State of California
AIR RESOURCES BOARD

RESEARCH PROPOSAL

Resolution 12-18

March 22, 2012

Agenda Item No.: 12-2-1

WHEREAS, the Air Resources Board (ARB) has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 2741-273, entitled "Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions," has been submitted by the University of California, Los Angeles;

WHEREAS, the Research Division staff has reviewed and recommended this proposal for approval; and

WHEREAS, the Research Screening Committee has reviewed and recommends for funding:

> Proposal Number 2741-273 entitled "Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions," submitted by the University of California, Los Angeles, for a total amount not to exceed $250,000.

NOW, THEREFORE, BE IT RESOLVED that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby accepts the recommendation of the Research Screening Committee and approves the following:

> Proposal Number 2741-273 entitled "Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions," submitted by the University of California, Los Angeles, for a total amount not to exceed $250,000.

BE IT FURTHER RESOLVED that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and contracts for the research effort proposed herein, and as described in Attachment A, in an amount not to exceed $250,000.

I hereby certify that the above is a true and correct copy of Resolution 12-18, as adopted by the Air Resources Board.

Mary Alice Morency, Clerk of the Board

ATTACHMENT A

"Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions"

Background

Complete streets are streets designed and operated with all users in mind, including pedestrians, bicyclists, motorists, and public transportation users, of all ages and abilities. The goals of complete streets are reductions in vehicle miles traveled (VMT), improved pedestrian, bicyclist, and car safety, enhanced active travel, and reduced transportation costs. While the health benefits of increased active transport are well known, there is little data on the potential usefulness of complete streets in promoting active transport and reducing VMT through changes in travel behavior. This project is mainly designed to evaluate the impact of complete streets conversion on travel behavior. However, this project also looks at how vehicle-related air pollution exposure may differ among different street users (bicyclists, pedestrians, and drivers) in complete versus incomplete streets.

Objective

The objectives of this study are to: (1) understand the impact of complete streets on travel behaviors of local residents; (2) assess how changes in travel behavior will impact subpopulations with different demographic and socio-economic characteristics; (3) illustrate how the impact of complete streets on travel behavior may vary across different typical land-use contexts and road types, and; (4) determine the street users' exposure to vehicle-related air pollution before and after the complete street conversion. Potential behavioral barriers to the usage of complete streets or behavioral change will also be explored.

Methods

This study will be conducted in Southern California and will employ two empirical strategies: a before-after comparison and a spatial difference-in-difference (DID) analysis. In the before-after comparison, individual travel behaviors will be compared at a study site before and after the conversion to a complete street. Travel behavior data will be collected through surveys mailed to the homes of potential street users in the surrounding neighborhood before and after the street conversion. Data on demographics, recent trips, as well as attitudes, perceptions, and barriers to the choice of travel will be collected and analyzed from surveys before and after the complete street conversion. Traffic counts and street users' exposure to vehicle-related air pollution will also be completed on the street before and after the conversion. Data on street users' exposure to air pollution such as ultrafine particles, fine particulate matter (PM2.5), and carbon monoxide will be collected by three research staff members driving, cycling, and walking before and after the street conversion. For the DID analysis, complete streets will be matched to incomplete streets that are similar in community location and socio-demographics. The DID analysis will examine six streets with three different land-use contexts (downtown business districts, urban mixed-use area, and suburban residential areas) in roadways selected to represent typical arterial and local road types. An intercept survey will be conducted for each pair of matched streets in the DID analysis to collect information such as the purpose of the travel, the

choice of mode of transport, and attitudes and perceptions including barriers to travel behavior. Data on street users' exposure to vehicle-related air pollution when driving, walking, and bicycling and traffic counts of buses, trucks, cars, motorcycles, cyclists, and pedestrians will also be collected simultaneously on each pair of streets.

Expected Results
This study is expected to (1) provide quantitative estimates of the effects of complete street conversions on travel behavior such as the choice and mode of travel and frequency of transit and non-motorized trips; (2) provide estimates of how travel behavior changes following the complete street conversion across population groups with different demographic and socio-economic characteristics; (3) demonstrate how impacts of complete street conversions may vary across different land use and road types; (4) identify the potential barriers to the usage of complete streets; (5) understand how personal exposure to vehicle-related air pollution differs between street users, in particular bicyclists and pedestrians, when using complete and incomplete streets.

Significance to the Board
This study will evaluate how complete street conversion influence travel behavior and mode choice and will help to determine the effectiveness of complete streets conversions for reducing VMT and vehicle-related air pollution. The study will also provide information on barriers to changes in travel behavior and how vehicle-related air pollution levels may differ among different street users. The information from this study will inform urban planners on the air quality benefits of complete street conversions.

Contractor:
University of California, Los Angeles

Contract Period:
36 months

Principal Investigator (PI):
Yifang Zhu, Ph.D.

Contract Amount:
$250,000

Basis for Indirect Cost Rate:
The State and the UC system have agreed to a ten percent indirect cost rate.

Past Experience with this Principal Investigator:
Dr. Yifang Zhu is an expert in conducting field studies, especially air pollution and exposure assessment research studies. Nancy McGuckin, the consultant for this proposed study, has considerable experience on implementing travel behavior surveys and is an internationally respected behavioral analyst. The main focus of Dr. Rui Wang's research has been on policy analysis and environmental and urban transportation development. He has substantial experience in conducting field studies related to transportation and environmental issues and travel behavior analysis.

Prior Research Division Funding to University of California, Los Angeles:

Year	2011	2010	2009
Funding	$630,264	$290,000	$539,284

BUDGET SUMMARY

Contractor: University of California, Los Angeles

"Effects of Complete Streets on Travel Behavior and Exposure to Vehicular Emissions"

DIRECT COSTS AND BENEFITS			
1.	Labor and Employee Fringe Benefits	$ 164,315	
2.	Subcontractors	$ 15,000	
3.	Equipment	$ 0	
4.	Travel and Subsistence	$ 2,330	
5.	Electronic Data Processing	$ 0	
6.	Reproduction/Publication	$ 220	
7.	Mail and Phone	$ 4,054	
8.	Supplies	$ 3,448	
9.	Analyses	$ 0	
10.	Miscellaneous	$ 40,496[1]	
	Total Direct Costs		$229,863
INDIRECT COSTS			
1.	Overhead	$ 20,137	
2.	General and Administrative Expenses	$ 0	
3.	Other Indirect Costs	$ 0	
4.	Fee or Profit	$ 0	
	Total Indirect Costs		$20,137
TOTAL PROJECT COSTS			**$250,000**

[1] The Miscellaneous category includes tuition and fees and survey incentives. The tuition and fees cover costs needed for a full-time graduate student researcher who will assist in conducting the field survey, data collection, and analysis. The survey incentives are for those interviewees that are willing to participate in the household and intercept surveys, to help compensate for their time in taking the survey.

ATTACHMENT 1

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractor: Nancy McGuckin

Description of subcontractor's responsibility: Nancy McGuckin has extensive experience designing and conducting travel behavior surveys; she will serve as a consultant in this study. Nancy will provide advice on the intercept survey design, assist with questionnaire development for the before/after survey, conduct field inspection and pretest the survey instrument, train the graduate students to conduct the intercept survey and participate in field work. She also will be involved in analyzing the survey data, developing quarterly reports and the final report including responding to comments from ARB staff, and participating in contract meetings.

DIRECT COSTS AND BENEFITS				
1.	Labor and Employee Fringe Benefits	$	15,000	
2.	Subcontractors	$	0	
3.	Equipment	$	0	
4.	Travel and Subsistence	$	0	
5.	Electronic Data Processing	$	0	
6.	Reproduction/Publication	$	0	
7.	Mail and Phone	$	0	
8.	Supplies	$	0	
9.	Analyses	$	0	
10.	Miscellaneous	$	0	
	Total Direct Costs			$15,000
INDIRECT COSTS				
1.	Overhead	$	0	
2.	General and Administrative Expenses	$	0	
3.	Other Indirect Costs	$	0	
4.	Fee or Profit	$	0	
	Total Indirect Costs			$ 0
TOTAL PROJECT COSTS				**$15,000**