

NOAO-S Facilities Operations

Status of Facilities Operations Special Projects

FY2018 Q1, December 31 2017

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Executive Summary

In FY2016 the NOAO-S Facilities Operations Department (Facilities Operations) embarked on an ambitious program to upgrade and improve the existing facilities to provide more reliable services and to allow for certification of critical areas and equipment. A first set of projects was planned for FY2016 and are described in *“Budget Fiscal Year 2016, v3.2, Section 4”*. In February 2016 a three-year budget proposal was prepared: *“Outlook budget fiscal years 2017-2019, Facilities Operations NOAO-S, v1.2”*. That document described the most urgent upgrades and improvements and presented a three-year budget outlook. Following this proposal, the FY2017 and FY2018 plans and budgets included a second respectively third set of upgrade and improvement plans, which are described in *“Budget Fiscal Year 2017, v4.1, Section 4”* and *“Budget Fiscal Year 2018, v2.1, Section 5”*. All documents are posted on the NOAO-S Facilities Operations website¹.

In this report we present the status of the upgrade and improvement projects, FY2016-FY2018, and the balance in the project accounts at the end of the first quarter of FY2018, including outstanding encumbrances as at December 31 2017. At the start of FY2018 the total funding for upgrade and improvement projects was 472.6 MCLP, including 239.6 MCLP of FY2017 carry forward in the project accounts. On December 31 2017 the balance in the project accounts and taking into account 7.4 MCLP in encumbrances, was 440.8 MCLP. Note that 59.5 MCLP of these 440.8 MCLP is reserved for severance pay. In FY2016-FY2018 23 projects were planned, 2 were added during the course of FY2016 and 2 during Q1 of FY2018. Of these 27 projects 12 projects were completed, 6 are underway, 8 have not started yet and 1 project will be deferred. A summary is provided in Tables 1 and 2.

An overview of the funding, expenditures and balances on December 31 2017 can be found in Table 3. The projects are grouped by category: road repair & maintenance, water & sewage, electric systems, buildings, communications and other. We note that the projects completed, including two unplanned FY2016 projects, come in over budget by a total of about 71 MCLP. Spending on the remaining projects, in particular purchases of equipment will be adjusted to match funding within each category. We expect that by the end of FY2018 we will have completed a total of 22 projects, resulting in a projected carry-forward of about 50MCLP in the project accounts.

¹ <http://www.ctio.noao.edu/noao/content/Reports-and-documentation>

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Table 1: Projects completed FY2016-FY2018Q1

Projects	Fiscal Year	Status
Road Repair / Maintenance		
Repair of washout	FY2016	Complete FY2018 Q1
Repair of road berm	FY2016	Complete FY2017
Water & sewage		
Renew pumps for mountain water supply system	Extra FY2016	Complete FY2016
Electric System		
Automatic Circuit Reclosers	FY2016	Complete FY2016
Equipment & spares	FY2017	Complete FY2017
Electric Substation Tololo	FY2016	Complete FY2017
Electric Substation Pachón	FY2016	Complete FY2017
Buldings		
Kitchen Tololo	FY2016	Complete FY2017
Hotel Buldings Improvements	FY2016	Complete FY2017
Move Hotel La Serena to house #9	FY2017	Complete FY2017
Roof repairs La Serena Maintenance Shop	Extra FY2016	Complete FY2016
Communications		
Communication Network	FY2016	Complete FY2017

Table 2: Projects in progress, not yet started, no progress or On-hold

Projects	Fiscal Year	Status	Complete by	Balance
				12/31/2017
Road Repair / Maintenance				
Backhoe	FY2017	On-hold, depending funding		
Install 3km of extra guard rails	FY2018	No progress		
Installation extra drainage	Extra FY2018	In progress	FY2018 Q2	
Total				172,642,173
Water & sewage				
Mountain water treatment system and water level meters	FY2017	In progress	FY2018 Q3	
Improvement Sewage System Tololo	FY2017	No progress		
Upgrade Electric System Pump Houses	FY2018	No progress		
Upgrade Cerro Tololo Booster System	FY2018	No progress		
Maintenance Water Tank Cerro Pachón	FY2018	No progress		
Maintenance Water Tank La Serena	FY2018	No progress		
Total				86,888,284
Electric System				
Replace cables, MT Lines Pachon	FY2017	In progress	FY2018 Q4	
Upgrade generator enclosure La Serena	Extra FY2018	In progress	FY2018 Q2	
Total				22,438,502
Buldings				
Kitchen Pachón	FY2016	In progress	FY2018 Q4	
Heaters Hotel/Kitchen, Tololo/Pachon	FY2016	In progress	FY2018 Q4	
ROB Roof Repair	FY2018	No progress		
ROB Upgrade Heating System	FY2018	No progress		
Total				102,670,617
Communications				
Total				-3,306,317
Other				
Severance Pay	FY2016			
Total				59,495,732
Total				440,828,992

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1. Introduction

In FY2016 the NOAO-S Facilities Operations Department (Facilities Operations) embarked on an ambitious project to upgrade and improve the common infrastructure on Cerro Tololo, Cerro Pachón and in La Serena, to provide more reliable services, and a safer work environment for the AURA staff. Where feasible critical areas and equipment will be upgraded such that certification under Chilean health and safety standards is possible.

The first set of 10 projects was planned for in FY2016 and are described in “*Budget Fiscal Year 2016, v3.2, Section 4*”, and in FY2017 and FY2018 another 13 projects were planned for. These projects are described in “*Budget Fiscal Year 2017, v4.1, Section 4*” and “*Budget Fiscal Year 2018, v2.1, Section 5*”. Progress has been reported on at the end of each quarter, and in this report, we present an update on the projects at the end of the first quarter of FY2018. All reports are posted on the NOAO-S Facilities Operations website.

2. Project account balances

Table 3 summarizes the project accounts: total funding, total expenditures including encumbrance and balances on December 31 2017. Details of the project accounts are given in Table 4.

The projects are grouped by category: road repair & maintenance, water & sewage, electric system, buildings, communications, other. The total amount of funding for the three years, FY2016-FY2018 is 704 MCLP. At the end of Q1 of FY2018 a total of 255.8 MCLP was spent and another 7.4 MCLP encumbered, with 12 projects completed, 6 in progress, 8 not yet started, 1 on-hold (purchase of backhoe). The funding includes about 60 MCLP set aside for severance pay. Severance reserve was budgeted for in the project accounts only in FY2016. From FY2017 onward severance reserve is budgeted for in the general overhead account, and we plan to move the 60 MCLP earmarked as severance funding to the general overhead account in Q2 of FY2018.

3. Projects completed, reported on previously

The upgrade and improvement program started in FY2016, and in this Section a short description of the projects completed in FY2016 and FY2017 is given. Details on those projects have been reported on previously, and the status reports describing these projects are posted on the NOAO-S Facilities Operations website.

3.1. Projects completed in FY2016

- **Power Line Stability**
Installation of three automatic circuit re-closers at critical points in the AURA power line system.
- **Communication Network**
Upgrade of the mountain communication system, consisting of replacement and relocation of the antenna on Cerro Pachón and replacement of the repeater.
- **Hotels Tololo, Pachón and La Serena**
Roof repair Hotel Tololo; Maintenance bathrooms Hotel Pachón

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- **Mountain Water Supply System**
Submersible pump repaired and a spare pump purchased
- **Maintenance shop roof repair**
Roof repair CTIO Instrument and Facilities Operations Maintenance workshops

3.2. Projects completed in FY2017

- **Policlinic Pachón**
The 2-units building was converted into a policlinic, which has been in use since October 2016.
- **Hotel Pachón**
Room #7, which used to be in use as policlinic, was converted back into a hotel room.
- **Hotel Tololo**
The hotel Tololo was painted outside (Q1), doors varnished and room numbers replaced (Q2).
- **Kitchen Tololo**
The kitchen Tololo was renovated, a project that started at the end of FY2016 Q3 and was completed in FY2017 Q1.
- **Repair of road berm at kilometer 27 of the main road**
Repair of the road berm consisted of replacing gabions at kilometer 27 which were damaged during a severe storm in March 2015. As part of the work the riverbed upstream was cleaned out as well. This work was completed in Q3.
- **La Serena Hotel**
House 9 on the La Serena compound was converted into a guesthouse/hotel, so that we can continue to offer a hotel service in La Serena. This work was completed in Q3.
- **Cerro Pachón electric substation**
Critical areas of the Cerro Pachón electric substation were fenced of and warning signboards installed. This project was completed in Q3.
- **Electric equipment and spares**
A spare automatic circuit re-closer and a vibration meter were purchased.
- **Cerro Tololo electric substation – enclosure**
Access to the Cerro Tololo powerhouse was improved and part of the bodega was converted to host the 1 MVA transformer.

4. Projects completed in the first quarter of FY2018

4.1. Road Maintenance: repair of wash-out (FY2016 project)

A severe storm in March 2015 washed out part of the road at “kilometer 30” and produced severe damage to the retaining wall at “kilometer 27”. Repair of the wash out at “kilometer 30”, which consisted of the installation of a ford with four culverts and a concrete road deck, was completed in the first quarter of FY2018 and accepted on November 15, 2017.

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5. Projects in progress

5.1. Cerro Tololo electric substation (NCE project)

Renovation and upgrades of the equipment in the Tololo Power House are underway, and are funded through the No-Cost-Extension of the NOAO Cooperative Agreement 2010-2015. Most of the new equipment has arrived and has been installed. Remaining is the installation of the protection cells, which are arrived in first quarter of FY2018. Unfortunately at around the same time, the electric engineer of the Facilities Operations department left, and we have deferred the installation until a new electric engineer is on board. The recruitment process started at the end of FY2018 Q1.

5.2. Installation extra drainage system main road

We proposed and obtained funding through the AURA Major Improvement Projects to install 31 extra drainage pipes in the main road to Cerro Tololo and Cerro Pachón, to stabilize the slope of the road. While this project was being carried out, we realized that at two additional locations extra drainage needed to be installed. The cost for the installation of these additional drainage pipes is charged to the project accounts. This project, which is marked as “Extra FY2018” in Tables 2–4, will be completed in FY2018 Q2.

5.3. Mountain water treatment system (FY2017 project)

We plan to upgrade the fill system for the water tanks on Tololo, renew the chlorination system and implement a water level measurement system. This project is included in the AURA Potable Water System upgrade, as part of the AURA Major Improvement Projects. In the first quarter of FY2018 we prioritized the improvements to be made to the water system on the mountain, and solicited quotes for the highest priority upgrade, the chlorination systems for the water distribution system on Cerro Tololo and Cerro Pachón. These systems will be purchased and installed in the first half of calendar year 2018.

5.4. Medium Tension Power Lines (FY2017 project)

We will be renewing parts of the medium tension power lines, in the part bifurcation to Cerro Pachón. Most of the materials have been purchased, but the actual installation by an external contractor, will start once a new electric engineer is on board, see comment in Section 5.1.

5.5. Upgrade generator housing La Serena Recinto

Because of the construction of a new office building on the La Serena Recinto to accommodate for LSST, extra parking space was created at the bottom part of the recinto. As part of this project a fence was put up around the transformers and generator housing, closing of the La Serena Recinto electric substation. Both construction of the new parking area and the enclosure for the electric substation were funded through the building project.

We used the opportunity to renovate the generator housing, which is part of the electric substation. The roof was replaced, the inside and outside walls of the housing were painted and the floor was repaired and

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painted. These were necessary renovation jobs that we decided not to postpone any longer. This project is marked as “Extra FY2018” and will be completed in FY2018 Q2.

5.6. Kitchen Pachón (FY2016 project)

Planning of the Pachón dining room and kitchen expansion started in FY2017 with a preliminary design of the new kitchen and dining room. The project includes an enlargement of the kitchen, renewal of equipment where necessary, and expansion of the dining area. It will also include improving the gym area. Detailed design started in the first quarter of FY2018, and is expected to be complete by the end of the second quarter of FY2018. Construction is expected to start in the fourth quarter of FY2018. The construction project is expected to take less than six months, although actual time will depend on the weather conditions during construction.

5.7. Heaters Hotel & Kitchens Tololo and Pachón (FY2016 project)

In FY2017 we reviewed the status of all heaters on Cerro Tololo and Cerro Pachón and defined for each heater if it needs to be replaced and if the area and piping needs to be upgraded. In the coming few years we plan to replace all air heaters with water heaters to comply with Chilean safety standards.

Replacement of the air heaters of the Tololo houses and the upgrade of the piping and manifold of the water heaters of the Tololo Technician and 10-units buildings is planned for the second half of FY2018. The upgrade of the heating system of the hotel/restaurant building on Cerro Pachón will be planned for and carried out in conjunction with the amplification of the Pachón kitchen/dining facilities.

The upgrades of the heating systems of the Round-Office-Building on Cerro Tololo are included in the FY2018 plan, towards the end of FY2018. The upgrade of the heating system of the Tololo hotel/restaurant building will be deferred to FY2019. These last two projects involve major upgrades not only of the heating equipment, but also of the heat distribution system (from hot air to radiators) and, in the case of the hotel/restaurant building will include the construction of a caseta to separate the heating system from electric panels.

6. Projects with no progress yet or on-hold

6.1. Backhoe purchase (FY2017 project)

Part of the upgrade and improvement budgets will be used for renewal of major equipment, in particular heavy equipment for road maintenance. When the FY2017 budget was being prepared, funds for the purchase of a backhoe were included. However, the repair at kilometer 30 and 27 is significantly more costly than what was budgeted, and the purchase of the backhoe is on-hold.

6.2. Upgrade Tololo Sewage System (FY2017 project)

As part of the renovation of the Tololo kitchen, the kitchen sewage system was renewed, including a new degreasing chamber. Expenses for this part of the project were part of the kitchen renovation. Originally we had planned to install a water treatment plant for the sewage system of the Tololo hotel/restaurant building only. However, we now plan to revise all septic tanks on Cerro Tololo, and evaluate whether

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major maintenance is sufficient or whether it is necessary to replace the tank with a water treatment plant. To balance resource, we will defer definition and execution of this project until work on the casino Pachón, another major project planned for FY2018, is well underway.

6.3. FY2018 projects not started yet

6.3.1. Improvements to water supply system

- Upgrade Electric System Pump Houses
- Upgrade Cerro Tololo Booster System
- Maintenance Water Tank Cerro Pachón
- Maintenance Water Tank La Serena

6.3.2. Renovation of the Round-Office-Building

- Roof Repair Round-Office Building
- Upgrade Heating System Round-Office-Building

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Table 3: Summary Project Accounts, December 31 2017

Projects	Fiscal Year	Status	Total FY2016-FY2018		Encumbrance 12/31/17	Balance 12/31/2017
			Budget	Spent		
Road Repair / Maintenance						
Repair of washout	FY2016	Complete FY2018 Q1	37,189,072	60,657,687		-23,468,615
Repair of road berm	FY2016	Complete FY2017	18,594,536	48,355,676		-29,761,141
Backhoe	FY2017	On-hold, depending funding	86,014,158			86,014,158
Install 3km of extra guard rails	FY2018	No progress	143,128,571			143,128,571
Installation extra drainage	Extra FY2018	In progress		3,270,800	3,270,800	-3,270,800
Total			284,926,337	109,013,364	3,270,800	172,642,173
Water & sewage						
Renew pumps for mountain water supply system	Extra FY2016	Complete FY2016		2,527,155		-2,527,155
Mountain water treatment system and water level meters	FY2017	In progress	16,176,975			16,176,975
Improvement Sewage System Tololo	FY2017	No progress	20,780,179			20,780,179
Upgrade Electric System Pump Houses	FY2018	No progress	20,770,286			20,770,286
Upgrade Cerro Tololo Booster System	FY2018	No progress	13,048,000			13,048,000
Maintenance Water Tank Cerro Pachón	FY2018	No progress	9,320,000			9,320,000
Maintenance Water Tank La Serena	FY2018	No progress	9,320,000			9,320,000
Total			89,415,439	2,527,155		86,888,284
Electric System						
Automatic Circuit Reclosers	FY2016	Complete FY2016	37,189,072	38,527,829		-1,338,757
Equipment & spares	FY2017	Complete FY2017	14,993,294	11,350,014		3,643,280
Electric Substation Tololo	FY2016	Complete FY2017	3,718,907	115,552		3,603,356
Electric Substation Pachón	FY2016	Complete FY0217	8,677,450	10,947,208		-2,269,758
Replace cables, MT Lines Pachon	FY2017	In progress	25,383,383	2,442,351		22,941,032
Upgrade generator enclosure La Serena	Extra FY2018	In progress		63,382,953	4,140,650	-4,140,650
Total			89,962,105	63,382,953	4,140,650	22,438,502
Buildings						
Kitchen Tololo	FY2016	Complete FY2017	11,776,539	15,163,128		-3,386,589
Kitchen Pachón	FY2016	In progress	61,981,786	766,809		61,214,977
Hotel Buildings Improvements	FY2016	Complete FY2017	14,131,847	19,487,121		-5,355,273
Move Hotel La Serena to house #9	FY2017	Complete FY2017	13,152,012	9,913,356		3,238,656
Roof repairs La Serena Maintenance Shop	Extra FY2016	Complete FY2016		10,205,609		-10,205,609
Heaters Hotel/Kitchen, Tololo/Pachon	FY2016	In progress	23,553,079	3,801,766		19,751,312
ROB Roof Repair	FY2018	No progress	20,770,286			20,770,286
ROB Upgrade Heating System	FY2018	No progress	16,642,857			16,642,857
Total			162,008,406	59,337,789		102,670,617
Communications						
Communication Network	FY2016	Complete FY2017	11,528,612	14,834,929		-3,306,317
Total			11,528,612	14,834,929		-3,306,317
Other						
Severance Pay	FY2016		66,196,547	6,700,816		59,495,732
			66,196,547	6,700,816		59,495,732
Total			704,037,447	255,797,006	7,411,450	440,828,992

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Table 4: FY2018 Details in Projects Accounts, December 31 2017

Projects	Fiscal Year	Status	Carry forward from FY2017 to FY2018	2018		Encumbrance 12/31/17	Balance 12/31/2017
				Budget	Budget including overhead Spent		
Road Repair / Maintenance							
Repair of washout	FY2016	Complete FY2018 Q1	177,738				-23,468,615
Repair of road berm	FY2016	Complete FY2017	-29,761,141	23,646,354			-29,761,141
Backhoe	FY2017	On-hold, depending funding	86,014,158				86,014,158
Install 3km of extra guard rails	FY2018	No progress		107,500,000			143,128,571
Installation extra drainage	Extra FY2018	In progress	56,430,756		3,270,800		-3,270,800
Total					3,270,800		172,642,173
Water & sewage							
Renew pumps for mountain water supply system	Extra FY2016	Complete FY2016	-2,527,155				-2,527,155
Mountain water treatment system and water level meters	FY2017	In progress	16,176,975				16,176,975
Improvement Sewage System Toloio	FY2017	No progress	20,780,179				20,780,179
Upgrade Electric System Pump Houses	FY2018	No progress		15,600,000			20,770,286
Upgrade Cerro Toloio Booster System	FY2018	No progress		9,800,000			13,048,000
Maintenance Water Tank Cerro Pachón	FY2018	No progress		7,000,000			9,320,000
Maintenance Water Tank La Serena	FY2018	No progress		7,000,000			9,320,000
Total			34,429,999				86,888,284
Electric System							
Automatic Circuit Reclosers	FY2016	Complete FY2016	-1,338,757				-1,338,757
Equipment & spares	FY2017	Complete FY2017	3,643,280				3,643,280
Electric Substation Toloio	FY2016	Complete FY2017	3,603,356				3,603,356
Electric Substation Pachón	FY2016	Complete FY2017	-2,269,758				-2,269,758
Replace cables, MT Lines Pachón	FY2017	Complete FY2017	22,941,032				22,941,032
Upgrade generator enclosure La Serena	Extra FY2018	In progress	26,579,152		4,140,650		-4,140,650
Total					4,140,650		22,438,502
Buildings							
Kitchen Toloio	FY2016	Complete FY2017	-3,386,589				-3,386,589
Kitchen Pachón	FY2016	In progress	61,214,977				61,214,977
Hotel Buildings Improvements	FY2016	Complete FY2017	-5,355,273				-5,355,273
Move Hotel La Serena to house #9	FY2017	Complete FY2017	3,989,667	751,012			3,238,656
Roof repairs La Serena Maintenance Shop	Extra FY2016	Complete FY2016	-10,205,609				-10,205,609
Heaters Hotel/Kitchen, Toloio/Pachón	FY2016	In progress	19,751,312				19,751,312
ROB Roof Repair	FY2018	No progress		15,600,000			20,770,286
ROB Upgrade Heating System	FY2018	No progress		12,500,000			16,642,857
Total			66,008,485				102,670,617
Communications							
Communication Network	FY2016	Complete FY2017	-3,306,317				-3,306,317
Total			-3,306,317				-3,306,317
Other							
Severance Pay	FY2016		59,495,732				59,495,732
Total			59,495,732				59,495,732
Overhead & IPC							
IPC				7,000,000			
Business Service Charges				8,700,000			
Overhead				42,300,000			
Total			233,637,807	233,000,000	233,000,000	24,397,366	440,828,992