

NOAO-S Facilities Operations

FY2018 Q1 Progress Report

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Executive Summary

This is the progress report of the NOAO-South Facilities Operations department for the first quarter of fiscal year 2018, FY2018 Q1. The total planned budget for one quarter was 695 MCLP, not taking into account larger expenses or seasonal variations. FY2018 Q1 expenditures added up to a total of 573 MCLP, 17.5% less than budgeted, while total revenues were 787 MCLP, 13.3% more than budgeted, resulting in a surplus of 214 MCLP. This includes a 44.6 MCLP surplus in the project cost centers.

Historical data shows that expenses in the first half-year tend to be significantly less than average. In addition, several of the larger road maintenance projects are planned for later in the year. The surplus of actual *Total Revenue* with respect to the budgeted *Total Revenue* is generated mostly by the per-use services.

After a brief introduction, we discuss in Section 2 the accomplishments of the department during this first quarter of FY2018, i.e. from October till December 2017. In Section 3 we discuss the financial status of the department at the end of FY2018 Q1, starting with a summary, followed by comments on the finances per revenue stream: mountain share charges, per-use charges and census charges. Details of the financial status are presented in the appendix.

This progress report is complemented with a report on the status of the projects: “*Status of Facilities Operations Special Projects, FY2018 Q1, December 31 2017*”, March 23, 2018. Both reports are posted on the NOAO-S Facilities Operations website¹.

¹ www.ctio.noao.edu/noao/content/Reports-and-documentation

NOAO-S Facilities Operations

Table 1: Milestones FY2018, updated December 31 2017

Number	Milestone Text	Due Date	Status	Detail and expected completion date if different from Due Date
2.6.1	Upgrade south wing of 20- <i>unidades</i> to be used during LSST construction.	31-Dec-17	Complete	
2.6.2	Upgrade water supply system at guard house Control Puerta	31-Dec-17	In progress	At the end of December, the tower for the new water tank was in fabrication, and a new water tank was ordered. This work is being carried out in parallel with the construction of bathrooms for visitors. Expected completion date: March 31, 2018
2.6.3	Replace 500-liter petrol tank serving generators on Cerro Tololo by a 3,000-liter tank.	31-Mar-18	In progress	Tank has been fabricated. Installation pending hire of new electrical engineer to supervise the installation. Expected completion date: September 30, 2018
2.6.4	Complete upgrade of Cerro Tololo power house (install protection cells).	30-Jun-18	In progress	Protection cells have arrived. Installation pending hire of electrical engineer. Expected completion date: FY2019
2.6.5	Complete upgrade of the heating system in hotel on Cerro Pachón.	30-Sep-18	Not started, as per plan	
2.6.6	Complete the expansion of the kitchen and dining room facilities on Cerro Pachón.	30-Sep-18	In progress	Preliminary design complete. Detailed design being prepared by external architect.

NOAO-S Facilities Operations

1. Introduction

The NOAO South Facilities Operations department is responsible for operations, maintenance and long-term stewardship of physical infrastructure shared by the facilities hosted by AURA-Observatory (AURA-O) in Chile. This includes support buildings, housing, hotel and kitchen facilities and miscellaneous other facilities in La Serena and on Cerro Tololo and Cerro Pachón.

A plan and budget are prepared on an annual basis, with a detailed budget for each cost center. Progress and finances are tracked on a monthly basis, and at the end of every quarter a progress report with the financial status and a brief update on work carried out by the department is presented to the programs and other clients. This report is the quarterly report for the first quarter of fiscal year 2018, FY2018 Q1.

Each year the department also plans for and executes several upgrade and improvement projects, as part of a major program to improve safety and services in all areas of the Facilities Operations department. Progress on those projects and the financial status of the associated cost centers is presented in a separate document, “*Status of Facilities Operations Special Projects, FY2018 Q1, December 31 2017*”, March 23, 2018.

2. Accomplishments during October – December 2017

In this section we discuss the accomplishments of the NOAO-S Facilities Operations department during the period October – December 2017 that are not covered by the project status report mentioned in the previous Section. For descriptive purposes these accomplishments are divided between milestones, planned for in the NOAO Program Operations Plan FY2018 (NOAO POP FY18) and additional projects that are part of regular operations, including regular maintenance projects.

2.1. Milestones

In Table 1 we list the FY2018 milestones presented in the NOAO POP FY18. In the table we include a brief comment on the status at the end of December 2017.

With the construction of the LSST moving into a new phase, whereby smaller contractors arrive on site for a shorter period of time than during the construction of the building, the demand for hotel accommodation on the mountain has increased considerably. This increased demand is expected to last through the remainder of the construction phase as well as the commissioning phase. To prepare for this increased demand, we have refurbished of 6 rooms in the south wing of the 20-unidades, the former Hotel Pachón accommodations. The refurbishment consisted of renewing the washbasins, installing build-in closets, painting the rooms, renewing bathroom tiling, replacing some of the windows, installing new roller curtains in all rooms and renewing part of the furniture. This project was completed in November 2017, completing milestone 2.6.1: “*Upgrade south wing of 20-unidades to be used during LSST construction*”.

In May 2017 an external consultancy company, South Hills Consulting LLP inspected all water supply systems on the AURA Chile premises (mountain and La Serena). Several recommendations were made to upgrade the current system and during the coming years these improvements will be implemented. One of the recommendations concerned the water supply system at the entrance of the AURA premises, “Control Puerta”. Based on these recommendations a plan to renovate this water supply system was prepared in the last quarter of FY2017 and completion of this project was included as

NOAO-S Facilities Operations

milestone 2.6.2 for FY2018. The upgrade consists of renewal of the water tank, installation of a water tower and installation of a water level metering system. The current concrete water tanks are replaced by one new, 5000-liter polypropylene tank placed on a water tower, slightly further up hill to provide the necessary water pressure in the guardhouse. The well area will also be upgraded, providing more protection against flooding of the area. This work is captured in milestone 2.6.2 of the NOAO POP FY18: *“Upgrade water supply system at guard house Control Puerta”*. This project is being carried out in parallel with an NOAO specific project to install bathrooms for mountain visitors at the guard station and, as a result the upgrade of the water supply system is progressing slower than anticipated. At the end of the first quarter of FY2018, the water tower has been fabricated, the water tank purchased and the well area upgraded. The project will be completed in the second quarter of FY2018, with the installation of the water tower and the tank. A chlorination system for the water supply system, to allow for a potable water supply is not considered part of this milestone, but will be installed later in FY2018, after we have gained experience with the newly to be installed chlorination systems on Cerro Tololo and Cerro Pachón.

At the end of November the electric engineer of the Facilities Operations department left the organization, and we have deferred all major electric projects until a new electric engineer is on board. The recruitment process started at the end of FY2018 Q1. With respect to Milestones 2.6.3, *“Replace 500-liter petrol tank serving generators on Cerro Tololo with a 3,000-liter”* this meant that although the 3,000-liter tank was fabricated, installation is waiting for the arrival of the electric engineer. Similarly, the completion of the upgrade of the powerhouse on Cerro Tololo, milestone 2.6.4, is on-hold till the electric engineer has arrived. The main element missing to reach completion of this milestone is the installation of the protection cells, which have already arrived and are stored on Cerro Tololo.

Milestone 2.6.5, *“Complete upgrade of the heating system in hotel on Cerro Pachón”* will be carried out in parallel with the project to remodel and expand the kitchen and dining facilities on Cerro Pachón, milestone 2.6.6. Already at the end of FY2017 we started development of the plans for the kitchen / dining facilities expansion and together with an external consultant and in the first quarter of FY2018 we issued a call for development of a detailed design by an architecture.

In FY2018 Q1 we furthermore completed FY2017 milestone 2.6.13, the repair of the mountain road at km 30 (wash out) and km 27 (damaged retaining wall & culverts) when the ford/bridge at km 30 was accepted on November 15 2017. We repaired the roof of the hotel/restaurant building on Cerro Pachón, completing FY2017 milestone 2.6.8.

2.2. Other projects and accomplishments

During the year various other projects are carried out, smaller scale improvements or projects that are part of regular maintenance. In this section we present what was accomplished in this respect in the period October – December 2017.

2.2.1. Road maintenance & heavy equipment

The winter of 2017 was a very severe winter with more than ten winter storms. Rain and snow not only deteriorated the main road, but also the secondary roads, i.e. service roads from Control Puerta to Quebrada San Carlos, from Cerro Tololo to the quebrada as well as the road along the power lines to Cerro Pachón. Once winter was over, and the main road brought back in good condition, repairs on the service roads started. Damage was such that at some places the road needed to be reconstructed with the bulldozer. Work on the service roads was completed by the end of November 2017.

NOAO-S Facilities Operations

In August 2017 we purchased a new road grader. This purchase, which was funded directly by AURA, was timely: the current road grader in use is aging and having an additional road grader facilitates the work of the road maintenance crew. The grader arrived on the day at road work at km 30 was accepted, November 15, 2017. As part of the purchase package, operators and garage personnel received 2-day training on the usage of the new road grader.

After the completion of the ford at km 30, the road maintenance crew re-built the access to the ford and re-routed the main road, so that the ford became integral part of the main road again. This work was completed in December 2017.

As reported in the report “Status of Facilities Operations Special Projects, we proposed and received funding directly from AURA, to install 31 drainage pipes in the main road to Cerro Tololo and Cerro Pachón to stabilize the road. Once the work was underway, it was realized that two drainage pipes needed to be added to the project. The installation of these additional pipes has been funded through the Facilities Operations Projects budget. The project was completed by the end of December 2017 with the installation of all 33 drainage pipes.

Other road maintenance & improvement projects carried out in FY2018 Q1 included the enlargement of the platform next to the Gemini telescope. At the end of FY2017, the annual cleaning of the ducts, in preparation for the following winter started. This work is expected to continue throughout the summer. At the end of FY2018 Q1 we also started the work of repairing the paved road on Cerro Tololo, replacing concrete slabs and renewing the seals.

2.2.2. Electric systems

The equipment in the Tololo powerhouse is being modernized and renewed, a project funded by the NOAO no cost extension (NCE, funds from the prior AURA cooperative agreement with NSF to operate NOAO). Most of the new equipment has been installed, including a new 1 MVA transformer, and another automatic switchgear to allow for automatic transfer from one generator to the other. A spare 1 MVA transformer also arrived and is stored on the platform in front of the Tololo powerhouse. Protection cells have been ordered, and were delivered in October 2017. However, as the electric engineer in charge of the project left the organization in November 2017, we postponed the installation of these cells, until a new electric engineer has been hired.

In FY2017 we purchased a new 3000-liter petrol tank to replace the 500-liter tanks for the generators in the powerhouse on Cerro Tololo. The 500-liter tank was fit for usage on Cerro Pachón, i.e. insulated, and will feed the generator supporting the communication hut on Cerro Pachón. Furthermore, a new 500-liter tank for the generator of the Hotel Pachón was purchased. By November 2017 all tanks have been delivered and are stored on the mountain, with installation being on hold till the arrival of the new electric engineer.

2.2.3. Kitchens Tololo and Pachón

On November 18 2017 the last inspection by of the kitchens on Cerro Tololo and Cerro Pachón was held, closing of the project of training of the kitchen staff, related to milestone 2.6.2 of FY2017: “*Define kitchen training plan*”.

In FY2018 Q1 several minor improvements were made to the kitchen area on Cerro Tololo and Cerro Pachón. Fly screens were installed in the service entrances of both kitchens, the entrance of the

NOAO-S Facilities Operations

storage area of the kitchen was tiled and a new compressor was installed in the freezer room of the Tololo kitchen.

2.2.4. Hotels Tololo and Pachón

In addition to repairing the roof of the Pachón hotel/restaurant building and rerubishing the 20-units building on Cerro Pachón, see Section 2.1 Milestones, we replaced the fans in the bathrooms of the rooms in the hotel Pachón.

2.2.5. Polyclinics Cerro Tololo and Cerro Pachón

Furniture for the office area of the polyclinic on Cerro Pachón arrived and was installed. The geyser for the polyclinic on Cerro Tololo was replaced.

2.2.6. La Serena recinto

In November 2017 the fire lane in the quebrada next to the offices was cleared of weed and dead wood in preparation for summer.

Preparations for the construction of the new LSST office building started. This included the construction of extra parking spaces on the recinto next to house 27 and house 8. The parking space was completed in FY2018 Q1, with the exception of the installation the light posts. The construction of the parking lot was funding through the new building project.

The electric substation of the La Serena recinto, with the main transformer and a generator house, is located next to this parking lot. This area was fenced off as part of this project and we used the opportunity to paint the generator house and repair its roof.

In FY2018 Q1 the decision was made to extend the contract of the guard service for the duration of LSST construction, rather than going through the bid process while a major construction project is happening on the recinto. Once construction is completed, the contract for the guard service will be reviewed and rebid.

3. Finances

For reference we will take one quarter of the FY2018 annual budget as target for Q1, i.e. 695 MCLP. We will note where seasonal effects or planned large expenditures for scheduled projects result in departures from a simple linear spending and revenue plan. Overall revenue and expenditures of the NOAO-S Facilities Operations department are on target. Actual *Total Revenues* are higher than budgeted by 13.3%, while actual *Total Expenses* were under budget by 17.5%. The total surplus in the first quarter of FY2018 is 214 MCLP, or 27% of the actual *Total Revenues*. This includes a 44.6 MCLP surplus in the project cost centers.

Historical data shows that expenses in the first half-year tend to be significantly less than average. In winter expenses tend to be well above average, especially for items such as heating, extra repairs and maintenance as result of winter storms, affecting roads, power lines, heaters and buildings. In addition, several of the larger road maintenance projects, such as installation of guardrails, or improving the surface of the road in some critical areas, are planned for later in the year. The surplus of actual *Total Revenue*

NOAO-S Facilities Operations

with respect to the budgeted *Total Revenue* is generated mostly by the per-use services, approximately 80 MCLP including all per-use services.

Payroll expenses are under budget by 12.3%, which is to be expected with benefits such as vacation bonuses and educational bonuses being paid out in the second and third quarter of the fiscal year. In addition, some of the open positions are still to be filled. Non-payroll expenses are under budget by 19%, mostly due to mountain projects not having started yet, see comment above. And indeed, $\frac{3}{4}$ of this underspent is in the cost centers for mountain shares and projects account: 75.4 MCLP of 98.4 MCLP, specifically under *Contracted Services*. In addition, costs expensed under *Equipment & Building Leases* and under *Professional Services* were budgeted under *Contracted Services*, with the result that *Equipment & Building Leases* as well as *Professional Services* are over budget, whereas *Contracted Services* are under budget.

3.1. Mountain Shares

The mountain share cost centers include:

- Emergency medical service
- Guard service
- Road maintenance
- Communications
- Maintenance of the power lines
- Maintenance of the Tololo power house (Tololo share only)

3.1.1. Mountain share common to both mountains

Total Expenses for the common mountain share cost centers are on target, while *Total Revenues* is 10% higher than budgeted, because one more telescope is open. Expenditures under *Supplies and Material* and *Travel Expenses* are higher than budgeted by 25% and 36% respectively. Costs expensed under *Equipment & Building Leases* and under *Professional Services* were budgeted under *Contracted Service*. In total expenditures under these three expense codes are falling behind by 38%, because some major contracts are behind in payment, such as the contract for the emergency medical services, and because some contracted work hasn't been carried out yet, for example maintenance of the medium tension power lines.

3.1.2. Cerro Tololo share

Total Expenses for the Cerro Tololo share cost centers are falling behind by 36%. Some of the roadwork, such as replacing pavement on Cerro Tololo and cleaning of the ducts only started at the end of the first quarter. While, maintenance of the power lines was postponed till summer. In addition, invoices for some contracts, such as generator maintenance and some out-source roadwork, had not been received by the closing of FY2018 Q1. This is reflected in the underspent in *Contracted Services*, *NOAO South Service* and in *Payroll*.

NOAO-S Facilities Operations

3.1.3. Cerro Pachón share

Total Expenses are falling behind by 58%. Several road improvement projects, such as re-surfacing the road between El Quisco and Cerro Pachón, and the installation of extra guardrails had not started yet by the end of the first quarter, while, maintenance of the power lines was postponed till summer. In addition, invoices for some contracts, such as out-source roadwork, had not been received by the closing of FY2018 Q1. This is reflected both in the underspent in *Contracted Services*, *NOAO South Services* and in *Payroll*.

3.2. Per-use services

3.2.1. Meal service

In the first quarter of FY2018 more meals were sold than estimated, resulting in 18% more *Total Revenues* than budgeted. This was largely due to more contracted work on the mountain, and more LSST staff and contractors using the dining facilities on the mountain than estimated.

Total Expenses are 38 MCLP less than *Total Revenues*, i.e. there was a 26% underspend in the first quarter. Several kitchen improvement projects, such as remodeling of the garbage area of the kitchen on Cerro Tololo and all projects related to building the extension of the Pachón kitchen and dining facilities will be carried out later in FY2018. As a result, expenditures under *Contracted Services* and *Capital Equipment* are lagging behind considerably. Other expenses budgeted under *Contracted Services* are replacements and hiring of external extra staff, which mostly occurs during the summer vacation, i.e. during the second quarter of a given fiscal year.

3.2.2. Hotel service

- **Mountain lodging**

Total Revenues and *Total Expenses* are on track, with 9% higher revenues than expenses. *Utilities & Office Expenses* lag behind by 30%, because the bulk of the expenses will occur in winter: gas cost for heating. Expenditures under *Supplies & Materials*, *Contracted Services* and *NOAO South Services* are relatively high in this first quarter, because of several renovation projects: the 20-units building was renovated to accommodate for LSST users and the roof of the Pachón hotel was repaired, see also Section 2.1 Milestones.

Lodging on Cerro Pachón continues to include 16,201 CLP to pay off the AURA loan. The total loan, including interest paid by AURA to the bank, was US\$ 881,416.50. As of December 31, 2017, an accumulated amount of US\$751,703.61 had been paid back leaving an amount outstanding on the AURA loan of US\$129,712.89.

- **La Serena lodging**

Total Revenues and *Total Expenses* lag behind, by 31% and 50% respectively, resulting in a small surplus of 1,75MCLP for the La Serena lodging cost center in the first quarter of FY2018.

3.2.3. Janitorial service

- **Mountain janitorial service**

Revenues and expenditures are on target.

NOAO-S Facilities Operations

- **La Serena janitorial service**

Total Revenues and *Total Expenses* in the first quarter of FY2018 are on target, considering that contracted services are meant to cover summer replacements.

3.2.4. Water and sewage

- **Mountain water and sewage**

Estimates for water usage on Cerro Tololo and Cerro Pachón were based on FY2017 actuals. In particular water usage on Cerro Pachón was significantly higher than budgeted, due to higher water consumption by LSST. As a result, *Total Revenues*, are about 60% higher than expected for one quarter. On the other hand, *Payroll* and *Non-Payroll Expenses* were considerably less during the first quarter of FY2018, with most work on the water supply system planned for in the second half of FY2018.

- **Water transportation to Cerro Pachón**

In the first quarter of FY2018, about 72% more water was sold to the programs on Cerro Pachón than estimated, resulting in a surplus of about 7.6MCLP in the cost center Water Transportation.

- **La Serena water and sewage**

In the first quarter of FY2018, revenues are 43% less than expenditures, leading to a deficit of 4.2MCLP. The reason is that water is provided for by Aguas del Valle, rather than coming from the well, as was expected at time of preparing the FY2018 budget. This results in almost triple the costs under *Utilities & Office Expense* than budgeted for.

3.2.5. Maintenance group

In the first quarter of FY2018, external work, reflected in *Total Revenues*, was almost double the estimated amount of external work, while internal work, i.e. work within the department (*A&F Internal Sales*) were on target by the end of FY2018 Q1. Expenditures are on target, including *Payroll*, as benefits such as vacation bonuses and educational bonuses being paid out in the second and third quarter of the fiscal year.

3.2.6. Garage

At the end of FY2018 Q1 the cost center Garage had a positive balance, mostly because expenses under *Payroll* were behind by 28%. The head of the garage was with sick leave in December, and the cost of the external contract of his replacement will show up in the second quarter of FY2018. Revenue in this cost center is on target, albeit distributed differently over external revenue (*Total Revenues*) and internal revenue (*A&F Internal Sales*) than estimated. *Total Revenues* is 4.9 MCLP more than budgeted, while *A&F Internal Sales* are 5.2 MCLP less than budgeted.

3.2.7. Transportation

Total Revenues and *Total Expenses* for both bus services, Bus Tololo and Bus Pachón are on target. This is to be expected, as the programs sign up for at a fixed number of seats at the beginning of the fiscal year.

NOAO-S Facilities Operations

The actual usage of the Shuttle Service on the other hand is more than double the estimated usage. This is for a large part due to a higher usage by staff and contractors of the NOAO-South Facilities Operations department.

3.3. Census charges

3.3.1. La Serena Census

The La Serena census cost centers include the La Serena guard service, maintenance of the common areas on the La Serena compound and the La Serena based communication services.

In the first quarter of FY2018 *Total Revenues* are 9.3% higher than budgeted, because there are more staff members working at the AURA programs in La Serena than estimated when the FY2018 budget was prepared. Several projects to improve the working conditions of the guards and other contractors working on the La Serena recinto, are planned for later in fiscal year, resulting in an underspend of 48% in *Contracted Services* and 41% in *Total Expenses*. These projects are planned to start in FY2018 Q2 and will be completed in FY2018 Q3.

3.3.2. All-Site, All-Staff Census

The cost centers financed by the All-Site, All-Staff census charges include the AURA reception in La Serena, which provides service to both La Serena and mountain facilities and safety in all areas that fall under the responsibility of the NOAO-S Facilities Operations department. This census charge also covers general support for the department, for example renewal of the vehicle fleet. In the first quarter of FY2018 a new pickup truck was purchased, using the entire FY2018 budget for *Capital Equipment* in these cost centers.

Total Revenues in the All-Site, All-Staff Census cost centers are about 8.5% more than budgeted, because there are more staff members working at the AURA programs in Chile than estimated when the FY2018 budget was prepared. And with *Total Expenses* being on target for the first quarter, the balance in the All-Site, All-Staff census cost centers is 4.2 MCLP.