

DEVELOPMENT OF NEW PRODUCTION FACILITY IN SOUTHERN NEVADA

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INTRODUCTION

There has been a growing amount of evidence that bare-root nursery stock has a very erratic success rate in Nevada. Accordingly, the Division of Forestry has embarked on a program of changing the existing Reno Nursery to containers and establishing a new nursery for containerized plants in Southern Nevada. The facility under construction is unique in that the first greenhouse unit to be installed will be solar heated.

CLIMATIC ADVANTAGE

Southern Nevada has a high percentage of days with rather intense sunshine. The design of the greenhouse takes advantage of this incoming energy to heat storage units, which in turn, provide heat for the night cycle. As winter storms are usually of short duration, it is believed that the storage system will be capable of providing 95 percent or more of the heat required for operation.

DESIGN

The greenhouse itself is to be the heat collector of the system. There are some advantages to be found in the concept; 1) removing the heated air to the storage unit aids in cooling the greenhouse, 2) expensive, external heat collectors are completely eliminated and 3) the clutter around the greenhouse is minimized.

The heat collected in the greenhouse is moved to the storage area in the form of heated air. Therefore, the per requirement is not excessive, 4,000 cubic feet of air has been calculated as sufficient under the given climatic conditions. The same fan handles the greenhouse heating cycle, air movement is controlled by 4 thermostatically controlled motorized dampers.

River rock is the storage medium in the thermal storage unit. By using known values for specific heat, 1,000 cubic feet of stone will be necessary to obtain the 95 percent operational value desired. In selecting the stone size, 2" diameter will provide the necessary mass, and at the same time, not present to high a factor of resistance to air movement. A uniform depth of 5' has been designed into the unit. The storage unit is above ground, external to the greenhouse, but the use of stone as storage makes it possible to place the unit under the greenhouse floor if adequate strength is designed into the construction.

THE GREENHOUSE

An aluminum framed greenhouse, 25' X 80', with 8' sidewalls will be used as the basic structure. Additional cooling is supplied by a combination of evaporative coolers and louvers. Glazing is double acrylic, 0.6" thick to minimize heat losses. Although cutting down on incident light, the loss is not great enough to require external heat collectors. A suspended oil-heater is provided to supply auxiliary heat for extended periods of overcast weather.

SUPPORTING STRUCTURES

Seed roan and potting shed are incorporated into a building to the north of the greenhouse. A concrete walk connects potting shed, greenhouse and a 40' X 80' lathhouse to hold growing plants after propagation. All growing areas are under automatic sprinkler systems programmed for night watering.