



Request for Quotes for Research Greenhouse to Support Work on Citrus Pests

The Citrus Research Board (CRB) is seeking quotes from greenhouse construction vendors to build a 24' x 30' greenhouse to grow high-quality citrus plants free of pests to support research on citrus pests and disease in an adjacent containment laboratory in Riverside, California. The project will require quotes for a complete package to design and build the greenhouse (including seeking permits) on an existing concrete slab outside of the containment laboratory. Electric, water, and sewer are available nearby. While we desire the capacity to grow citrus pest-free at a very high level of assurance, using a positive pressure HVAC system and an entry vestibule/passageway, there will not be a direct connection between the greenhouse and the permitted containment laboratory nor will it need to meet the standards to be permitted as such.

A brief description of the project is below. A full package of information with a PDF schematic drawing, layout of plumbing and concrete (slab and grade), site photos with a Statement of Work showing all the requirements for the RFQ is available to vendors interested to bid.

To receive the full bid package, please contact Marcy L. Martin of the CRB by email, marcy@citrusresearch.org, or phone, 559-738-0246. For technical questions, please contact Joe Ploski, 602-810-1939, joeploski@gmail.com and Greg Simmons, 602-708-7286 gregory.s.simmons@usda.gov

Project Description:

The Structural Package will include the greenhouse structure, positive pressure evaporative cooling system with automatic shutters, heating system including circulating fans, air moving exhaust system, overhead room lighting, and automated environmental control system. The design and construction of the greenhouse need to take into consideration the environmental conditions in the Riverside, California area. Required operating temperature should allow reasonable ecological control to maintain between 65 F and 90 F. The Structural Package should be delivered to the location and installed as a turn-key greenhouse which includes all electrical and plumbing. All building permits required for construction should be a part of the bid submittal. Please provide an itemized listing of costs for the Structural Package. A complete set of drawings and specifications will need to be reviewed and approved before acceptance of a bid.

Insect control also needs to be addressed in the bid submittal as part of the turn-key package.

A greenhouse entry enclosure needs to be designed and included in the bid submittal as part of the turn-key package.

STATEMENT OF WORK
FOR
GREENHOUSE CONSTRUCTION

DATE: January 9, 2020

TITLE: Greenhouse

LOCATION: 1020 Marlborough Ave.
Riverside, CA 92507
Riverside County

SCOPE: The contractor shall furnish all labor, material and equipment necessary to design and build a 24' x 30' greenhouse with insect control screening and attached entry enclosure.

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STRUCTURAL PACKAGE:

STRUCTURE: Arched or A-frame bug tight greenhouse structure, 24' x 30' with 12' sidewalls with one 36" aluminum storm entry door with viewing window (bug tight and sealed all around); greenhouse covering - 16 mm double polycarbonate roof, sides and ends; two gutters and two downspouts which will drain on east side of greenhouse. Please provide architectural drawing of structure and specifications for polycarbonate roof and sides as well as entry door, gutters and downspouts. Please provide all applicable warranty information.

POSITIVE PRESSURE EVAPORATIVE FAN AND PAD COOLING

SYSTEM: Includes all materials and components for installation. Includes water distribution and return system in order to maintain proper cooling for greenhouse location. Operating environment for summer will be 85-90 degrees F. Positive pressure variable speed fans will be controlled by the automated environmental control system. Includes shutters that are controlled by the automated environmental control system and that will automatically open and close to give varying air flows through the greenhouse. Structure should have two independent evaporative cooling systems. Please provide specifications for positive pressure evaporative cooling systems to include voltage (120V/230V single-phase is available at the facility) and all pertinent warranty information.

AIR MOVING SYSTEMS: Two variable speed exhaust fans which include shutters that are controlled by an automated environmental control system and will automatically open and close to give varying air flows through the greenhouse. These two variable speed exhaust fans will be located at the opposite end from the positive pressure evaporative coolers. Fans appropriate for the environmental conditions in a Coastal area should be used. Please provide specifications for exhaust fans to include CFM, HP, and voltage (230V single-phase is available at facility) and all pertinent warranty information.

HEATING: Electric heater that will compensate for outside temperatures of a low of 35 degrees F. Heating system should include circulating fans and hanging equipment and should be tied to an automated environmental control system. Operating environment for winter will be between 65-70 degrees F. Please provide specifications and all applicable warranty information for the heating system. 230V single-phase electrical service is available at the facility.

HUMIDIFICATION: Humidification will be provided by a Dramm or comparable humidifier applicable to a greenhouse situation. Humidifier will be controlled by an automated environmental control system. Humidification range will be from 65% to 85%. Please provide specifications and all pertinent warranty information for the humidification system. 120V/230V single-phase is available at the facility.

OVERHEAD ROOM LIGHTING: Two 4' LED overhead lights with one switch at greenhouse entry door as per drawing.

ENVIRONMENTAL CONTROLLER: The preferred Environmental Controller would be an automated environmental control system for a greenhouse application. The controller should automatically control the environmental heating and cooling system, humidification system, circulating fans, exhaust fans and louvers. Controller should also be able to control LED lighting and Aluminet automatic shade system. The automated environmental control

system should be capable of operating automatically or manually and have a digital readout. Environmental Control System should be a turn-key system including all relay control outputs. Please provide specifications for the controller as well as all pertinent warranty information. 120V/230V single-phase electrical service is available at the facility.

INSECT CONTROL: Insect control consists of Econet thrips screen, possibility of being installed in several different ways. It takes into consideration the very high drop in air flow through the screen which is 42% which should be part of the design for higher CFM and even flow of air through the pad system and the insect screen so that temperature is evenly maintained and the problem of reduced air flow is solved. Include the option of building two removable enclosure structures around the evaporative coolers that are 15' wide x 8' high x 3' deep with Econet thrips screen as per attached drawing. There should be 5 removable 3' x 8' Econet thrips screen panels for each enclosure structure to provide access to the evaporative coolers for maintenance purposes. All framed structures and removable panels need to have gasketed seals all around so they will be bug tight. The enclosure structures need to be mounted 8 inches above grade. This should give us at least 8x the evaporative cooling square footage. There will also be two removable framed structures around the exhaust fans that measure 15' wide x 8' high x 2' deep. The enclosure structures need to be mounted 20 inches above grade because of existing curbing next to building. There should be 5 removable 3' x 8' Econet thrips screen panels for each enclosure structure to provide access to the evaporative coolers for maintenance purposes. All framed structures and removable panels need to have gasketed seals all around so they will be bug tight.

ENTRY ENCLOSURE: This area is the adjoining room that connects the BSL-3 Lab building to the greenhouse. Approximate size is 7' 2" inches deep x 10' wide x 7' high. This will all be made of 16 mm double-wall polycarbonate. Emergency entry side aluminum door will be 36" with viewing window (bug tight and sealed all around). A 6" rain deflector will be installed above the door area to deflect rain run-off from roof. An exhaust fan will need to be installed as per drawing. The positive pressure fan will be tied electrically to the BSL-3 Lab door and will provide air movement to the greenhouse when the door is open. (120V/230V single-phase is available at facility.) The ceiling and walls will need to be attached to building overhang. The framework of the enclosure will be anchored to the BSL-3 Lab building and greenhouse and concrete slab. The entire entry enclosure will have a bug-tight and water-tight seal. The 16 mm double-wall polycarbonate panels will also need to be sealed so they are bug-tight and water-tight.

SHADING: vents, heat and evap cooling to maintain

Interior retractable shade device, Aluminet or equivalent. Temperature range assumes outside low of 38F and high of 95F. All finishes to be light colors. Perimeter gasketed and self closing doors.

ELECTRICAL REQUIREMENTS:

Provide electrical circuit breaker distribution panel, outdoor rated, that will be attached to the exterior wall of BSL-3 Lab and connected to main breaker on the inside wall of BSL-3 Lab. All electrical wiring will go from the circuit breaker distribution panel and connect to electrical conduit stub-outs located beneath distribution panel. Architectural drawing and pictures show stub-outs of electrical inside the greenhouse and outside that can be used. All electrical gutters and conduit inside the greenhouse will be PVC. All electrical receptacles will be GFI protected and have clear plastic covers for added protection.

Positive pressure evaporative cooler will also have GFI protection for the receptacles with protective clear plastic cover as well as fused outdoor rated disconnects mounted by the cooler to disconnect positive pressure fans. Louvers on the positive pressure evaporative coolers will also be controlled by the environmental controller.

Exhaust fans will have fused outdoor rated disconnects mounted by fan and controlled by an automated environmental control system.

Electric heater will have fused outdoor rated disconnect and will be controlled by an automated environmental control system.

Circulating fans will be controlled by an automated environmental control system.

Room lighting will be controlled by a light switch that will operate two 4' LED lights.

The greenhouse should be prewired 240V single phase to accommodate optional LED lighting that will be controlled by an automated environmental control system.

An exhaust fan for entry into the greenhouse will be controlled by pressure switch attached to the BSL-3 Lab door.

SHADE SYSTEM: Interior retractable shade device, using Aluminet 60% shade or equivalent. Temperature range assumes outside low of 38F and high of 110 F. roof shading will be automatically controlled by an automated environmental control system. Note that there will be no roof vents. Also provide specifications for the shading material.

OPTIONAL ITEMS:

BENCHES: Please provide pricing for:

- Long benches with rolling tops

Final decision will be based on budgetary limitations. Benches will be owner installed.

LIGHTING: Please provide pricing for using LED lighting.

POST CONSTRUCTION PHASE:

Successful Bidder must:

- Demonstrate complete and operating system to owner.
- Provide final complete engineering mechanical drawings including electrical and plumbing schematics.

PROJECT CONTACT PERSONS:

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