

# Sandstone Ranch Observatory Business Plan

## Executive Summary

This Business Plan and supporting documents describes a project to design, finance, construct, and operate a new astronomical observatory to be located near the Sandstone Ranch Visitors Center parking area.

We are proposing that the City of Longmont lease 1/4 acre of land south of the Sandstone Visitor Center to the Longmont Astronomical Society for period of 25 years. The lease may be renewed if the City of Longmont and Longmont Astronomical Society agree that continued operation of the facility is in the interest of both parties. If not, the observatory, control room, and other facilities shall be removed upon expiration of the lease. The party or parties deciding to terminate the lease shall pay for removal and relocation of the observatory and all equipment.

The Longmont Astronomical Society shall own the observatory including all support facilities and equipment. The Longmont Astronomical Society shall be responsible for construction, maintenance, and operation of the observatory, and developing and presenting astronomy education programs at the observatory.. The Longmont Astronomical Society will obtain liability, other insurance for the facility after it is constructed.

## Objectives

- Provide a facility in the City of Longmont where everyone may learn about astronomy and promote interest science and engineering by providing an opportunity to view and study objects in our universe with high quality telescopes and state-of-the-art equipment.
- Observatory and support facility will be designed to be in compliance with the American Disability act.
- Dome and telescope will be capable of operating remotely as well as manually. This will enable rental of telescope time to anyone with internet connectivity.
- Telescope will be of sufficient diameter (20 inch or larger) and adequately instrumented to be used in support of professional research projects.

## Design Overview

### Location

The observatory is to be located approximately 65 feet south of the southern end of the Sandstone Ranch Visitor Center parking lot and located between a trail to an overlook on the west and a oil facility road on the east..

### Facilities

The observatory facilities to be constructed are a dome building, a control center, telescope pads for small telescopes and park benches, a trail connecting the existing trail to overlook ,

pathway lighting from the existing shelter to the dome building, an access road from dome to the oil facility road to the east, park benches, and a screen fence east of the control center to shield observing pads from car lights in the parking lot.

#### Dome building

The dome building will be used to house a telescope and instruments such as imaging cameras and a spectrograph. The dome is a prefab building which be built on top a nearly circular foundation. It is comprised of cylindrical walls and a motorized rotating dome roof. A motorized shutter on the dome may be opened when viewing with the telescope and closed for inclement weather. The dome building is not insulated and will not be heated or cooled so that the telescope and building will be approximately the same temperature as the surrounding air. This minimizes air turbulence during operation of the telescope. This is very important for viewing, imaging, and spectrographic measurements.

The telescope will be mounted on a motorized pier which may be adjusted in height for viewing by children and by people in wheelchairs. An articulating eyepiece may also be used to further increase or decrease the height of the eyepiece. A computer monitor will be available for people to view through the telescope using video cameras to assist people who cannot see clearly through the eyepiece.

#### Control building

The control building will be used to remotely control the telescope when taking long exposure images or spectrographic measurements. It will be used for security monitoring of the site and the telescope. In addition the control building will function as a shelter for telescope operators during cold or windy nights. It will be insulated and heated in winter to 50 or 60 degrees F. during telescope operations and to 30 to 40 degrees at other times. It will not be air conditioned. The control building will have a area for storage of smaller telescopes and other equipment. The control building will not be open to the public.

#### Outdoor facilities

Pathway lighting will be installed to provide illumination to guide the public from the existing shelter to the dome building. Six telescope pads will be built for use by small telescopes. The small telescopes will used to supplement the main telescope during public nights and to provide a "hands-on" on experience for people to touch and experience use of a telescope. Surrounding the telescope pads will park benches for people to relax or to listen to outdoor presentations. A screening fence will be installed just north of the pads to block lights from cars coming into the parking lot.

For more detail, please refer to the concept drawings which are included as separate documents.

Detailed cost estimates have been prepared. A summary of the cost estimates is included in a separate document.

## Financing

The Longmont Astronomical Society has applied for and received a grant from Trimble Navigation, LTD. for software to develop the concept drawings. We have applied for and been accepted by the Google Non-Profit program; we'll be applying for several of their grants/programs. We are researching possible grants from several of the two hundred or so foundations which fund science education programs in Colorado. We also are looking at setting up a crowd funded project with KickStarter or similar companies. Once built, time on the observatory's telescope has value. That time may be rented to remote users on the internet or to local groups, educational institutions, and individuals who wish to use the telescope and instruments. Time on the telescope should rent for somewhere between \$50 to \$100 per hour depending on sky conditions.

## Construction

A licensed and insured general contractor will be selected to construct the control building, dome building, paths, concrete,, and electrical work. The general contractor will be responsible for proper fencing, signage, barricading to ensure public during construction. The general contractor will responsible for cleanup and restoration of the area after construction. After the control and dome building are completed, the Longmont Astronomical Society will install the telescope, science instruments, security monitoring, and the telescope control equipment.

## Operations

The Longmont Astronomical Society will operate and maintain the facility after construction is completed. LAS will develop public educational programs and presentations for students and adults of all ages. The programs will be presented to the public on several evenings each month. The schedule and number of presentations will vary with holidays, season of the year, weather, and other considerations such number of volunteers available. We expect observatory to be fully utilized every night that the sky clear. In this area, that will be around 2 or 3 nights per week. We expect that observatory will be open to the public around one night per week, weather permitting. A minimum of two people will be required to operate the facility when it is open to the public. One person will be needed to do the presentation and answer questions. The second person will operate the telescope and dome controls, and monitor cameras. Occasionally, additional volunteers will be needed to supervise scopes and presentations at the outdoor pads.

Maintenance of the telescope and equipment will be relatively inexpensive. The rotating dome and telescope each have a lifetime of 50 years or more. Lubrication about once per year is all that is required. There are a number of recurring expenses such as electricity, internet service, cleaning supplies, and of course liability and property insurance costs. These are summarized in a separate document..

## Support needed from the City

We request that the City of Longmont keep the restroom in the existing shelter open during

winter. The City has the shelter open during spring through fall only. We request that the City provide snow removal service for trails leading from existing shelter to the dome and telescope pads. And of course the observatory will also need police and fire protection services provided by the City.

## Next steps

Assuming this concept is acceptable to the City of Longmont we will move ahead with obtaining financing and begin work on the building permit application. A structural engineering firm has been contacted and will arrange for soils analysis, perform structural design, and engineering needed for the final drawings and building permit.