



ATTACHMENT 1: SCOPE OF WORK

Capital Region Transportation Sector Urban Heat Island Mitigation Project

RFP Issued: June 18, 2018
Proposals Due: July 13, 2018, 5:00 PM PDT

Task 1: Project Initiation and Management

Task 1.1: Initial Meeting with Caltrans
 SMAQMD is responsible for this task.

Task 1.2: Contract with Sub-Applicant
 SMAQMD is responsible for this task.

Task 1.3: Request for Proposals and Contracting with Consultants
 LGC is responsible for this task.

Task 1.4: Project Kickoff Meeting
 Consultant will participate in kickoff meeting after they are selected.

Task 1.5: Project Management
 SMAQMD is responsible for this task.

Task 1.6: Technical Advisory Committee
 Consultant will participate in quarterly meetings of the technical advisory committee that will be established for this project. LGC, with support from SMAQMD, will convene the committee. Participants will include Caltrans staff, SACOG, SMUD, cities and counties in the SACOG region, and other stakeholders with expertise in the transportation, land use and community development, public health, and other relevant sectors. The committee will provide guidance and input throughout the duration of the project duration on the development of the Regional Heat Pollution Reduction Plan, assessment of UHI mitigation measures, and prioritization of transportation infrastructure, corridors, and projects.

| Task | Deliverables |
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| 1.1 | <i>Meeting notes summary</i> |
| 1.2 | <i>Copy of executed subcontract</i> |
| 1.3 | <i>Copy of procurement procedures and executed consultant contracts</i> |

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| 1.4 | <i>Meeting agendas; meeting note summaries; participant lists</i> |
| 1.5 | <i>Meeting notes</i> |
| 1.6 | <i>Meeting agendas; meeting note summaries; participant lists</i> |

Task 2: Community Outreach and Engagement

Task 2.1: Community Engagement Plan

LGC is responsible for this task.

Task 2.2: Community Engagement

LGC is responsible for this task.

Task 2.3: Community Priorities Report and Map

LGC is responsible for this task.

| Task | Deliverables |
|-------------|---|
| 2.1 | <i>Community Engagement Plan; notes from listening sessions; summary of literature review</i> |
| 2.2 | <i>Workshop agendas; workshop notes; participant lists</i> |
| 2.3 | <i>Community Priorities Report; Community Priorities Map</i> |

Task 3: Advanced Urban Heat Island Effect Analysis

The Consultant will build a model for the heat island effect for the Sacramento region. The model will be able to identify areas most impacted by heat and analyze the effectiveness of selected mitigation measures and deployment scenarios. The model will include at a minimum Sacramento, Placer, El Dorado, and Yolo County, and ideally also Yuba and Sutter County. The model will also cover one future climate scenario. Mitigation measures selected for analysis will be decided based on community outreach outcomes and discussions with SMAQMD, LGC, and the Technical Advisory Committee, but will likely include cool roofs, cool pavements, urban forestry, solar photovoltaic deployment, electric vehicle deployment, and green infrastructure.

Task 3.1: Land-use and land-cover analysis

The Consultant will develop a detailed characterization of land use and land cover (LULC) for the greater SACOG region that is sufficiently detailed and spatially resolved to serve as a basis for input into land-surface modules of atmospheric models. The Consultant will identify and acquire existing and in-progress, area-specific LULC data from datasets generated by local agencies and from the National Land Cover Database for the SACOG region. The Consultant will characterize at fine scales for present years (current conditions) and future years projected changes in urbanization and land use, and define

technical potential for deployment of UHI mitigation measures and the corresponding spatial characteristics of their implementation.

Task 3.2: Observational data preparation

The Consultant will acquire and quality-check observational weather data from the SACOG study domain, and obtain existing weather data from mesonet and METAR stations networks in the region, for several years of the current climate. The Consultant will analyze data and prepare for its use in subsequent sub-tasks including in meteorological-model performance evaluation and in data assimilation into atmospheric models. The Consultant will also use observational data to verify the spatial patterns of modeled urban heat islands to be generated for the SACOG region.

Task 3.3: Base atmospheric modeling and model performance evaluation

The Consultant will establish a reference state meteorology model for the current climate to serve as a base case scenario to evaluate model performance, as well as to help select the best model configurations, parameterizations, urban representations, and inputs. The Consultant will evaluate several urbanized meteorological modeling approaches and parameterizations to select the best scheme. The Consultant will also consider several air quality issues to define constraints on the meteorological modeling to ensure that it accounts for potential adverse effects in developing mitigation scenarios, thus maximizing benefits and minimizing negative impacts. These air quality issues will include the impact of surface cooling on boundary-layer height and mixing, the impacts of albedo from cool roofs and pavements, and the effects of biogenic emissions from certain tree species.

Task 3.4: Atmospheric modeling of scenarios and mitigation measures under the current climate scenario

The Consultant will carry out atmospheric modeling for the SACOG region under the current climate scenario to characterize area-specific urban climate features, flow field, urban heat transport, urban heat island effect, and urban heat island index. Indicators such as cumulative, instantaneous, peaks, maxima, and threshold-level metrics will be used to create region-specific urban heat island index models. Heat-related diagnostic variables from the meteorological model will also be used, depending on the parameterization selections. The Consultant will also use climate reanalysis to drive fine-scale meteorological simulations with a highly urbanized, fine-resolution version of the model, simulating current years focusing on summer months.

The Consultant will also model various perturbation scenarios to characterize the effectiveness of selected mitigation measures. The mitigation measures and scenarios will be developed in consultation with SMAQMD, SMUD, SACOG, and other project partners, integrating stakeholder input from community workshops (Task 2). Scenarios under consideration include: urban forestry and green spaces near the transportation system and throughout urban areas; solar PV shading parking lots and atop suitable buildings; electric vehicles and charging infrastructure; and cool pavements, where suitable, and cool roofs.

Task 3.5: Atmospheric modeling of scenarios and mitigation measures in the future climate

The Consultant will analyze the heat island effect and a subset of the mitigation measures selected in Task 3.4 for a future climate scenario. The Consultant will carry out dynamic downscaling of a global climate model to drive mesoscale and fine-scale urbanized meteorological simulations of the SACOG region, selecting future years and downscaling representative concentration pathways (e.g., RCP 4.5, 6.0, or 8.5), focusing on the summer months. The Consultant will model the future climate and future land use and land cover to determine the future urban heat island index and the impact of mitigation

measures, and determine the impact of future climate change on the urban heat island effect, local meteorology, and urban climate.

Task 3.6: Develop Urban Heat Island Analysis Report

The Consultant will produce a report that summarizes Task 3.1 to 3.5 for dissemination. Study results will be shared as GIS data and/or Google Earth data, and through peer-reviewed publications. The report will also integrate priorities from disadvantaged communities and align with State of California initiatives and priorities, including the General Plan Guidelines, Safeguarding California, and other State adaptation policies.

| Task | Deliverable |
|-------------|--|
| 3.1 | <i>Summary of land-use and land-cover analysis</i> |
| 3.2 | <i>Summary of data analyzed</i> |
| 3.3 | <i>Reference-state modeled meteorology for current climate</i> |
| 3.4 | <i>Atmospheric modeling of current climate and current land-use and land-cover; characterization of mitigation measures; scenarios for current climate</i> |
| 3.5 | <i>Atmospheric modeling of future climate and future land-use and land-cover; scenarios for future climate</i> |
| 3.6 | <i>UHI Analysis Report; GIS or Google Earth data; datasets</i> |

Task 4: Regional Transportation Database

Task 4.1: Compile existing transportation plans and projects
SMAQMD is responsible for this task.

Task 4.2: Assess electric vehicle ownership and infrastructure projections
SMAQMD is responsible for this task.

Task 4.3: Develop Regional Transportation Database and Map
The Planning Consultant is responsible for this task.

| Task | Deliverable |
|-------------|--|
| 4.1 | <i>List of transportation projects and plans compiled</i> |
| 4.2 | <i>Summary of electric vehicle scenarios and their impacts and vulnerabilities to heat</i> |

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| 4.3 | <i>Regional Transportation Database; GIS or Google Earth Map</i> |
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Task 5: Regional Heat Pollution Reduction Plan

Task 5.1: Draft Regional Heat Pollution Reduction Plan

The Consultant will provide modeling results from Task 3 for incorporation into the Regional Heat Pollution Reduction Plan to identify priority areas for UHI mitigation and identify the combination of mitigation measures and implementation scenarios that would maximize cooling effectiveness.

Task 5.2: Finalize Regional Heat Pollution Reduction Plan

The Planning Consultant is responsible for this task.

| Task | Deliverable |
|------|---|
| 5.1 | <i>Draft Regional Heat Pollution Reduction Plan</i> |
| 5.2 | <i>Final Regional Heat Pollution Reduction Plan</i> |

Task 6: Integration and Dissemination of Project Results

Task 6.1: Develop targeted recommendations for local jurisdictions

The Planning Consultant is responsible for this task.

Task 6.2: Develop Project Summary Report

LGC is responsible for this task.

Task 6.3: Hold webinar and one in-person event

LGC is responsible for this task.

Task 6.4: Develop case study for ICARP

LGC is responsible for this task.

| Task | Deliverable |
|------|--|
| 6.1 | <i>Targeted local jurisdiction recommendations and template language</i> |
| 6.2 | <i>Project Summary Report</i> |
| 6.3 | <i>Webinar; participant list</i> |
| 6.4 | <i>Case study for ICARP</i> |

Task 7: Administration

Task 7.1: Invoicing

Consultant will be responsible for submitting all invoices and supporting materials on time, abiding by SMAQMD's process and timeline.

Task 7.2: Reporting

SMAQMD is responsible for this task.

| Task | Deliverable |
|-------------|---------------------------------------|
| 7.1 | <i>Quarterly invoices to Caltrans</i> |
| 7.2 | <i>Quarterly reports for Caltrans</i> |