at current levels. Table 2 summarizes the major testing equipment for ARB’s Preferred Alternative and the three LAO Alternatives.

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**Table 2  
Summary of Major Test Equipment for ARB's Preferred Alternative and LAO Alternatives**

Major Equipment Category	Current <sup>1</sup>	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		New Facility	Existing Facility	New Facility	Existing Facility	New Facility	Existing Facility <sup>2</sup>	New Facility	Existing Facility
Light-Duty Emissions-Based Chassis Dynamometers/Test Cells	5	5	-	-	5	5	1	-	5
Light-Duty Chassis Dynamometers/Test Cells for Preparatory Work	-	2	-	-	-	2	-	-	-
Light-Duty Vehicle SHEDs	3	3	-	-	3	3	1	-	3
Environmental Chamber	-	1	-	-	1	1	-	1	-
Motorcycle and Small Off-Road Vehicle Emissions-Based Chassis Dynamometer and Test Cell, Including 3 Small Off-Road Engine Dynamometers	1	-	-	-	1	-	-	-	-
Motorcycle Emissions-Based Chassis Dynamometers and Test Cells	-	2	-	-	-	2	-	2	
Motorcycle Chassis Dynamometer and Test Cell for Preparatory Work	-	1	-	-	-	1	-	1	-
Small Off-Road Engine Test Cell, with 3 Small Off-Road Engine Dynamometers and Shared Emissions Equipment	-	1	-	-	-	1	-	1	-
Heavy-Duty Emissions-Based Chassis Dynamometers and Test Cells	1	2	-	2	-	2	-	2	-
Heavy-Duty Chassis Dynamometer and Test Cell for Preparatory Work	-	1	-	1	-	1	-	1	-
Heavy-Duty Engine Dynamometers and Test Cells	1	2	-	2	-	2	-	2	-
Heavy-Duty SHED Testing	-	1	-	1	-	1	-	1	-

1. ARB currently maintains a SHED that is used for conducting running loss testing. The Environmental Chamber replaces this unit in all alternatives.
2. One emissions-based chassis dynamometer and one SHED is maintained to support PEMS comparison testing and other limited light-duty testing operations. Limited chemistry functions are also maintained to support these operations.

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Table 3 summarizes the testing capabilities of ARB's Preferred Alternative and the three LAO Alternatives.

**Table 3  
Summary of Testing Capabilities for ARB's Preferred Alternative and LAO Alternatives**

Major Equipment Category	Basis	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		New Facility	Existing Facility	New Facility	Existing Facility	New Facility	Existing Facility	New Facility	Existing Facility
Light-Duty Chassis Dynamometer Testing	# of Tests	2,174	-	-	1,558	2,174	100	-	1,558
Light-Duty Vehicle SHED Testing (Sum of Hot Soak + Diurnal Tests)	# of Tests	288	-	-	228	288	25	-	228
Environmental Chamber Testing	# of Tests	180	-	-	180	180	-	180	-
Motorcycle and Small Off-Road Vehicle Testing	# of Tests	991	-	-	211	991	-	991	-
Heavy-Duty Emissions-Based Chassis Dynamometer Testing	# of Tests	700	-	700	-	700	-	700	-
Heavy-Duty Chassis Dynamometer Testing	# of Tests	160	-	160	-	160	-	160	-
Heavy-Duty Engine Dynamometer Testing	# of Tests	300	-	300	-	300	-	300	-
Heavy-Duty SHED Testing	# of Projects	8-10	-	8-10	-	8-10	-	8-10	-
PEMS Testing	Test-Hours	14,000	-	14,000	-	-	14,000	14,000	-
OBD Testing	Vehicle-Days	320	-	320	-	320	-	320	-

Analysis: The primary difference between the alternatives is related to the light-duty testing capabilities. In LAO Alternative 1, ARB would conduct all of the light-duty testing at the existing El Monte facilities. However, space limitations at the El Monte facilities preclude any upgrades that would increase testing capabilities. Some of the test cells and dynamometers need to be upgraded to allow for testing of all wheel drive vehicles, but upgrading will not increase capacity. Similar logic applies to the evaporative emissions testing conducted in the SHEDs. These units will also need to be replaced because they will have reached the end of their useful life in the next five years, but space limitations preclude increasing testing capabilities. Therefore, light-duty testing would continue at current levels under this alternative. This current level does not meet the necessary levels of future testing outlined in the COBCP. LAO Alternative 1 also does not alter the motorcycle and small off-road equipment testing

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requirements. Therefore, this testing would continue at current levels. This level does not meet the necessary levels of future testing outlined in the COBCP. LAO Alternative 1 provides for the installation of an Environmental Chamber; therefore, necessary levels of Environmental Chamber testing would be achieved.

LAO Alternative 2 provides for a new testing facility that achieves the necessary level of testing. Some limited additional testing capabilities are achieved by maintaining some of the equipment at the Haagen-Smit Laboratory and Annex 4. In addition, limited chemistry laboratory functions are maintained to support PEMS testing and the limited light-duty testing. However, splitting facilities for minimal light duty testing gain would not be cost effective. Additionally, running all PEMS testing from a separate facility that is not designed for heavy-duty vehicles creates access issues such as limited heavy-duty vehicle parking and vehicle movement areas.

In LAO Alternative 3, ARB would conduct almost all of the light-duty testing at the existing El Monte facilities. Motorcycle and small off-road equipment testing would be done at the new facility. In addition, the Environmental Chamber would be located at the new facility. However, space limitations at the existing El Monte facilities preclude any upgrades that would increase testing capabilities. As with Alternative 1, some of the test cells and dynamometers need to be upgraded to allow for testing of all wheel drive vehicles, but upgrading will not increase capacity. Similar logic applies to the evaporative emissions testing conducted in the SHEDs. These units will also need to be replaced because they will have reached the end of their useful life in the next five years, but space limitations preclude increasing testing capabilities. Therefore, light-duty testing would continue at current levels under this alternative. This current level does not meet the necessary levels of testing outlined in the COBCP. In addition, the locating the Environmental Chamber away from the primary light-duty vehicle testing causes logistical difficulties as this configuration requires that procured vehicles be transported between facilities for the required specialized testing.

In terms of testing capabilities, there are no advantages to constructing a new facility and maintaining the existing test facilities and leased office space because there is essentially no ability to upgrade the El Monte facilities to allow for increased testing. The testing is limited by the inability to stage vehicles in the cold soak area, the lack of space to install preparatory dynamometers at the existing facilities that would allow for a higher throughput, the physical limitations associated with expeditiously moving vehicles from Annex 4 (SHEDs) to the Haagen-Smit Laboratory as part of the mandated test procedures, the staffing required to conduct the testing at two different locations, and the information technology infrastructure required to efficiently process information. Alternative 2 is the only alternative that provides additional capabilities; however, this alternative provides only a very limited opportunity for increasing test capabilities over ARB's Preferred Alternative.

2. Equipment Costs for the Various Alternatives: We still have some concerns with the assumption that equipment costs would be the same for the ARB proposal, LAO Alternative 1, and LAO Alternative 2. I know we discussed this in one of our meetings, but could you please provide a written description of the basis for this assumption?

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Response: Through the course of assessing program needs, ARB identified new equipment purchases as well as the replacement of “anyway” equipment based on the age and use of the equipment and its life expectancy. “Anyway” purchases are purchases unrelated to the proposed project and are typically procured when the equipment’s life expectancy has reached its end. Equipment life expectancy varies between five and twenty-five years and is based on its type and purpose. If the consolidation project is approved and if it is not detrimental to any program, ARB plans to delay the purchase of “anyway” replacement equipment so these purchases can coincide with the acquisition of the new facility. As you may recall, ARB’s Preferred Alternative identified \$101.7 million in total equipment costs. Of this, approximately \$54 million in equipment costs are categorized as “anyway” purchases within the next five years.

Maintaining the El Monte facilities would eliminate some equipment costs. However, there are costs associated with the duplication of equipment and support areas that somewhat offset potential savings. As mentioned previously, maintaining two separate facilities would result in duplication of needed on-site equipment and several support areas that includes, but is not limited to laboratory equipment (e.g., fume hoods, chemical analyzers), clean rooms, machine and electronic fabrication shop space and equipment, underground storage tanks and vehicle fueling areas, cylinder storage areas, and a significant amount of infrastructure systems (oxygen detection, fire alarm, safety surveillance, information technology, etc.).

In response to the LAO question, ARB has estimated the equipment costs for each of the LAO Alternatives and compared this to ARB’s Preferred Alternative. These costs are detailed in Table 4.

**Table 4  
Summary of Equipment Costs for ARB’s Preferred Alternative and LAO Alternatives**

Category	Cost Per Unit	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
<b>VEHICLE TESTING – LIGHT DUTY VEHICLES AND ENGINES</b>									
Light-Duty Emissions-Based Chassis Dynamometers/Test Cells	\$1,800,000	5	\$9,000,000	2	\$3,600,000	5	\$9,000,000	2	\$3,600,000
Light-Duty Chassis Dynamometer Analytical Equipment	\$1,700,000	5	\$8,500,000	5	\$8,500,000	5	\$8,500,000	5	\$8,500,000
Light-Duty Chassis Dynamometers/Test Cells for Preparatory Work	\$1,000,000	2	\$2,000,000	0	\$0	2	\$2,000,000	0	\$0

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Category	Cost Per Unit	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
Light-Duty Vehicle SHEDs-Standard Size	\$600,000	3	\$1,800,000	3	\$1,800,000	3	\$1,800,000	3	\$1,800,000
Light-Duty Vehicle SHEDs – Analytical Equipment	\$400,000	3	\$1,200,000	3	\$1,200,000	3	\$1,200,000	3	\$1,200,000
Light-Duty Environmental Chamber Testing	\$5,000,000	1	\$5,000,000	1	\$5,000,000	1	\$5,000,000	1	\$5,000,000
Light-Duty PEMS	\$300,000	2	\$600,000	2	\$600,000	2	\$600,000	2	\$600,000
Light-Duty Smog Check and Repair Equipment	\$50,000	2	\$100,000	2	\$100,000	2	\$100,000	2	\$100,000
Motorcycle and Small Off-Road Vehicle Emissions-Based Chassis Dynamometer and Test Cell, Including 3 Small Off-Road Engine Dynamometers	\$1,100,000	0	\$0	1	\$1,100,000	0	\$0	0	\$0
Motorcycle Emissions-Based Chassis Dynamometers and Test Cells	\$1,100,000	2	\$2,200,000	0	\$0	2	\$2,200,000	2	\$2,200,000
Motorcycle Chassis Dynamometer Analytical and Other Sampling Equipment	\$1,500,000	2	\$3,000,000	1	\$1,500,000	2	\$3,000,000	2	\$3,000,000
Motorcycle Chassis Dynamometer and Test Cell for Preparatory Work	\$300,000	1	\$300,000	0	\$0	1	\$300,000	1	\$300,000
Small Off-Road Engine Test Cell, with 3 Small Off-Road Engine Dynamometers and Shared Emissions Equipment	\$1,100,000	1	\$1,100,000	1	\$1,100,000	1	\$1,100,000	1	\$1,100,000

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Category	Cost Per Unit	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
Small Off-Road Engine Dynamometer Analytical and Other Sampling Equipment	\$1,500,000	1	\$1,500,000	0	\$0	1	\$1,500,000	1	\$1,500,000
<b>SUBTOTAL Light-Duty Vehicles and Engines</b>			<b>\$36,300,000</b>		<b>\$24,500,000</b>		<b>\$36,300,000</b>		<b>\$28,900,000</b>
<b>HEAVY-DUTY VEHICLES AND ENGINES</b>									
Heavy-Duty Emissions-Based Chassis Dynamometers and Test Cells	\$4,300,000	2	\$8,600,000	2	\$8,600,000	2	\$8,600,000	2	\$8,600,000
Heavy-Duty Chassis Dynamometer Analytical Equipment	\$1,700,000	2	\$3,400,000	2	\$3,400,000	2	\$3,400,000	2	\$3,400,000
Heavy-Duty Chassis Dynamometer and Test Cell for Preparatory Work	\$3,800,000	1	\$3,800,000	1	\$3,800,000	1	\$3,800,000	1	\$3,800,000
Heavy-Duty Engine Dynamometers and Test Cells	\$3,800,000	2	\$7,600,000	2	\$7,600,000	2	\$7,600,000	2	\$7,600,000
Emissions Dynamometer Analytical Equipment	\$1,700,000	2	\$3,400,000	2	\$3,400,000	2	\$3,400,000	2	\$3,400,000
Heavy-Duty SHED	\$1,000,000	1	\$1,000,000	1	\$1,000,000	1	\$1,000,000	1	\$1,000,000
Heavy-Duty SHED Analytical Equipment	\$400,000	1	\$400,000	1	\$400,000	1	\$400,000	1	\$400,000
Heavy-Duty PEMS Units	\$300,000	8	\$2,400,000	8	\$2,400,000	8	\$2,400,000	8	\$2,400,000
Heavy-Duty PEMS – Room Support; Lifting Cranes	\$200,000	1	\$200,000	1	\$200,000	1	\$200,000	1	\$200,000
Test Engine Setup/ Teardown Area	\$100,000	1	\$100,000	1	\$100,000	1	\$100,000	1	\$100,000

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Category	Cost Per Unit	Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
OBD Setup/Teardown Area (HD/LD)	\$200,000	1	\$200,000	1	\$200,000	1	\$200,000	1	\$200,000
<b>SUBTOTAL Heavy-Duty Vehicles and Engines</b>			<b>\$31,100,000</b>		<b>\$31,100,000</b>		<b>\$31,100,000</b>		<b>\$31,100,000</b>
<b>TESTING SUPPORT</b>									
QC Verification Equipment	\$55,000	19	\$1,045,000	19	\$1,045,000	21	\$1,155,000	19	\$1,045,000
VTS Data Acquisition Equipment	\$500,000	15	\$7,500,000	15	\$7,500,000	16	\$8,000,000	15	\$7,500,000
Machine Shop Equipment	\$300,000	1	\$300,000	2	\$600,000	2	\$600,000	2	\$600,000
Machine Shop Welding Hood	\$40,000	1	\$40,000	2	\$80,000	2	\$80,000	2	\$80,000
Electronics Shop/ Instrument and Dynamometer Repair	\$250,000	1	\$250,000	2	\$500,000	2	\$500,000	2	\$500,000
Canister Loading Bench with Piping	\$60,000	15	\$900,000	15	\$900,000	16	\$960,000	15	\$900,000
Underground Fuel Storage	\$120,000	5	\$600,000	10	\$1,200,000	10	\$1,200,000	10	\$1,200,000
Air Compressors with Piping	\$125,000	2	\$250,000	4	\$500,000	4	\$500,000	4	\$500,000
Zero Air Generators with Piping	\$80,000	3	\$240,000	6	\$480,000	4	\$320,000	6	\$480,000
Fire Suppression in Fueling Room	\$20,000	1	\$20,000	2	\$40,000	2	\$40,000	2	\$40,000
Fume Hoods with Monitoring System	\$40,000	50	\$2,000,000	40	\$1,600,000	55	\$2,200,000	40	\$1,600,000
Oxygen Detection System	\$100,000	1	\$100,000	2	\$200,000	2	\$200,000	2	\$200,000
CNG Fueling Station	\$750,000	1	\$750,000	1	\$750,000	1	\$750,000	1	\$750,000
Hydrogen Fueling Station	\$1,500,000	1	\$1,500,000	1	\$1,500,000	1	\$1,500,000	1	\$1,500,000

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		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
EV Chargers for Testing	\$3,000	5	\$15,000	5	\$15,000	5	\$15,000	5	\$15,000
Hazardous Materials Storage	\$100,000	1	\$100,000	2	\$200,000	2	\$200,000	2	\$200,000
<b>SUBTOTAL Testing Support</b>			<b>\$15,610,000</b>		<b>\$17,110,000</b>		<b>\$18,220,000</b>		<b>\$17,110,000</b>
<b>CHEMISTRY LABORATORY</b>									
GC Laboratory	\$1,500,000	1	\$1,500,000	1.5	\$2,250,000	1.2	\$1,800,000	1.5	\$2,250,000
LC Laboratory	\$500,000	1	\$500,000	1.5	\$750,000	1.2	\$600,000	1.5	\$750,000
GHG + Lab Air Lab (CFR Part 1066)	\$1,000,000	1	\$1,000,000	1.5	\$1,500,000	1.2	\$1,200,000	1.5	\$1,500,000
Real-Time Laboratory	\$1,500,000	1	\$1,500,000	1	\$1,500,000	1	\$1,500,000	1	\$1,500,000
Sample Check/In-Out Laboratory	\$200,000	1	\$200,000	2	\$400,000	1.2	\$240,000	2	\$400,000
Gravimetric Laboratory Clean Room	\$1,400,000	2	\$2,800,000	2	\$2,800,000	2	\$2,800,000	2	\$2,800,000
Gravimetric Laboratory Equipment	\$350,000	2	\$700,000	2	\$700,000	2	\$700,000	2	\$700,000
GC/Mass Spec Laboratory	\$1,750,000	1	\$1,750,000	1	\$1,750,000	1	\$1,750,000	1	\$1,750,000
Aerosol Laboratory	\$750,000	1	\$750,000	1.5	\$1,125,000	1.2	\$900,000	1.5	\$1,125,000
Metals Laboratory Clean Room	\$1,600,000	1	\$1,600,000	1	\$1,600,000	1	\$1,600,000	1	\$1,600,000
Metals Laboratory Equipment	\$400,000	1	\$400,000	1	\$400,000	1	\$400,000	1	\$400,000
Extraction Laboratory IC/Carbon	\$500,000	1	\$500,000	1	\$500,000	1	\$500,000	1	\$500,000
SVOC/SOA Laboratory	\$500,000	1	\$500,000	1.5	\$750,000	1	\$500,000	1.5	\$750,000
Real-Time BC/AMS Laboratory	\$2,000,000	1	\$2,000,000	1	\$2,000,000	1	\$2,000,000	1	\$2,000,000

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		# of Units	Cost	# of Units	Cost	# of Units	Cost	# of Units	Cost
Fossil Fuels Laboratory	\$2,000,000	1	\$2,000,000	1	\$2,000,000	1	\$2,000,000	1	\$2,000,000
Alternative Fuels Laboratory	\$1,000,000	1	\$1,000,000	1	\$1,000,000	1	\$1,000,000	1	\$1,000,000
<b>SUBTOTAL Chemical Laboratory</b>			<b>\$18,700,000</b>		<b>\$21,025,000</b>		<b>\$19,490,000</b>		<b>\$21,025,000</b>
<b>TOTAL Equipment Costs</b>			<b>\$101,710,000</b>		<b>\$93,735,000</b>		<b>\$105,110,000</b>		<b>\$98,135,000</b>

Analysis: The costs do not vary considerably. The equipment costs for LAO Alternative 1 are approximately eight percent less than the costs for ARB's preferred alternative. There is some cost savings associated with light-duty and motorcycle dynamometers, but this savings is somewhat offset by the duplicative equipment needed to maintain two facilities. The equipment costs associated with LAO Alternative 2 are actually three percent higher than ARB's preferred alternative. The increase is associated with the needed duplication of equipment to maintain two facilities. The costs for LAO Alternative 3 are approximately four percent lower than the ARB Preferred Alternative. The LAO Alternative 3 also does not support the level of testing identified in the COBCP. Note, however, that the equipment for Alternatives 1 and 3 provide only about three-quarters of the amount of testing necessary to meet light-duty vehicle testing needs. In addition, Alternative 1 only provides about 20 percent of the amount of testing necessary to meet motorcycle and small off-road equipment needs.

3. Cost Analysis for LAO Alternative 3: Please provide a cost estimate (including direct and indirect facility costs, equipment costs, and the present value of ongoing maintenance/operations costs) for LAO Alternative 3.

Response: ARB has summarized the costs for ARB's Preferred Alternative and the three LAO Alternatives in Table 5. ARB has also now conducted a more detailed assessment of upgrade and renovation costs that would be needed to maintain the existing El Monte facilities, in particular the Haagen-Smit Laboratory. These costs are summarized in Table 5, and detailed in Table 6. The costs are based on the following information.

- The dollars per square foot are based on the IBI Program Summary, dated January 7, 2015. Note that the estimate for sitework is based on the total sitework costs (\$19,497,585) divided by the acreage (14 acres). This results in an estimated cost per square foot of \$31.97. This is also consistent with the data presented in the Clarke Project Solutions Report that was used to support the IBI Program Summary Report (<http://www.arb.ca.gov/socalfacility>).
- For Alternative 3, the light-duty square footage estimate was based on the square footage for the following categories: cold soak for five vehicles; the footprint for the Environmental Chamber; the motorcycle test cell, the small off-road test cell, miscellaneous equipment storage, and miscellaneous other space.

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- Note 1. The Other-New Facility Costs are estimated based on the ratio of the Total Estimated Project Costs for the preferred alternative stated in the Capital Outlay Budget Change Proposal Attachment 1 (\$258,178,000) to the Direct Costs for the preferred alternative (\$189,191,000). The calculation is as follows:

$$\text{Other Facility Costs} = \frac{258,178,000}{189,191,000} \times (\text{Direct Costs}) - \text{Direct Costs}$$

- Note 2. ARB has revised the cost for the Environmental Chamber after further review. The cost of the Environmental Chamber is estimated to be \$5,000,000 and was included in equipment costs. For Alternative 1, ARB now estimates that there would be an additional \$2,000,000 to modify Annex 4 to accommodate the unit. This leased space would require extensive modifications as the building infrastructure has a supporting beam that precludes the installation of a SHED that must expand and contract. In addition, ARB expects to have to make other safety, structural, and ADA compliance modifications in order to meet current code requirements as part of the Environmental Chamber installation. HSL does not have the floor space to accommodate the unit.
- Note 3. The HSL Modifications are those represented by the detailed information presented in Table 6. Note that these costs apply to all three LAO Alternatives. The implementation of these additional measures is necessary to reduce the facility's energy consumption and address safety and infrastructural issues. The energy-efficiency improvements are necessary to comply with the Governor's Executive Order for existing buildings. Currently, there is no exemption process to exclude existing State buildings from meeting energy goals. However, ARB is optimistic that if there is a new facility approved then the renovations and upgrades would not need to be done. These costs are preliminary; ARB must coordinate with DGS' Office of Sustainability, conduct extensive market research to ensure the various systems are compatible, and conduct an extensive assessment of the facility to ensure it can be adapted without endangering staff or causing significant interference to testing and research needs.
- Note 4. For LAO Alternatives 1 and 3, the Present Value of El Monte Lease Payments was based on existing annual lease costs of approximately \$2,000,000, with the assumption that these costs would escalate at two percent per year for 25 years. For LAO Alternatives 1 and 3, the result was reduced by approximately 20 percent to account for the heavy-duty vehicle, chemistry laboratory, OBD system, PEMS, and administrative staff that would likely be assigned to the new facility. For Alternative 2, we reduced the lease costs by 1/3 to account for the staff that is relocated to the new facility.
- Note 5. The Equipment Costs are the same as those presented in Table 4.
- Note 6. The Site Assessment and Performance Criteria Costs are the same as those presented in the COBCP.

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**Table 5  
Detailed Cost Calculations for the Preferred Alternative and Three LAO Alternatives**

Program Area	Cost Basis	Overall Cost Estimates (Sq. Ft. Estimates are for the New Facility Only)							
		Preferred Alternative		LAO Alternative 1		LAO Alternative 2		LAO Alternative 3	
		Sq. Ft. <sup>1</sup>	Cost	Sq. Ft.	Cost	Sq. Ft.	Cost	Sq. Ft.	Cost
Light-Duty Testing	487.05/sq.ft.	91,171	\$44,404,800	N/A	N/A	70,000	\$34,093,500	10,000	\$4,870,500
Heavy-Duty Testing and OBD	650.75/sq.ft.	62,316	\$40,552,100	62,300	\$40,541,725	62,300	\$40,541,725	62,300	\$40,541,725
Portable Emission Measurement Systems	382.17/sq.ft.	6,683	\$2,553,900	6,700	\$2,560,539	N/A	N/A	6,700	\$2,560,539
Chemistry Laboratory	694.63/sq.ft.	48,016	\$33,353,400	20,000	\$13,892,600	40,000	\$27,785,200	32,000	\$22,228,160
Offices and Shared Operation	407.82/sq.ft.	72,702	\$29,649,300	10,000	\$4,078,200	50,000	\$20,391,000	15,000	\$6,117,300
Administrative Services	259.23/sq.ft.	18,365	\$4,760,800	1,000	\$259,230	10,000	\$2,592,300	1,000	\$259,230
Parking	78.37/sq.ft.	184,000	\$14,420,100	50,000	\$3,918,500	90,000	\$7,053,300	50,000	\$3,918,500
Site Footprint	31.97/sq.ft.	609,840	\$19,496,600	217,800	\$6,963,066	522,720	\$16,711,358	217,800	\$6,963,066
Direct Costs – New Facility			\$189,191,000		\$72,213,860		\$149,168,383		\$87,459,020
Other-New Facility Costs	Note 1		\$68,987,000		\$26,332,212		\$54,393,070		\$31,891,239
<b>Total New Facility Costs</b>			<b>\$258,178,000</b>		<b>\$98,546,072</b>		<b>\$203,561,453</b>		<b>\$119,350,259</b>
Environmental Chamber Installation	Note 2		\$0		\$2,000,000		\$0		\$0
HSL Facility Modifications	Note 3		\$0		\$12,585,000		\$12,585,000		\$12,585,000
Present Value of El Monte Lease Payments	Note 4		\$0		\$31,237,530		\$26,031,269		\$31,237,530
<b>Total Facility Costs</b>			<b>\$258,178,000</b>		<b>\$144,368,602</b>		<b>\$242,177,722</b>		<b>\$163,172,789</b>
Equipment Costs	Note 5		\$101,710,000		\$93,735,000		\$105,110,000		\$98,135,000
Site Assessment and Performance Criteria Costs	Note 6		\$5,900,000		\$5,900,000		\$5,900,000		\$5,900,000
<b>Total Project Costs</b>			<b>\$365,788,000</b>		\$244,003,602		\$353,187,722		\$267,207,789

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**Table 6  
Haagen-Smit Laboratory Renovations Necessary to Comply with Governor's Energy-Related Executive Orders  
and General El Monte Facility Upgrades and Renovations Necessary to Address Safety and Infrastructure Issues**

<b>Item No.</b>	<b>Equipment</b>	<b>Basis</b>	<b>Estimated Cost</b>
1	HVAC Upgrade	350 TONS @ \$6,000/TON for Chilled Water Retrofit	\$2,100,000
2	Installation of Solar Panels (provided in table 1 also)	Based on 50% of roof space use or 26,800 sq. ft.; 1,788 - 250 W panels and a rate of \$0.129/Kw-hr	\$900,000
3	Plumbing Upgrades <sup>1</sup>	Reconfigure plumbing; 10 toilets/10 urinals	\$50,000
4	Replacement of Boilers with Tankless Water Heaters	2 electric WH/ 1 50-gal WH/ 1 30-gal WH	\$20,000
5	Abatement of Asbestos & Lead Paint	HSL Building	\$400,000
6	Replacement of Dual Pane Windows & Doors	Assuming 45 Commercial Type windows (various sizes) & Doors	\$200,000
7	Installation of LED Lighting & Motion Sensors	Offices and Hallways with an area of 29,311 sq. ft.	\$330,000
8	Insulation of Exposed Roof (Dynamometer and Testing Areas)	Assuming an R30 or better Insulation and area of 9,000 s.f. (Annex 4 & HSL)	\$50,000
9	Insulation of Drop Ceilings (Hallway & Offices)	A total area of 22,375 sq. ft. for Annex 4 & HSL	\$65,000
10	Implementation of Storm Water System	Lump Sum	\$300,000
11	Roll-up Door & Air Curtain	Based on 14 doors	\$200,000
12	Expansion of Sewer System to Outdoor Project Areas	Lump Sum	\$500,000
13	Sound and Fire Proofing @ dyno & Chem. Areas	Lump Sum	\$1,500,000
14	Total Building Automation	Lump Sum	\$800,000
15	Fire Alarm System	Lump Sum	\$400,000
16	Surveillance System	Lump Sum	\$100,000
17	Electrical System Upgrade	Lump Sum	\$500,000
18	Roof Improvements	Lump Sum	\$270,000
19	Information Technology Upgrades <sup>1</sup>	Assessment of IT Needs	\$3,900,000
<b>TOTAL UPGRADES AND RENOVATIONS</b>			<b>\$12,585,000</b>

1. The estimated cost assumes the need for plumbing modifications that will allow for zero and low-flow utilities.

2. For the IT infrastructure costs, ARB would need to refresh and/or rebuild its IT infrastructure due to aged technology such as wiring, telecommunication, and other computing IT equipment. ARB would need to retrofit room(s) to accommodate the IT equipment with technology and facilities that provides cooled space to certain specifications, and includes noise reduction. The projected costs equate to approximately \$3,900,000 for servers, network, telecommunications, office IT equipment, and space retrofitting.

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Analysis: There is a relatively minor total construction cost difference between ARB's Preferred Alternative and LAO Alternative 2. The small cost savings and limited increased testing does not justify the operational and management difficulties that are not present with ARB's Preferred Alternative. ARB notes that ongoing lease payments to a private party are of no value to the State. Every year that ARB continues to lease the El Monte facilities results in additional costs. While Table 5 shows a present value of 25-year lease payments, there would still be lease costs beyond that time period. For example, the additional lease costs for a 40 year period could exceed \$12 million dollars. In addition, there are estimated costs of at least \$12 million dollars, potentially more, in upgrades and renovations necessary to meet the Governor's energy efficiency requirements for existing buildings and other safety and infrastructure requirements that would be necessary if ARB staff were to remain in the existing facilities.

Alternative 1 does not meet ARB's future light-duty, motorcycle, or small off-road testing needs as outlined in the COBCP and provides less than minimal testing. There are no renovations that can be done at the El Monte facilities that will improve the testing capabilities due to the limited space available. In addition, the operational and management difficulties associated with maintaining two facilities are not justified and the same difficulties associated with the upgrade, renovation, and leasing costs exist for this alternative as well. ARB's Preferred Alternative also eliminates logistical barriers that will be created by separate sites and fragmented programs.

Alternative 3 does not meet ARB's future light-duty vehicle testing needs as outlined in the COBCP and provides less than minimal testing. There are no renovations that can be done at the El Monte facilities that will improve the testing capabilities due to the limited space available. In addition, the operational and management difficulties associated with maintaining two facilities are not justified and the same difficulties associated with the upgrade, renovation, and leasing costs exist for this alternative as well. The preferred alternative also eliminates logistical barriers that will be created by separate sites and fragmented programs.