



LARGE SYNOPTIC SURVEY TELESCOPE

Large Synoptic Survey Telescope (LSST) Site Environmental and Cultural Plan

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The LSST Site Environmental and Cultural Plan

1 Introduction

The Large Synoptic Survey Telescope (LSST) Project will comply with all environmental and cultural regulations applicable to its development sites. Governing statutes and permit procedures will be adhered to for all construction and site occupancy efforts associated with the project. This plan briefly defines how these considerations will be folded into the project development and outlines a methodology that will be applied to all efforts directly and indirectly pursued for the LSST.

2 Background

The 8.4m Large Synoptic Survey Telescope (LSST) Project will digitally survey the entire visible sky, exploring the nature of dark matter and dark energy and opening a time window into the night sky. The project consists of an 8.4 meter telescope supporting a 3.2 Gigapixel optical camera and a data processing and storage system to handle the ~2 petabytes of information generated each year.

Several construction efforts and site occupancies will be associated with the LSST. These include telescope and support facilities at the summit, base office and data management facilities in Chile and U.S.-based data archive centers. There may also be minor construction activities and right-of-way authorizations associated with new utility and data communication lines.

In April of 2006 the El Peñón peak, at Cerro Pachón in Chile was selected as the site for the LSST observatory and summit support facility. The base facility is expected to be in the AURA Recinto in La Serena Chile, at a specific location to be determined.

3 Environmental and Cultural Sensitivity Plan

It is the policy of the LSST Project that all development efforts associated with the LSST Project be pursued in compliance with all applicable environmental, cultural, and safety regulations and permitting requirements. Site development and infrastructure planning will include consideration of these factors. Sensitivity to identified issues will be integrated into the project review process during the design development and construction phases. This will insure appropriate treatment of these conditions throughout the development process and limit the need for specific corrective or mitigating actions.

The LSST project has been organized such that all construction and development activities for the mountain and base infrastructure are under the control of the Telescope and Site Group. This will facilitate single-point responsibility for all aspects of the project that have potential for environmental impact. This group reports to the LSST Project Manager, where compliance with this policy will be verified. In the event that the LSST pursues construction efforts within the United States, the responsibility for such effort may be delegated to a partner institution, in which case the LSST will require adherence to the principles of this policy. Prior to initiating any new environmental assessments, regardless of location, the Project Manager will consult with the NSF Program Officer and NSF Office of General Counsel.



This policy will be enforced for all phases of the project including site evaluation and preparation, construction, and operation. The following sections provide additional details associated with the LSST plans and approach to meeting the specific obligations of this policy.

3.1 Work with Local Organizations

The presence of existing observatory infrastructure and an established scientific host organization was a strong consideration in site selection. The site selected for LSST at Cerro Pachón in Chile is on land owned by the internationally recognized AURA Corporation. The land is specifically designated to be used for astronomical observatories and currently hosts the Cerro Tololo Inter-American Observatory (CTIO), Gemini and SOAR telescope facilities and their support infrastructure.

U.S.-based infrastructure for LSST will be tied to existing NSF-funded facilities or otherwise located in metropolitan areas with well defined permitting requirements that will be followed.

3.2 Chilean Environmental Regulations

As part of the site evaluation process the project investigated the applicable environmental statutes in Chile. The AURA Site Host Proposal (Document – 1262) further elaborates and clarifies the requirements. Chilean environmental policy is based on a national law which establishes a process for evaluation of environmental impact. This law calls for one of two levels of documentation, depending on the nature of the proposed project. The first and least extensive level, an Environmental Impact Declaration (*Declaración de Impacto Ambiental [DIA]*), applies to projects of low impact potential that are not within a national park or protected area. This designation was assigned to the environmental permitting for the Gemini and SOAR observatories, and, in preparation of the AURA Site Host Proposal, was determined to be applicable to the LSST Project. The DIA was required to be submitted by AURA on behalf of the project to CONAMA (*Comisión Nacional de Medio Ambiente*). The DIA included a succinct description of the construction and operation phases of the project and any direct foreseeable environmental impacts. The DIA was required to be accompanied by a Baseline Study of Biological Resources (Flora & Fauna) specific to the site. Biological consultants contracted by AURA performed this study, which identified some protected plants in the vicinity of El Peñón that needed to be transplanted, but no major issues of concern. All the submitted documentation was reviewed by CONAMA and their regional counterpart COREMA. Due to the precedent for observatory structures at this site and the relatively minimal impact anticipated, the LSST project was approved in a December 2008 resolution of CONAMA/COREMA, which was the lead Chilean Environmental Protection Agency at the time of the submission and resolution.¹ The second, more extensive level of documentation, a full Environmental Impact Study, was not required.

In Chile, as in the U.S., environmental and cultural concerns are subject to change as community sensitivities arise and new biological and archaeological research is conducted. LSST will continue to

¹ The responsibility for environmental compliance regionally and nationally in Chile has subsequently been consolidated under the *Servicio de Evaluación Ambiental* (SEA). All follow-up submittals and compliance inspections have been, and will continued to be, pursued through this agency.



confer with AURA and the appropriate governmental agencies in Chile to further define any pertinent issues or changes in environmental policy that should be taken into consideration.

3.3 Coordination with U.S. and NSF Requirements

Although Chilean statutes govern the permitting process for the observatory site, the NSF still has an important role as the lead U.S. agency for the LSST Project in regard to environmental issues. The nature of that responsibility is to some extent defined by the Executive Order that covers federal actions causing environmental impact outside the U.S. (EO 12114). A preliminary reading of that Order indicates that the documentation required to satisfy the Chilean agency would also be sufficient to qualify the LSST project for an exemption from the full procedures called for by the Order, based on:

- (EO 12114) Section 2-5 - Exemptions & Considerations
 - (a) Notwithstanding Section 2-3, the following actions are exempt from this Order;
 - (i) Actions not having a significant effect on the environment outside the United States
as determined by the agency;

The NSF participated in the review and evaluation of the documentation prepared for the Chilean agency and prior to the initiation of any work on site, the NSF Office of General Counsel was formally requested to make a determination regarding this order and any further impact analysis that would be required. The Chilean environmental documentation was found to be satisfactory by the NSF, which concluded in October of 2010 that the proposed action will have no effects significant to historic properties or threatened or endangered species or their habitats.

3.4 Approach to Design and Construction

For the design and permitting of on-site buildings and infrastructure the LSST Project has and will continue to employ architects and engineers who are locally-based or otherwise familiar with the applicable statutes and environmental sensitivities in the area. Identified environmental concerns are included in the criteria for regular design reviews at all stages of the project.

All phases of development of the LSST summit and base facilities (site selection, survey work, design, permitting and construction) are being coordinated by the Telescope and Site Group. Efforts within the United States will be coordinated to maintain a similar single-point responsibility for all aspects of the project that have potential for environmental impact.