Hawaii Energy and Environmental Technologies (HEET) Initiative

Office of Naval Research
Grant Award Number N0014-10-1-0310

Task 4.5 Energy Test Platforms
Deliverable 3

Turbine Installation: Site Preparation and Footings
Crissy Field Center Wind Power Study
March 2013

Hawai‘i Natural Energy Institute
School of Ocean and Earth Science and Technology
University of Hawai‘i at Mānoa
Deliverable 3
Turbine Installation: Site Preparation and Footings

Crissy Field Center
Wind Power Study

HNEI Subcontract, Prime Award No. N00014-10-1-0310

Golden Gate National Parks Conservancy
3/11/2013
Background

Per the terms of the project contract between the Golden Gate National Parks Conservancy and the Hawaii Natural Energy Institute, dated October 14, 2011, and as outlined in the Statement of Work, the Golden Gate National Parks Conservancy (Parks Conservancy) will plan, permit, install and operate up to five wind energy systems at the Crissy Field Center (CFC), an existing modular test platform manufactured by Project Frog. The Parks Conservancy will develop a Data Acquisition System (DAS) that will record wind speed, wind direction, and power generation for each wind energy system. Data from the DAS shall be made available to HNEI sufficient for industry standard analysis.

Performance of the turbines on the site will be monitored for approximately five years, with full access by HNEI to monitoring equipment and data. Project FROG will assist the Conservancy with integrating the wind energy data into a monitoring system that will track overall building performance – the system will also include a simple dashboard interface for use by the Center’s education programs.

Deliverable 3 Turbine Installation: Site Preparation and Footings

The Deliverables and Payment Schedule in the Contract Statement of Work stipulates that Report 3 show “…documented evidence of progress being made in the installation of the wind turbines; documentation to include photos and certification by subrecipients Contractor.”
1. Footings: Site Layout and Excavation

Electrical Conduit Layout

North Turbine Footing Layout
Excavation Start: South Footing

Excavation Start: South Footing
Excavation Start: South Footing

Footing Excavation
Footing Excavation

Footing Excavation
2. Excavation and Installation of Distribution Conduit

Main Electrical Conduit Trench

Pre-Installed Conduit Run to Building
Pre-Installed Electrical Conduit Run to Building

Connection: Facility to Turbine Electrical Conduit
Main Conduit Distribution to Turbines

Electrical Junction at Building Interior
Electrical Junction at Building Interior

Electrical Conduit At Mechanical Closet
3. Steel Reinforcement, Concrete

Rebar on Site

Rebar Installation Start
Tower Cage Rebar Prepared

Cages Tied to Bases
Rebar Placement

First Concrete Pour Complete
Second Concrete Pour Forms Prepared

Windspire Footing Encased in Sonotube
Second Pour

Completed Footing with Disconnect/Brake Switches
Typical Conduit Distribution to Turbines

Detection Tape at Conduit Trench: Ready for Backfill
Backfill in Progress

Backfill at Footings, by 6" Lift
4. Inspection Report and Final Affidavit for Concrete, Reinforcing Steel
1/31/2013

Golden Gate National Parks Conservancy (E)
Tom Odgers
Building 37 Fort Mason
San Francisco, CA 94123

RE: Exterior Electrical Charging Station Juice Bar at Crissy Field
1199 East Beach Street
San Francisco, CA 94129

CEL#: 1025642

FINAL REPORT FOR SPECIAL INSPECTION
AND MATERIALS TESTING SERVICES
(Effective Through 01/17/12)

In accordance with Section 1701, 1703, 1704 of the 2010 San Francisco Building Code, Consolidated Engineering Laboratories has provided the requested special inspection and testing on the subject project as listed below:

1. Concrete placement and testing.
2. Reinforcing steel placement.
3. Earthwork – compaction testing.

These inspections were performed by personnel under the general supervision of a Registered Civil Engineer in the State of California. Details of our work on this project are contained in our testing and inspection reports, issued during the course of construction.

Based solely upon the inspections and tests performed and upon our substantiating reports, it is our professional judgment that the inspected work was performed substantially in conformance with the approved plans and specifications, approvals by the Engineer of Record and the applicable workmanship provisions of the San Francisco Building Code.

Special inspection and materials testing is the observation of construction for general conformance with the approved design drawings and specifications. It should not be relied upon by others as acceptance or as a guarantee of work, nor should it in any manner relieve any contractor, or any other party, from their obligations and responsibilities under either the construction contract or generally accepted industry custom/practice.
We appreciate the opportunity of working with you. If you have any questions or require additional information, please feel free to contact us at your convenience.

REVIEWING ENGINEER: GREG LeROY, R.C.E.

CC:
Golden Gate National Parks Conservancy (E)

All reports are submitted as the confidential property of clients. Publication of statements, conclusions, or extracts is reserved pending our written approval.
1/31/2013

Golden Gate National Parks Conservancy (E)
Tom Odgers
Building 37 Fort Mason
San Francisco, CA 94123

RE: Exterior Electrical Charging Station
Juice Bar at Crissy Field
1199 East Beach Street
San Francisco, CA 94129

CELER#: 1025642

Inspection Date: 01/10-11/12
Location: Jobsite
Inspector: E. Bobrovitsky
Report #: 001

REINFORCING / CONCRETE INSPECTION REPORT

On the above dates, our representatives inspected the referenced project.

Please refer to the attached reports for details and locations of our testing and/or inspection services for
the above noted dates.

Work inspected was in compliance with approved plans and specifications.

REVIEWING ENGINEER: GREG LeROY, R.C.E.

CC:
Golden Gate National Parks Conservancy (E)

Enclosures (2)

All reports are submitted as the confidential property of our clients. Publication of statements, conclusions, or extracts is reserved pending our written approval.
CONCRETE, PRECAST AND REINFORCING

Project Name: Exterior Electrical Charging station
Job Project: 1025-047 0d & Bar at Sunny Field
Project Location: 144 Beach at 30th
Contractor: 

Testing/Inspection Date(s): 01/10/12

Inspected order placement at: & see below

<table>
<thead>
<tr>
<th>Number</th>
<th>Detail No.</th>
<th>Other</th>
</tr>
</thead>
</table>

Inspected placement of: [ ] Anchor bolts [ ] Bolt-downs [ ] Tie-downs
[ ] Cast in place [ ] Precast Operations

[ ] Measured loads for correct mix and proper slump
[ ] Fresh concrete properties report left with IOR

Inspected placing and vibrating of: [ ] cubic yards of concrete
[ ] cubic feet of grout

Performed: [ ] slump [ ] entrainment [ ] Unit weight tests

Cast: [ ] set(s) of cylinders [ ] grout cubes [ ] set(s) of shrinkage beams

Concrete Mix Number: 

Skumps in tolerance? [ ] Yes [ ] No [ ] Returned to plant for duration

Work inspected was: [ ] Completed [ ] In Progress [ ] Pending Approval

WIP Punchlist dated:

Non-compliance report dated:

[ ] was left with contractor [ ] items were reinspected and: [ ] accepted [ ] See attached [ ] remain in progress

Issues/Problems? [ ] Yes [ ] No (Describe below) Notified:

Notes:

<table>
<thead>
<tr>
<th>Number</th>
<th>Concrete</th>
<th>Placement Type (dual, wall, footing)</th>
<th>Structure/Location/Level</th>
<th>Location (Grid Lines)</th>
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<tbody>
<tr>
<td></td>
<td>[ ]</td>
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</tbody>
</table>

The Work: [ ] WAS [ ] WAS NOT INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE [ ] DSA [ ] OSHPD [ ] CITY APPROVED DOCUMENTS

The Work Inspected: [ ] MET [ ] DID NOT MEET THE REQUIREMENTS OF THE [ ] DSA [ ] OSHPD [ ] CITY APPROVED DOCUMENTS

Material Sampling: [ ] WAS [ ] WAS NOT [ ] N/A PERFORMED IN ACCORDANCE WITH THE [ ] DSA [ ] OSHPD [ ] CITY APPROVED DOCUMENTS

Signature of Special Inspector: Edward Bohmeyer
Print Name/Title: EDWARD ISOBOVITSKY / Special Inspector
CERTIFICATION#: 5065086
CONCRETE, PRECAST AND REINFORCING

Project Name: Exterior Electrical Charging Station
Cel Project#: 1625642
Project Location: 1199 Beach st. SF

Testing/Inspection Date(s): 01/11/12

Reported to: August

Inspected rebar placement at: * con below

Drawing No.: Detail No.: Other:

Inspected placement of: 
- Anchor bolts 
- Hold-downs 
- Tie-downs 
- Inspected: 
  - Cast-in-place 
  - Precast Operations

- Monitored loads for correct mix and proper slump.
- Fresh concrete properties report left with IOR

- Edited placing and vibrating of ___20___ cubic yards of concrete
- Inspected placing of ___ cubic feet of grout

- Performed 
  - Slump 
  - Air entrainment 
  - Unit weight tests

- Cast ___ (sets) of ___ cylinders 
  - grout cubes
- Cast ___ (sets) of shrinkage beams

Concrete Mix Number: 6012

Slumps in tolerance? 
- Yes 
- No 

Work inspected was: 
- Completed 
- In Progress 
- Pending Approval

WIP Punchlist date: 
- Non-compliance report dated:

- was left with contractor 
- Items were reinspected and: 
- accepted 
- See attached 
- remain in progress

Issues/Problems? 
- Yes 
- No (Describe below) 

Notified: 

Notes/Comments:

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<th>Rebar</th>
<th>Concrete</th>
<th>Placement Type (slab, wall, footing)</th>
<th>Structure Bldg/Level</th>
<th>Location (Grid Lines)</th>
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<tr>
<td>✓</td>
<td>✓</td>
<td>Footing</td>
<td></td>
<td>For Wind Turbines in front of Grady Field Gut (5 total)</td>
</tr>
<tr>
<td>✓</td>
<td>✓</td>
<td>Footing</td>
<td></td>
<td>For Charging Station (same area)</td>
</tr>
</tbody>
</table>

The Work: WAS NOT INSPECTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE DSA OSHPD IV CITY APPROVED DOCUMENTS

The Work Inspected: DID NOT MEET THE REQUIREMENTS OF THE DSA OSHPD IV CITY APPROVED DOCUMENTS

Material Sampling: WAS NOT N/A PERFORMED IN ACCORDANCE WITH THE DSA OSHPD IV CITY APPROVED DOCUMENTS

Signature of Special Inspector: Edward Boland
Date: 01/11/12

Print Name/Title: Edward Boland
Special Inspector

CERTIFICATION#: G065086