



**CONTRACT REQUEST FORM (CRF)**

CEC-94 (Revised 01/13)

CALIFORNIA ENERGY COMMISSION



<b>I) List all key partners:</b> (attach additional sheets as necessary)
Legal Company Name:

<b>J) Budget Information</b>			
Funding Source	Funding Year of Appropriation	Budget List No.	Amount
NG Subaccount, PIERDD	13-14	501.001H	\$325,000
R&D Program Area: EGRO: EA		TOTAL:	\$325,000
Explanation for "Other" selection			
Reimbursement Contract #:		Federal Agreement #:	

<b>K) Contractor's Administrator/ Officer</b>		<b>Contractor's Project Manager</b>	
Name:	Jane Meyer	Name:	Benjamin Brooks
Address:	345 MIDDLEFIELD RD	Address:	345 MIDDLEFIELD RD
City, State, Zip: MENLO PARK, CA 94025-3561		City, State, Zip: MENLO PARK, CA 94025-3561	
Phone:	650-329-4741 /	Fax:	- -
E-Mail:	jmeyer@usgs.gov	E-Mail:	bbrooks@usgs.gov

<b>L) Selection Process Used</b> (For amendments, address amendment exemption or NCB, do not identify solicitation type of original agreement.)			
<input type="checkbox"/> Solicitation	Select Type	Solicitation #:	# of Bids: _____ Low Bid? <input type="checkbox"/> No <input type="checkbox"/> Yes
<input type="checkbox"/> Non Competitive Bid	(Attach CEC 96)		
<input checked="" type="checkbox"/> Exempt	Other Governmental Entity		

<b>M) Contractor Entity Type</b>	
<input type="checkbox"/> Private Company (including non-profits)	
<input type="checkbox"/> CA State Agency (including UC and CSU)	
<input checked="" type="checkbox"/> Government Entity (i.e. city, county, federal government, air/water/school district, joint power authorities, university from another state)	

<b>N) Is Contractor a certified Small Business (SB), Micro Business (MB) or DVBE?</b>	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
If yes, check appropriate box:	<input type="checkbox"/> SB <input type="checkbox"/> MB <input type="checkbox"/> DVBE

<b>O) Civil Service Considerations</b>	
<input type="checkbox"/> Not Applicable (Agreement is with a CA State Entity or a membership/co-sponsorship)	
<input checked="" type="checkbox"/> Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)	
<input type="checkbox"/> The Services Contracted:	
<input type="checkbox"/> are not available within civil service	
<input type="checkbox"/> cannot be performed satisfactorily by civil service employees	
<input type="checkbox"/> are of such a highly specialized or technical nature that the expert knowledge, expertise, and ability are not available through the civil service system.	
<input type="checkbox"/> The Services are of such an:	
<input type="checkbox"/> urgent	
<input type="checkbox"/> temporary, or	
<input type="checkbox"/> occasional nature	
that the delay to implement under civil service would frustrate their very purpose.	
<b>Justification:</b>	
Public Resources Code 25620, et seq., authorizes the Commission to contract for the subject work. (PIER)	

<b>P) Payment Method</b>			
<input checked="" type="checkbox"/> A. Reimbursement in arrears based on:			
<input checked="" type="checkbox"/> Itemized Monthly	<input type="checkbox"/> Itemized Quarterly	<input type="checkbox"/> Flat Rate	<input type="checkbox"/> One-time
<input type="checkbox"/> B. Advanced Payment			
<input type="checkbox"/> C. Other, explain:			

<b>Q) Retention</b>	
1. Is Agreement subject to retention?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes
If Yes, Will retention be released prior to Agreement termination?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes



**R) Justification of Rates**

The rates for this agreement are consistent with the federal rates charged by the US Geological Survey for similar work.

**S) Disabled Veteran Business Enterprise Program (DVBE)**

1.  Exempt (Interagency/Other Government Entity)
2.  Meets DVBE Requirements      DVBE Amount:\$ \_\_\_\_\_ DVBE %: \_\_\_\_\_  
      Contractor is Certified DVBE  
      Contractor is Subcontracting with a DVBE: \_\_\_\_\_
3.  Contractor selected through CMAS or MSA with no DVBE participation.
4.  Requesting DVBE Exemption (attach CEC 95)

**T) Miscellaneous Contract Information**

1. Will there be Work Authorizations?       No       Yes
2. Is the Contractor providing confidential information?       No       Yes
3. Is the Contractor going to purchase equipment?       No       Yes
4. Check frequency of progress reports  
      Monthly       Quarterly       \_\_\_\_\_
5. Will a final report be required?       No       Yes
6. Is the agreement, with amendments, longer than a year? If yes, why?       No       Yes

The Department of General Services has agreed to give the Commission blanket authority to execute multi-year contracts to support the Commission's RD&D Programs.

**U) The following items should be attached to this CRF (as applicable)**

- |   |   |  |
|---|---|--|
| 1. Exhibit A, Scope of Work                         | <input type="checkbox"/> N/A            | <input checked="" type="checkbox"/> Attached |
| 2. Exhibit B, Budget Detail                         | <input type="checkbox"/> N/A            | <input checked="" type="checkbox"/> Attached |
| 3. CEC 96, NCB Request                              | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached            |
| 4. CEC 30, Survey of Prior Work                     | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached            |
| 5. CEC 95, DVBE Exemption Request                   | <input checked="" type="checkbox"/> N/A | <input type="checkbox"/> Attached            |
| 6. CEQA Documentation                               | <input type="checkbox"/> N/A            | <input checked="" type="checkbox"/> Attached |
| 7. Resumes  | <input type="checkbox"/> N/A            | <input checked="" type="checkbox"/> Attached |
| 8. CEC 105, Questionnaire for Identifying Conflicts |   | <input checked="" type="checkbox"/> Attached |

\_\_\_\_\_  
 Agreement Manager      Date      Office Manager      Date      Deputy Director      Date

## Exhibit A SCOPE OF WORK

### TECHNICAL TASK LIST

Task #	CPR	Task Name
1	N/A	Administration
2	N/A	Collaborative Development of Field Strategy
3	N/A	Conduct Field Campaign
4	N/A	Analyze Data
5	N/A	Calculate & Analyze Subsidence
6	N/A	Technology Transfer Activities

### GLOSSARY

*Specific terms and acronyms used throughout this work statement are defined as follows:*

Acronym	Definition
BLIDAR	Balloon or Backpack-mounted Light Detection And Ranging
CPR	Critical Project Review
DWR	Department of Water Resources
Energy Commission	California Energy Commission
InSAR	Interferometric Synthetic Aperture Radar
LiDAR	Light Detection And Ranging
MLS	Mobile Laser System, including LiDAR
PAC	Project Advisory Committee
PG&E	Pacific Gas and Electric
PIER	Public Interest Energy Research
UAVSAR	Uninhabited Aerial Vehicle Synthetic Aperture Radar
UCC.1	Uniform Commercial Code (Financing Statement)
USGS	United States Geological Survey

### Problem Statement

The 2012 Vulnerability and Adaptation Study, also known as the Third California Climate Change Assessment, revealed general subsidence of the levee system through the use of Interferometric Synthetic Aperture Radar (InSAR) satellite data. However, InSAR data have several limitations in this context. For example, due to geometric decorrelation issues, InSAR data cannot detect subsidence rates above a certain threshold. Due to these limitations, results from the 2012 Vulnerability and Adaptation Study were not as detailed as necessary and are considered preliminary.

Although State-sponsored research has made significant strides in investigating the impacts of climate change on the energy system, to date most of this research has focused on the electricity system. The project responds to issues identified in a 2013

## **Exhibit A**

### **SCOPE OF WORK**

IEPR workshop, namely the need to safeguard the natural gas system against the risks posed by a failing Delta Island levee infrastructure that is aggravated by sea level rise.

The focus of this project is a unique novel, low-cost, ground-based Light Detection and Ranging (LiDAR) technology called “Mobile Laser Scanning” (MLS), developed with previous Energy Commission funding, to measure subsidence associated with the Delta Island levees at unprecedented spatial and temporal scales. Over a period of two years, the research team anticipates being able to provide subsidence rate measurements associated with the majority of levees associated with critical energy infrastructure including gas pipelines, storage fields, power stations, and transmission lines. This would represent a level of synoptic assessment of levee stability and subsidence previously unobtainable.

MLS has a significant advantage over space-based (e.g. InSAR) or air-based approaches (e.g., Uninhabited Aerial Vehicle Synthetic Aperture Radar (UAVSAR) or Airborne LiDAR), in that it only requires one person and a truck to mobilize, versus an entire team or satellite operation. Furthermore, data are fully processed either before returning from the field or a few hours upon return versus months or years for UAVSAR data, for example. MLS is extremely well-suited for monitoring energy system infrastructure, as it allows field researchers to focus on critical locations, revisit them as frequently as needed, and adapt the field strategy as appropriate if new information suggests the need to do so. This will allow for unprecedented understanding of the processes controlling subsidence and levee failure. Additionally, because LiDAR data are free of the coherence and correlation issues that afflict InSAR data based on radar, MLS accommodates much longer-term deformation mapping, which is crucial for ongoing vulnerability assessment of critical natural gas infrastructure.

This project will deliver measurements of Delta Island levee system subsidence in the areas of the Delta’s energy infrastructure with an appropriate level of spatial and temporal resolution to support vulnerability mapping as well as estimates of when key levees are likely to fail to meet protective standards, taking into account updates sea level rise scenarios. These measurements will substantially improve on prior work that reveals significant subsidence in the Delta Island levee system but does not offer sufficient detail to assess and safeguard against risks to the natural gas system.

#### **Goals of the Agreement**

The goal of this agreement is to observe subsidence related to the Delta Island levee system with unprecedented spatiotemporal detail. Investigators will focus their observations in locations where the Delta energy infrastructure (natural gas pipelines, underground natural gas storage, and electricity transmission lines) is most critical. Initial surveying will occur at the Rio Vista Gas Field, followed by Pacific Gas and Electric Company’s McDonald Island Gas storage, and systematic scanning of levees associated with gas pipelines and power transmission lines.

Investigators will rely primarily on a Balloon or backpack-mounted Light Detection and Ranging (BLIDAR) mounted on a specially outfitted truck that is already in the United

## **Exhibit A**

### **SCOPE OF WORK**

States Geological Survey's (USGS) possession. Bi-monthly surveys along levee crest roads will enable surveying a distance of approximately 1700 km of levee crests, with higher frequency surveys to explore high-priority energy infrastructure zones.

This agreement will leverage findings of an ongoing Energy Commission-funded project that is exploring coastal and inland risks of sea level rise to the natural gas infrastructure as well as a 2007 Delta-wide data set obtained by the Department of Water Resources (DWR) through airborne LiDAR.

#### **Objectives of the Agreement**

The project involves bi-monthly surveys along Delta levee crest roads. The ability to travel at speeds of more than 10km/hr while conducting laser scans means that the team should be able to cover distance equivalent to the approximately 1700km of levee crests. Rather than this complete coverage, however, the team will conduct higher frequency surveys of high-priority energy infrastructure zones. Results will be shared with other Energy Commission-funded researchers.

Individual scans will be compared to the 2007 Delta-wide DWR LiDAR data set. Ultimately, this project will deliver:

- A map identifying rates of subsidence associated with levees critical to energy infrastructure;
- A systematic assessment of the time until levee sections will fall below PL 84-99 standards, given updated sea-level rise scenarios and measurements.

#### **Electronic File Format**

The Contractor shall deliver an electronic copy (CD ROM or memory stick or as otherwise specified by the CCM) of the full text in a compatible version of Microsoft Word (.doc).

The following describes the accepted formats of electronic data and documents provided to the Energy Commission as contract deliverables and establishes the computer platforms, operating systems and software versions that will be required to review and approve all software deliverables.

- Data sets shall be in Microsoft (MS) Access or MS Excel file format.
- PC-based text documents shall be in MS Word file format.
- Documents intended for public distribution shall be in PDF file format, with the native file format provided as well.
- Project management documents shall be in MS Project file format.

#### **Software Application Development**

If this scope of work includes any software application development, including but not limited to databases, websites, models, or modeling tools, contractor shall utilize the following standard Application Architecture components in compatible versions:

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- Microsoft ASP.NET framework (version 3.5 and up) Recommend 4.0
- Microsoft Internet Information Services (IIS), (version 6 and up) Recommend 7.5
- Visual Studio.NET (version 2008 and up) Recommend 2010
- C# Programming Language with Presentation (UI), Business Object and Data Layers
- SQL (Structured Query Language)
- Microsoft SQL Server 2008, Stored Procedures Recommend 2008 R2
- Microsoft SQL Reporting Services Recommend 2008 R2
- XML (external interfaces)

Any exceptions to the Electronic File Format requirements above must be approved in writing by the Energy Commission Information Technology Services Branch.

#### **TASK 1.0 ADMINISTRATION**

##### **MEETINGS**

###### **Task 1.1 Attend Kick-off Meeting**

The goal of this task is to establish the lines of communication and procedures for implementing this Agreement.

###### **The Contractor shall:**

- Attend a “kick-off” meeting with the Commission Contract Manager, the Contracts Officer, and a representative of the Accounting Office. The Contractor shall bring their Project Manager, Contracts Administrator, Accounting Officer, and others designated by the Commission Contract Manager to this meeting. The administrative and technical aspects of this Agreement will be discussed at the meeting. Prior to the kick-off meeting, the Commission Contract Manager will provide an agenda to all potential meeting participants.

The administrative portion of the meeting shall include, but not be limited to, the following:

- Terms and conditions of the Agreement
- CPRs (Task 1.2)
- Permit documentation (Task 1.8)

The technical portion of the meeting shall include, but not be limited to, the following:

- The Commission Contract Manager’s expectations for accomplishing tasks described in the Scope of Work;
- An updated Schedule of Deliverables
- An updated Gantt Chart (optional)
- Progress Reports (Task 1.4)
- Technical Deliverables (Task 1.5)

## **Exhibit A**

### **SCOPE OF WORK**

- Final Report (Task 1.6)
- Establish the PAC (Task 1.9) (optional)
- PAC Meetings (Task 1.10) (optional)

The Commission Contract Manager shall designate the date and location of this meeting.

#### **Contractor Deliverables:**

- An Updated Schedule of Deliverables
- An Updated List of Match Funds
- An Updated List of Permits

#### **Commission Contract Manager Deliverables:**

- Final Report Instructions

#### **Task 1.2 CPR Meetings (N/A)**

The goal of this task is to determine if the project should continue to receive Energy Commission funding to complete this Agreement and if it should, are there any modifications that need to be made to the tasks, deliverables, schedule or budget.

CPRs provide the opportunity for frank discussions between the Energy Commission and the Contractor. CPRs generally take place at key, predetermined points in the Agreement, as determined by the Commission Contract Manager and as shown in the Technical Task List above and in the Schedule of Deliverables. However, the Commission Contract Manager may schedule additional CPRs as necessary, and any additional costs will be borne by the Contractor.

Participants include the Commission Contract Manager and the Contractor, and may include the Commission Contracts Officer, the PIER Program Team Lead, other Energy Commission staff and Management as well as other individuals selected by the Commission Contract Manager to provide support to the Energy Commission.

#### **The Commission Contract Manager shall:**

- Determine the location, date and time of each CPR meeting with the Contractor. These meetings generally take place at the Energy Commission, but they may take place at another location.
- Send the Contractor the agenda and a list of expected participants in advance of each CPR. If applicable, the agenda shall include a discussion on both match funding and permits.
- Conduct and make a record of each CPR meeting. One of the outcomes of this meeting will be a schedule for providing the written determination described below.
- Determine whether to continue the project, and if continuing, whether or not to modify the tasks, schedule, deliverables and budget for the remainder of the Agreement, including not proceeding with one or more tasks.

## **Exhibit A**

### **SCOPE OF WORK**

- Provide the Contractor with a written determination in accordance with the schedule. The written response may include a requirement for the Contractor to revise one or more deliverable(s) that were included in the CPR.

#### **The Contractor shall:**

- Prepare a CPR Report for each CPR that discusses the progress of the Agreement toward achieving its goals and objectives. This report shall include recommendations and conclusions regarding continued work of the projects. This report shall be submitted along with any other deliverables identified in this Scope of Work. Submit these documents to the Commission Contract Manager and any other designated reviewers at least 15 working days in advance of each CPR meeting.
- Present the required information at each CPR meeting and participate in a discussion about the Agreement.

#### **Contractor Deliverables:**

- CPR Report(s)
- CPR deliverables identified in the Scope of Work

#### **Commission Contract Manager Deliverables:**

- Agenda and a List of Expected Participants
- Schedule for Written Determination
- Written Determination

#### **Task 1.3 Final Meeting**

The goal of this task is to closeout this Agreement.

#### **The Contractor shall:**

- Meet with the Energy Commission to present the findings, conclusions, and recommendations. The final meeting must be completed during the closeout of this Agreement.

This meeting will be attended by, at a minimum, the Contractor, the Commission Contracts Officer, and the Commission Contract Manager. The technical and administrative aspects of Agreement closeout will be discussed at the meeting, which may be two separate meetings at the discretion of the Commission Contract Manager.

The technical portion of the meeting shall present findings, conclusions, and recommended next steps (if any) for the Agreement. The Commission Contract Manager will determine the appropriate meeting participants.

The administrative portion of the meeting shall be a discussion with the Commission Contract Manager and the Contracts Officer about the following Agreement closeout items:

- What to do with any state-owned equipment (Options)

## **Exhibit A**

### **SCOPE OF WORK**

- Need to file UCC.1 form re: Energy Commission's interest in patented technology
- Energy Commission's request for specific "generated" data (not already provided in Agreement deliverables)
- Need to document Contractor's disclosure of "subject inventions" developed under the Agreement
- "Surviving" Agreement provisions, such as repayment provisions and confidential deliverables
- Final invoicing and release of retention
- Prepare a schedule for completing the closeout activities for this Agreement.

#### **Deliverables:**

- Written documentation of meeting agreements and all pertinent information
- Schedule for completing closeout activities

### **REPORTING**

**See Exhibit D, Reports/Deliverables/Records.**

#### **Task 1.4 Monthly Progress Reports**

The goal of this task is to periodically verify that satisfactory and continued progress is made towards achieving the research objectives of this Agreement.

#### **The Contractor shall:**

- Prepare progress reports which summarize all Agreement activities conducted by the Contractor for the reporting period, including an assessment of the ability to complete the Agreement within the current budget and any anticipated cost overruns. Each progress report is due to the Commission Contract Manager within 10 working days after the end of the reporting period. Attachment A-2, Progress Report Format, provides the recommended specifications.

#### **Deliverables:**

- Monthly Progress Reports

#### **Task 1.5 Test Plans, Technical Reports and Interim Deliverables**

The goal of this task is to set forth the general requirements for submitting test plans, technical reports and other interim deliverables, unless described differently in the Technical Tasks. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/>

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### **SCOPE OF WORK**

#### **The Contractor shall:**

- Unless otherwise directed in this Scope of Work, submit a draft of each deliverable listed in the Technical Tasks to the Commission Contract Manager for review and comment in accordance with the approved Schedule of Deliverables. The Commission Contract Manager will provide written comments back to the Contractor on the draft deliverable within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final deliverable to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final deliverable within 5 working days of receipt. Key elements from this deliverable shall be included in the Final Report for this project.

#### **Task 1.6 Final Report**

The goal of this task is to prepare a comprehensive written Final Report that describes the original purpose, approach, results and conclusions of the work done under this Agreement. The Commission Contract Manager will review and approve the Final Report. The Final Report must be completed on or before the termination date of the Agreement. When creating these deliverables, the Contractor shall use and follow, unless otherwise instructed in writing by the Commission Contract Manager, the latest version of the PIER Style Manual published on the Energy Commission's web site:

<http://www.energy.ca.gov/contracts/pier/contractors/>

The Final Report shall be a public document. If the Contractor has obtained confidential status from the Energy Commission and will be preparing a confidential version of the Final Report as well, the Contractor shall perform the following subtasks for both the public and confidential versions of the Final Report.

#### **Task 1.6.1 Final Report Outline**

##### **The Contractor shall:**

- Prepare a draft outline of the Final Report.
- Submit the draft outline of Final Report to the Commission Contract Manager for review and approval. The Commission Contract Manager will provide written comments back to the Contractor on the draft outline within 10 working days of receipt. Once agreement has been reached on the draft, the Contractor shall submit the final outline to the Commission Contract Manager. The Commission Contract Manager shall provide written approval of the final outline within 5 working days of receipt.

##### **Deliverables:**

- Draft Outline of the Final Report
- Final Outline of the Final Report

## **Exhibit A**

### **SCOPE OF WORK**

#### **Task 1.6.2 Final Report**

##### **The Contractor shall:**

- Prepare the draft Final Report for this Agreement in accordance with the approved outline.
- Submit the draft Final Report to the Commission Contract Manager for review and comment. The Commission Contract Manager will provide written comments within 10 working days of receipt.

Once agreement on the draft Final Report has been reached, the Commission Contract Manager shall forward the electronic version of this report for Energy Commission internal approval. Once the approval is given, the Commission Contract Manager shall provide written approval to the Contractor within 5 working days.

- Submit one bound copy of the Final Report with the final invoice.

##### **Deliverables:**

- Draft Final Report
- Final Report

#### **MATCH FUNDS, PERMITS, AND ELECTRONIC FILE FORMAT**

##### **Task 1.7 Identify and Obtain Matching Funds**

The goal of this task is to ensure that the match funds planned for this Agreement are obtained for and applied to this Agreement during the term of this Agreement.

The costs to obtain and document match fund commitments are not reimbursable through this Agreement. While the PIER budget for this task will be zero dollars, the Contractor may utilize match funds for this task. Match funds shall be spent concurrently or in advance of PIER funds during the term of this Agreement. Match funds must be identified in writing, and the associated commitments obtained before the Contractor can incur any costs for which the Contractor will request reimbursement.

##### **The Contractor shall:**

- Prepare a letter documenting the match funding committed to this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
  1. If no match funds were part of the proposal that led to the Energy Commission awarding this Agreement and none have been identified at the time this Agreement starts, then state such in the letter.
  2. If match funds were a part of the proposal that led to the Energy Commission awarding this Agreement, then provide in the letter:
    - A list of the match funds that identifies the:
      - Amount of each cash match fund, its source, including a contact name, address and telephone number and the task(s) to which the match

## **Exhibit A**

### **SCOPE OF WORK**

funds will be applied.

- Amount of each in-kind contribution, a description, documented market or book value, and its source, including a contact name, address and telephone number and the task(s) to which the match funds will be applied. If the in-kind contribution is equipment or other tangible or real property, the Contractor shall identify its owner and provide a contact name, address and telephone number, and the address where the property is located.
- A copy of the letter of commitment from an authorized representative of each source of cash match funding or in-kind contributions that these funds or contributions have been secured.
- Discuss match funds and the implications to the Agreement if they are significantly reduced or not obtained as committed, at the kick-off meeting. If applicable, match funds will be included as a line item in the progress reports and will be a topic at CPR meetings.
- Provide the appropriate information to the Commission Contract Manager if during the course of the Agreement additional match funds are received.
- Notify the Commission Contract Manager within 10 working days if during the course of the Agreement existing match funds are reduced. Reduction in match funds may trigger an additional CPR.

#### **Deliverables:**

- A letter regarding Match Funds or stating that no Match Funds are provided
- Letter(s) for New Match Funds
- A copy of each Match Fund commitment letter
- Letter that Match Funds were Reduced (if applicable)

#### **Task 1.8 Identify and Obtain Required Permits**

The goal of this task is to obtain all permits required for work completed under this Agreement in advance of the date they are needed to keep the Agreement schedule on track.

Permit costs and the expenses associated with obtaining permits are not reimbursable under this Agreement. While the PIER budget for this task will be zero dollars, the Contractor shall show match funds for this task. Permits must be identified in writing and obtained before the Contractor can incur any costs related to the use of the permits for which the Contractor will request reimbursement.

#### **The Contractor shall:**

- Prepare a letter documenting the permits required to conduct this Agreement and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting:
  1. If there are no permits required at the start of this Agreement, then state such in the letter.

## **Exhibit A**

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2. If it is known at the beginning of the Agreement that permits will be required during the course of the Agreement, provide in the letter:
  - A list of the permits that identifies the:
    - Type of permit
    - Name, address and telephone number of the permitting jurisdictions or lead agencies
  - Schedule the Contractor will follow in applying for and obtaining these permits.
- The list of permits and the schedule for obtaining them will be discussed at the kick-off meeting, and a timetable for submitting the updated list, schedule and the copies of the permits will be developed. The implications to the Agreement if the permits are not obtained in a timely fashion or are denied will also be discussed. If applicable, permits will be included as a line item in the progress reports and will be a topic at CPR meetings.
- If during the course of the Agreement additional permits become necessary, then provide the appropriate information on each permit and an updated schedule to the Commission Contract Manager.
- As permits are obtained, send a copy of each approved permit to the Commission Contract Manager.
- If during the course of the Agreement permits are not obtained on time or are denied, notify the Commission Contract Manager within 5 working days. Either of these events may trigger an additional CPR.

#### **Deliverables:**

- A letter documenting the Permits or stating that no Permits are required
- Updated list of Permits as they change during the Term of the Agreement
- Updated schedule for acquiring Permits as it changes during the Term of the Agreement
- A copy of each approved Permit

#### **Project Advisory Committee (PAC)**

##### **Task 1.9 Establish the PAC**

The goal of this task is to create an advisory committee for this Agreement.

The PAC should be composed of diverse professionals. The number can vary depending on potential interest and time availability. The exact composition of the PAC may change as the need warrants. PAC members serve at the discretion of the Commission Contract Manager.

The PAC may be composed of qualified professionals spanning the following types of disciplines:

- Researchers knowledgeable about the project subject matter
- Members of the trades who will apply the results of the project (e.g., designers, engineers, architects, contractors, and trade representatives)

## **Exhibit A**

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- Members of other State, federal, and/or local agencies for whom results may be leveraged to meet their responsibilities (e.g., Department of Water Resources, Delta Stewardship Council, California Public Utilities Commission)
- Public Interest Environmental Groups
- Utility Representatives
- Members of the relevant technical society committees

The purpose of the PAC is to:

- Provide guidance in research direction. The guidance may include scope of research; research methodologies; timing; coordination with other research. The guidance may be based on:
  - technical area expertise
  - knowledge of applications for research results
  - linkages between the agreement work and other past, present or future research (both public and private sectors) they are aware of in a particular area.
- Review deliverables. Provide specific suggestions and recommendations for needed adjustments, refinements, or enhancement of the deliverables.
- Evaluate tangible benefits to California of this research and provide recommendations, as needed, to enhance tangible benefits.
- Provide recommendations regarding information dissemination relevant to the research products.

#### **The Contractor shall:**

- Work with the contract manager to prepare a draft list of potential PAC members that includes name, company, physical and electronic address, and phone number and submit it to the Commission Contract Manager at least 2 working days prior to the kick-off meeting. This list will be discussed at the kick-off meeting and a schedule for recruiting members and holding the first PAC meeting will be developed.
- Recruit PAC members and ensure that each individual understands the member obligations described above, as well as the meeting schedule outlined in Task 1.11.
- Prepare the final list of PAC members.
- Submit letters of acceptance or other comparable documentation of commitment for each PAC member.

#### **Deliverables:**

- Draft List of PAC Members
- Final List of PAC Members
- Letters of acceptance, or other comparable documentation of commitment for each PAC Member

## **Exhibit A**

### **SCOPE OF WORK**

#### **Task 1.10 Conduct PAC Meetings**

The goal of this task is for the PAC to provide strategic guidance to this project by participating in regular meetings or teleconferences.

#### **The Contractor shall:**

- Discuss the PAC meeting schedule, to be developed in collaboration with the Commission Contract Manager, at the kick-off meeting. The number of face-to-face meetings and teleconferences and the location of PAC meetings shall be determined in consultation with the Commission Contract Manager. This draft schedule shall be presented to the PAC members during recruiting and finalized at the first PAC meeting.
- Participate in PAC meetings in accordance with the schedule. Changes to the schedule must be pre-approved in writing by the Commission Contract Manager.
- Review PAC meeting agenda(s) drafted by Contract Manager with back-up materials for agenda items.
- Review PAC meeting summaries, drafted by Contract Manager, and provide recommended resolution of major PAC issues.

#### **Deliverables:**

- Draft PAC Meeting Schedule
- Final PAC Meeting Schedule
- PAC Meeting Agenda(s) with Back-up Materials for Agenda Items
- Written PAC meeting summaries, including recommended resolution of major PAC issues

# Exhibit A

## SCOPE OF WORK

### TECHNICAL TASKS

The Contractor shall prepare all deliverables in accordance with the requirements in Task 1.5.

#### **Task 2 Collaborative Development of Field Strategy**

The goal of this task is to consult with researchers who are developing hydrodynamic modeling of sea level rise impacts on the Delta as well as with client divisions at the Energy Commission and staff at the Department of Water Resources (if needed) to develop a strategy for field work that prioritizes areas of interest from a natural gas energy system perspective and areas where state-of-the-art modeling and surveying indicates a need for additional information about subsidence rates.

##### **The Contractor shall:**

- Consult with researchers at the University of California, Berkeley who are currently under contract with the Energy Commission (#500-11-016) to develop hydrodynamical models of sea level rise impacts on the Delta
- Consult with client divisions at the Energy Commission to elicit specific areas of concern from a natural gas energy system perspective; these areas may be critical to storage or transmission of natural gas
- Consult with staff at the Department of Water Resources, as available and relevant, to elicit information from past and current research that suggests places or particular interest regarding levee subsidence, whether on account of the rate(s) of subsidence, uncertainty, or other factors
- Prepare *agendas and brief meeting summaries* (approximately one page) for meetings with the parties consulted for submission to the CAM
- Develop a draft *field strategy* that takes into account the knowledge gained through the consultations outlined above, but retains flexibility to respond to learning that occurs during the field research and/or through other channels. The strategy must include a timeline delineating the places to be surveyed, for submission to the CAM

##### **Deliverables:**

- Agendas and Meeting Summaries
- Draft Field Strategy

#### **Task 3 Conduct Field Campaign**

The goal of this task is to acquire MLS data from the targeted areas. This will involve regular visits to the Delta according to the strategy and schedule developed in Task 2.

##### **The Contractor shall:**

- Acquire LiDAR and navigational (inertial navigation system and GPS) data by driving down Delta levee roads while the MLS system (e.g. BLIDAR) is mounted on the back of a truck

## **Exhibit A**

### **SCOPE OF WORK**

- Deploy a temporary GPS reference station within 10 km of each survey
- Submit *digital copies of raw LiDAR and navigation data* from the MLS system, as well as *digital copies of the raw GPS reference station data* to the CAM

#### **Deliverables:**

- Digital Copies of Raw LiDAR and Navigation Data
- Digital Copies of Raw GPS Reference Station Data

#### **Task 4 Analyze Field Data**

The goal of this task is to create a LiDAR point-cloud in a GPS-based ('georeferenced') reference frame.

#### **The Contractor shall:**

- Process the kinematic GPS trajectory of the MLS system with respect to the GPS reference station(s)
- Merge the inertial navigation data with the kinematic GPS trajectory
- Georeference the MLS point cloud data using the merged GPS and inertial data, and submit a *georeferenced MLS point cloud data set* to the CAM

#### **Deliverables:**

- Georeferenced MLS Point Cloud Data Set

#### **Task 5 Calculate and Analyze Subsidence**

The goal of this task is to create a subsidence map of the Delta levees. The map will cover the time period from 2007 to the date of collection of the new MLS data sets.

#### **The Contractor shall:**

- Place the 2007 data set in the same reference frame as the new MLS data sets.
- Difference the 2007 and new MLS data sets to produce a subsidence map (it is also possible that uplift may be found)
- Analyze patterns of subsidence and attempt to relate them to the subsidence process (e.g., peat compaction and levee failure)
- Prepare a *subsidence map* identifying rates of subsidence associated with levees critical to the energy infrastructure in the Delta for submission to CAM
- Prepare a *systematic assessment report*, based on the subsidence map, of the time until levee sections will fall below PL 84-99 standards, given updated sea level rise scenarios and measurements

#### **Deliverables:**

- Subsidence Map
- Systematic Assessment Report

## **Exhibit A**

### **SCOPE OF WORK**

#### **Task 6 Information Transfer Activities**

The goal of this task is to develop a plan to make the knowledge gained, experimental results, and lessons learned available to key decision-makers.

#### **The Contractor shall:**

- Prepare a *data layer in a format compatible with Cal-Adapt.org* (e.g. net CDF), and/or for archiving with other State data resources (e.g., Geoportal) so that knowledge gained in this project can be made available to the public
- Conduct information transfer activities as opportunities arise (e.g., workshops and conferences). Report on these activities in the Monthly Progress Reports

#### **Deliverables:**

- Cal-Adapt.org Data Layer

**RESOLUTION NO:**

**STATE OF CALIFORNIA**

**STATE ENERGY RESOURCES  
CONSERVATION AND DEVELOPMENT COMMISSION**

**RESOLUTION - RE: U.S. GEOLOGICAL SURVEY**

**RESOLVED**, that the State Energy Resources Conservation and Development Commission (Energy Commission) adopts the staff CEQA findings contained in the Agreement Request Form; and

**RESOLVED**, that the Energy Commission approves Agreement 500-14-001 with **U.S. Geological Survey** for a \$325,000 contract to measure subsidence associated with the Delta Island levees using a ground-based mobile laser scanning, light detection and ranging technology system. The data gathered in this agreement will assist in safeguarding the natural gas system against risks posed by a failing Delta Island levee infrastructure and aggravated by sea level rise; and

**FURTHER BE IT RESOLVED**, that the Executive Director or his/her designee shall execute the same on behalf of the Energy Commission.

**CERTIFICATION**

The undersigned Secretariat to the Commission does hereby certify that the foregoing is a full, true, and correct copy of a Resolution duly and regularly adopted at a meeting of the California Energy Commission held on August 27, 2014.

AYE: [List of Commissioners]

NAY: [List of Commissioners]

ABSENT: [List of Commissioners]

ABSTAIN: [List of Commissioners]

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Harriet Kallemeyn,  
Secretariat