

PUNO

BASURA No. 1
(COMPACTOR No. 3, D-500)

PROYECTO ESPECIAL LAGO SIZICOMA

Nota de la Comisión de recolección de basuras N° 1
(Computadora N° 03 D-500)

① Permita identificar puntos de
acopio de residuos sólidos.

1,2,3,4 Orden de puntos de acopio

..... Ruta de recolección de los puntos
de acopio

..... Ruta de recolección de residuos
sólidos a domicilio.

Sección de la ruta de recolección.

Día Miércoles:
(d) Sr. Leticia, Sr. Miguel, Sr. Patricia, Sr. Juanita,
Sr. Lina, Sr. D. Rosal, Sr. Chacita, Sr. D. Juan,
Sr. Juanito, Sr. D. Juan, Sr. Leticia.

Elaborado por: Freddy Bauda López Realizes
Jenny Frascua Quinte

Mesa de Trabajo del Municipio de San José

PUNO
100
PUNO

**1.2 OTHER DATA CONCERNED TO COLLECTION AND
TRANSPORTATION OF THE WASTE**

- (1) Planning of Treatment for Illegal Dumped Waste, 1999**

MUNICIPALIDAD PROVINCIAL DE PUNO
Dirección de Servicios a la Comunidad
SECRETARIA
REGISTRO _____ FECHA 7-7-99
HORA _____ FIRMA _____

INFORME N° 54 - '99 - MPP - DEOPJ

PARA : Ing° Jorge Romero Ríos.
Director de Servicios a la Comunidad.
DE : Jefatura de Ecología Ornato Parques y Jardines.
ASUNTO : Presento Perfil de Proyecto.
FECHA : Puno, 07 de Julio de 1999

Por el presente tengo a bien de informar a Ud. lo siguiente.

Que a petición de su Dirección, es que hago alcance de una copia del Perfil de Proyecto.

Es cuanto informa a Ud. para los fines del caso.

ATENTAMENTE,

C.C.
Archivo

MUNICIPALIDAD PROVINCIAL DE PUNO
DPT. DE ECOLOGIA ORNATO PARQUES Y JARDINES
MEX. FELIPE LARICO FERNANDEZ
JEFE

PERFIL DE PROYECTO

**+
LIMPIEZA Y MANTENIMIENTO DEL SISTEMA
DE DRENAJE DE AGUAS PLUVIALES EN LA
CIUDAD DE PUNO**

MEMORIA DESCRIPTIVA

1.1.- NOMBRE DEL PROYECTO : Limpieza y mantenimiento del sistema de drenaje de aguas pluviales y Bahía Interior de la ciudad de Puno.

1.2.- UBICACION : Departamento : Puno
Provincia : Puno
Distrito : Puno (ciudad)

1.3.- ENTIDAD EJECUTORA : Municipalidad Provincial de Puno
Dirección de Servicios a la Comunidad
Div. Ecología, Ornato, Parques y Jardines.

1.4.- FINANCIAMIENTO : A través de la Oficina Regional PRONAA - PUNO.

1.5.- PLAZO DE EJECUCION : El plazo de ejecución de la obra de limpieza y mantenimiento del sistema de drenaje de aguas pluviales y Bahía Interior de la ciudad, será en 233 días laborables (lunes a viernes) a partir del mes de Junio de 1999 a Abril del 2000.

II. ASPECTOS GENERALES Y PROBLEMÁTICA

2.1. PROBLEMÁTICA.-

La ciudad de Puno cuenta actualmente con 108.498 habitantes que se distribuyen en 57 vecindarios, 20 urbanizaciones, 01 grupo habitacional, 04 asociaciones de vivienda, 03 asentamientos humanos y 02 pueblos.

Se halla ubicado en un terreno de topografía accidentada, en su parte alta e inundable en su parte baja.

En la zona alta de ciudad conformada por la cadena de montañas que la rodean se originan aproximadamente 20 microcuencas con lechos pluviales que tienen un comportamiento de huaycos los que posteriormente generan las cárcavas y finalmente la erosión constante; esto es muy notorio en épocas de lluvias (meses de diciembre a abril) cuando las aguas que bajan de los cerros, cruzan por la ciudad una parte por las alcantarillas y otra parte por las vías públicas, transportando a su paso material constituido por : lodo, piedras, basura de distinto origen, desechos orgánicos y otros; parte de ellos a veces quedan en las calles, pero finalmente llegan a la zona inundable o baja y la bahía interior del Lago Titicaca.

La falta de programas de limpieza y mantenimiento de estos lechos en su origen, asociado al crecimiento urbanístico acelerado y en muchos casos sin planificación, hacen que se modifique la estructura y morfología del terreno transformando el paisaje natural de la microcuenca.

Las alcantarillas o sistemas de canalización existentes en la ciudad, en muchos casos su capacidad queda insuficiente en el ámbito comprendido desde el barrio Llavine hasta la zona de Salcedo. En muchas oportunidades estas canalizaciones que en cantidad superan unos veinte, han tenido problemas de atoros, reflujos ocasionando inundaciones de la zona céntrica y baja de ciudad.

2.2. JUSTIFICACION.-

Ante la problemática planteada más adelante que provocan la colmatación del sistema de alcantarillas con la consiguiente contaminación del medio ambiente local y la Bahía Interior de Puno, muchas instituciones han ofrecido su participación en el tratamiento de éstas, así por ejemplo el PELT inició en 1992 algunas acciones de control de erosión y pluvial concentrando su atención en las partes altas, donde tiene origen la erosión pluvial haciendo la construcción de diques o terrazas en la zona alta de los lechos o donde se producen las escorrentías hasta su cauce a una alcantarilla mediante la ejecución de obras de concreto con el propósito de que sirvan como

sistemas de contención de la corriente de agua o desarenadores, así como la arborización de zonas aledañas a éstos para evitar la erosión constante.

2.3. OBJETIVOS DEL PROYECTO.-

Estarán orientados básicamente en restablecer el flujo normal de las aguas, tanto filtrantes como pluviales a través de un mantenimiento o limpieza de los lugares donde existe los canales y los diques o contenedores en el ámbito urbano de Puno.

Con estas acciones se contribuirá en la disminución de la contaminación del medio ambiente, de malos olores, atoros, inundaciones particularmente de la Bahía Interior de Puno.

También estará orientado a mantener la ciudad libre de focos infecciosos, desarrollando quincenales campañas de limpieza de las orillas (zona inundable) de la Bahía Interior de Puno.

Evitar las emergencias en época de lluvias por el incremento del caudal de aguas.

III. DESCRIPCION DEL PROYECTO.

El proyecto de limpieza y mantenimiento del sistema de drenaje de la ciudad de Puno, estará ubicado en la cuenca comprendida desde el barrio Llavine hasta los barrios Chanu Chanu y Huaynapucara.

- Barrio Alto Llavine y Llavine propiamente dicha.
- Barrio Alto Bellavista (Canal del Jr. Huancayo).
- Barrio huascar y Machallata (Cunetas Av. la Torre).
- Barrio Dos de Mayo (Prolongación Jr. Zarumilla).
- Barrios Pacsa y Pirhua Pirhuani (río socavón).
- Barrio Mañazo (río Sayhuani).
- Barrio Ricardo Palma, Chacarilla Alta, Tercer Mundo (río Pucamayo):
- Barrio Chacarilla Alta , San Miguel (río Chacarilla).
- Barrio Santa Rosa (prolongación de la canalización Jr. Gamaliel Churata, Jr. Pichacani y prolongación de canalización.
- Barrio San Martín (prolongación Jr. Ciudad de la Paz, Jr. América).
- Barrio Manto, Simón Bolívar, Torres San Carlos (río ubicado en su lado sur).
- Barrios Chanu Chanu y Huaynapura (río que surca dichos barrios hasta la alcantarilla con límite del cuartel).

El trabajo de limpieza y mantenimiento del sistema de drenaje motivo del presente Perfil de Proyecto pretende realizar especialmente en los lugares que no están canalizados con obra de concreto, es decir la prolongación de las alcantarillas o canalizaciones en donde se observa la

colmatación de material entre basura, piedras y otros desechos, provocando la obstrucción del sistema y Bahía interior de Puno.

La extracción de materiales, limpieza y mantenimiento de canales se realizará en 90 días, y operativos de limpieza en la zona inundable de la Bahía interior en 30 días, así mismo el traslado del material sólido extraído de los canales y Bahía interior se hará en 113 días; haciendo un total de 233 días.

⑧ LUAGARES DE TRABAJO	VOLUMEN DE ELIMINACION
Nº. 1 - Barrio Llavine	50 M3
2 - Jr. Huancayo	20 M3
3 - Barrio Huascar	50 M3
4 - Barrio Dos de Mayo	200 M3
5 - Río Socavón	800 M3
6 - Río Sayhuani	100 M3
7 - Río Pucamayo	800 M3
8 - Río Chacarilla	500 M3
9 - Barrio Santa Rosa	100 M3
10 - Barrio San Martín	200 M3
11 - Barrio Manto	100 M3
12 - Barrio Huaynapucara	300 M3
13 - Limpieza de la zona inundable (Bahía interior)	1000 M3 ← ✓
(14) - Otros	500 M3
TOTAL	4720 M3

⑧ See attached map.

REQUERIMIENTO DE M.O PARA LA EXTRACCION DE MATERIAL SOLIDO DE CANALES Y BAHIA INTERIOR

Rendimiento :1,6 m3/día/hombre.

DESCRIPCION	CANT. MATERIAL (m3)	M.O. (hombres)	TIEMPO EJECUCION (dias)	C. UNITARIO/ DIA C. TOTAL	Sl.
Extrac., manten. y limpieza de Canales	3,720	30	90	13	36,100
Limpieza Bahía Interior	1,000	30	30	13	11,700
SUB TOTAL	4,720	60	120		46,800

REQUERIMIENTO DE MAQUINARIA PARA TRASLADO DE MATERIALES

Rendimiento : 07 viajes/día

DESCRIPCION Y TIPO DE MAQUINARIA	CANT. MATERIAL (m3)	CANT. DE MAQUINARIA	TIEMPO EJECUCION (dias)	C. UNITARIO/ DIA C. TOTAL	Sl.
Extrac., manten. y limpieza de Canales					
VOLQUETE (01 unidad)	3,720	620 viajes	89	70	6,230
C. FRONTAL (01 unidad)	3,720	01 unidad	89	70	6,230
SUB TOTAL	3,720		89		12,460
Limpieza de la Bahía Interior					
VOLQUETE (01 unidad)	1,000	167 viajes	24	70	1,680
C. FRONTAL (01 unidad)	1,000	01 unidad	24	70	1,680
SUB TOTAL	1,000		24		3,360

RESUMEN GENERAL DE COSTOS

DESCRIPCION	CANT. DE MATERIAL	CANT. DE M.O. Y MAQUINARIA	TIEMPO EJECUCION	C. TOTAL Sl.
M.O.	4720 m3	60 hombres	120 dias	46,800
TRASLADO DE MATERIAL	4720 m3	Volquete C. Frontal	113 dias	16,820
TOTAL	4720 m3		233 dias	62,620

IV. CONCLUSIONES Y RECOMENDACIONES

La limpieza de sistema de drenaje anteriormente expuestas estará sujeta a la posibilidad de que la oficina del PRONAA - Puno acepte la propuesta especialmente en cuanto se refiere a su financiamiento.

Por su parte la Municipalidad Provincial de Puno, se estaría comprometiendo en la provisión de equipos de seguridad o protección (bolas de jete, mamelecillos, guantes de cuero, cascos, mascarillas de protección) y herramientas de trabajo como: Palas, picos, carretillas, bugues, barretas, combos, etc.

Para la realización de esta actividad se preparará grupos de trabajo en diferentes frentes adoptando que no se generen aglomeración para evitar accidentes.

La supervisión antes, durante y después de la actividad, serán de ambas instituciones.

La evacuación o retiro de los materiales extraídos será de responsabilidad de la Municipalidad Provincial de Puno, debiendo proveer de volquetes, maquinaria pesada o cargador frontal, combustible y otros.

(2) Project of Construction of the Repair Shop, 1997

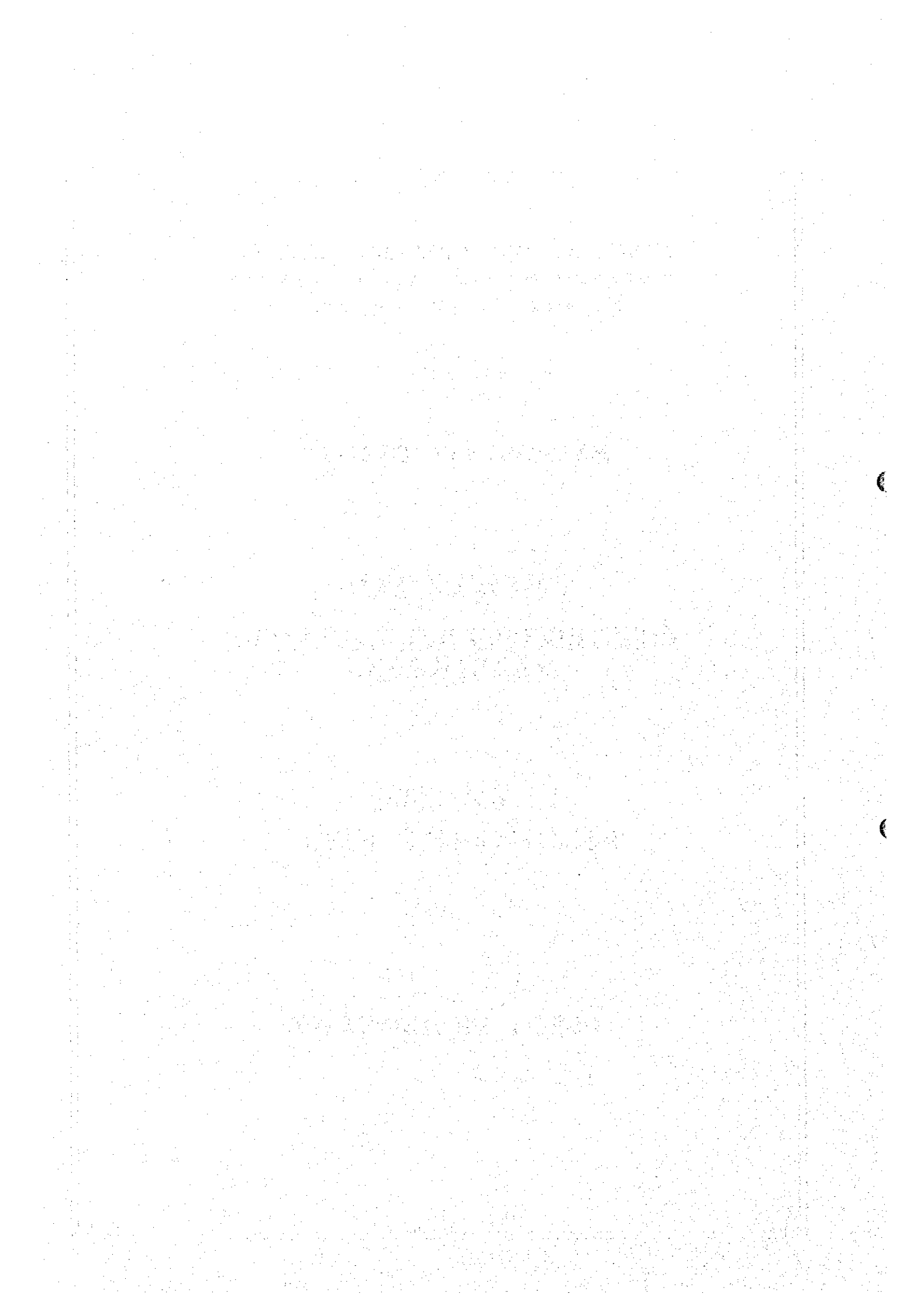
MUNICIPALIDAD PROVINCIAL DE PUNO
DIRECCION DE INFRAESTRUCTURA Y DESARROLLO URBANO
DIVISION DE ESTUDIOS Y PROYECTOS

EXPEDIENTE TECNICO

PROYECTO:
CONSTRUCCION DEL TALLER DE
MAESTRANZA

UBICACION:
BARRIO PROGRESO - PUNO

PUNO , DICIEMBRE 1997



**MUNICIPALITY OF PUNO PROVINCE
HEAD OFFICE OF INFRASTRUCTURE AND URBAN DEVELOPMENT
DIVISION OF SURVEYS AND PROJECTS**

TECHNICAL FILE

**PROJECT
CONSTRUCTION OF THE REPAIR SHOP**

**LOCATION
BARRIO PROGRESO – PUNO**

DECEMBER, 1997 (PUNO)

DESCRIPTIVE REPORT

PROJECT : CONSTRUCTION OF THE REPAIR SHOP
WORK : CONSTRUCTION OF THE REPAIR SHOP

I. DESCRIPTIVE REPORT

1.1 GENERAL STATEMENTS

1.1.1 BACKGROUND

Considering the infrastructure system that the Puno city has, the present Work that involves the construction of the Repair Shop, has as a main objective to improve the traffic system and infrastructure of all this area, by eliminating all non-favorable conditions of health and cleaning to contribute to the urban development of the city.

1.1.2 LOCATION

The work is located on the following places:

- Region : Moquegua, Tacna and Puno
- Sub-Region : Puno
- District : Puno
- Community : Barrio Progreso

1.1.3 DESCRIPTION OF WORK

The programming of the work requires to divide the land into two areas to carry out different activities in their offices.

- Public cleaning area
- Environmental Sanitation area

PUBLIC CLEANING AREA: It will have three offices, one material storeroom, one bathroom for men and another one for women with a circulation area in the main front, which will allow the respective control in the independent access door because of the cleaning equipment is located on containers. There will be an area for machine maintenance and cleaning (washing and lubrication) with a storeroom for tools.

Also there will be a parking lot for the cleaning vehicles. This parking lot will have capacity for eight vehicles.

The construction of this repair shop will have a large tower, which will allow to watch carefully all the material in the repair shop.

ENVIRONMENTAL SANITATION ZONE: It will have two offices, storerooms, dressing rooms and one bathroom for men and women.

There will be a watching area located on the last side of the zone, close to the street, which will allow to control the access of staff and vehicles. Likewise, the Maneuvers area will allow the easy driving and maneuverability of drivers.

The traverse and the work execution will be carried out by respecting as possible as it can be, the current cement and mud construction. Besides, it will be foreseen the appropriate

drainage system and the evacuation of rainfall that occur in rainy season, where the technical characteristics on execution will be controlled with the appropriate supervision of the Public Works Division of the Municipality of Puno Province.

All works will be executed according to the plans and technical specifications, which were described in the respective technical file.

1.1.4 BILL OF QUANTITIES

In order to make the respective construction budget for the Repair Shop it has been considered to make the bill of quantities of the following generic items:

- Preliminary works
- Dirt moving
- Simple concrete works – Framework
- Brick masonry
- Stucco threads – Plastered ceiling
- Floors, footing, metallic carpentry, timber
- Sanitary and electrical installations

1.1.5 UNIT COST ANALYSIS

In this project, a unit cost analysis has been considered according to the most important items for this kind of project, by making an very exhaustive analysis of each item related to the manual labor, equipment, tools and materials to propose the work budget.

1.1.6 MANUAL LABOR

All works related to the present project will be made with the participation of the staff with manual labor specialized on this kind of work.

1.1.7 QUARRIES TO BE USED

Quarries to be used for the landfill of this area, which is located near the Lake Titicaca will be:

- Salcedo
- Chejona

1.1.8 EXECUTION METHODOLOGY

TECHNICAL HEAD OFFICE

This Head Office will be in charge of the Public Works Head Office of the Municipality of Puno province, conducted by a Certified Civil Engineer.

SUPERVISION

The development of the physical and financial execution will be carried out by the Municipality, through the Office of Projects and Surveys by direct administration.

TECHNICAL SPECIFICATIONS

1. GENERAL STATEMENTS

The following specifications for the REPAIR SHOP WORK showed by us, have general character, letting know that the work resident can use the work materials, according to his best criteria, as well as the suitable methods for the good execution of the project, having as a reference the National Construction Regulation and the RULCOP.

1.2 Materials

Materials to be used in the work are new and of first quality, according to the description of the work plans, as well as the test records required by each material. In the case of materials whose preparation is manual, the test records will be verified and authorized as possible as they can, by the Resident with previous knowledge of the Supervisor.

Materials that come from factories should be introduced in the work in their original container and duly registered and sealed. Otherwise, Supervisor will take the preventive measures to guarantee the material to be used is according to the particular specifications.

Resident will inform the Supervisor about the important assays or samples of materials, which should be approved before being used in work.

Material assay, as well as the sampling will be carried out under the responsibility of the resident, according to the specifications and as many times as the Supervisor requires. In short, all materials should be carefully watched to finish the work in a qualified and opportune way.

Resident has the obligation of organizing and watching the following operations in related to the use of materials for the work:

- Transportation
- Load
- Fitting
- Cleaning
- Protection
- Preservation in work warehouses

In the supply of cement and other materials, the resident should take the necessary measures to maintain the properties of storage and stock, which had been stored for a long time.

1.3 Watching

In each area, there will be a watchman who will be in charge of the work maintenance, provisional installations and materials in site up to the conclusion of the work.

1.4 Permits

Resident will be exempted of all procedures to get the Municipal Permit because it is related to a work executed by the Municipality and ordered by Municipal Resolution.

1.5 Reference Plans

Works will be constructed according to the general and detailed plans that compose these specifications.

1.6 Manual labor

Manual labor will always be very careful and with good constructive technique, employing qualified and skilled operators. Besides, it will be intended that works perform in every moment an ordered aspect that shows the good execution.

1.7 Staff

Resident before starting the works, will show the Supervisor Engineer and the Office of Surveys and Projects the payroll of the following staff:

- Construction manager
- Watchman
- Storage man

If the Resident Engineer is not present, the construction manager or the Resident Engineer Assistant should represent him.

1.8 Any disagreement occurred in the finishes, technical specifications and plans should be consulted to the Engineers and / or architects of the Office of Surveys and Projects, who should propose and set the solution.

1.9 Any detail that is missed in plans to make clear the proposal of design should be requested to the architects of the Division of Surveys and Projects.

2. PRELIMINARY WORKS

2.1 Resident should execute all preliminary works of construction, which involve:

- a) General ground cleaning of all materials that can interfere with the development of foreseen works.
- b) Provision of level and alignment points to be maintained to the final phase of works should be in accordance to the plans of axis and levels.
- c) Traverse, marking out, point placement and determination of levels. Supervisor Engineer should approve the exact location of leveling Benchmark and reference points proposed by the Resident, to transfer the axis and elevations, which are pointed out in the plans, to the land. Likewise, the Supervisor Engineer will execute all auxiliary installations required for the progress and security of the work

2.2. Preliminary Works

Resident should construct offices, warehouses required by the works, as well as fences, watching areas and toilets for the workers.

Resident should dismount all these provisional constructions. In addition, the resident will be in charge of the water and electric power supply during the construction process.

2.3 Work offices

It implies the construction of an office-cabin. Resident should verify the office is clean and in good condition during the work construction. The office should have suitable benches, tables and boards, book filing cabinets and plan hangers, office and drawing stationary, which is very important to the good administration of the work.

2.4 Warehouses and storeroom

Temporal buildings will be constructed to protect and maintain the materials to handle them in good conditions and to provide the work the essential things for its good working and continuous development.

Its execution will take preventive measures against loss, robbery and other damages.

In those buildings, tools and implements of work should be stored and protected, as well as that fragile equipment.

Resident is responsible of watching all work materials are in good conditions without any damage.

2.5 Machinery and equipment

Resident should request in advance all the necessary machinery and equipment for the work execution.

2.6 Traverse

All preliminary works, traverse and marking out should be executed by the Division of Surveys and Projects (Topography unit).

Supervisor Engineer should verify the traverse of axis and levels of the construction.

2.7 Work cleaning

It will be demanded the correct and complete cleaning of the work during the work progress.

The fulfillment of this part will be considered exhaustively at the end of works. The non-fulfillment of this part gives power to the Supervisor Engineer to delay the work reception date, therefore the work presentation.

3. DIRT MOVING

3.1 General statements

This chapter involves the following works:

- a) Excavation, landfill, leveling process and other necessary additional works to complete the works described in the architectural, structural and installation plans.
- b) Remove the excess of dirt moving, organic and cleaning material of the ground.

3.2 Land grading

It will involve the area where building, green areas, gardens, etc. are located.

Land grading will be made by the Resident, by executing the necessary cuts and landfills to get the grades indicated in the respective plans.

Resident should keep carefully the reference points of elevations, and if they were displaced or destroyed, he should replace them in their original position.

3.3 Excavation

Excavations for foundations and shoes will have an exact size. Before pouring concrete, it is necessary to have the approval for trenches.

It will be avoided the excessive lifting of dust, by using a convenient irrigation system. The bottom of excavation will remain clean and equal, according to the levels required by the structural plans. Resident should inform the Supervisor Engineer as soon as possible by work notebook, who is the person that will make the convenient modification, as well as order the execution of load tests, which will be made by an Engineer specialized on soil mechanics.

3.4 Leveling and landfill

This item is related to the landfill of all excavations as the result of the execution of foundation or sanitary and/or electrical installations, which are buried, as well as those places where floor levels are above land elevations.

In landfills, it could be used the material excess of excavation and clean selected dirt moving, specially, the concrete, excluding spoils, wastes and other organic materials, which are capable of decomposition. Besides, it could be possible to use debris, concrete traces or masonry materials, as long as their size is not larger than 25cm. Before depositing the landfill, it is necessary to clean the soil surface, by removing those inappropriate materials for the base.

Before the execution of landfills, foundations, pipes or other works in excavation or underground should be completed, tested, inspected and approved by the Supervisor Engineer.

Landfill will be tamped in horizontal coats of 0,15cm, by adding the necessary thing to obtain a good content of wetness and compacting.

3.5 Removal of material excess

After finished the work, Resident should remove the dirt moving material or others, which not allow to continue the works of gardening and others. In areas where grass and other plants will be planted, the soil should be raked and leveled with (chacra) small land earth, which should have borrow origin and free of dirt moving materials.

Dirt moving materials will be transported out of the perimeter of work site, or where the Supervisor Engineer determines.

3.6 Landfill with borrow material

This item is related to all current landfills in work according to the level of the existing land and the level of the finished floor. Landfill quarry will be located according to the soil design and the respective materials such as gravel, stones, mud, etc.

4. SIMPLE CONCRETE WORKS

4.1 Lineal foundations

Walls founded over land will have lineal foundations. In a ratio of 1:10 gallons of water by cement sack up to 10 ones, as a maximum, walls can be of cyclopean concrete of cement and concrete. It will be added clean big stone of river (displacing stone), as long as they does not exceed the 30% and the diameter is 0.25 cm.

Concrete could be poured directly to the trench without forms, as long as there is not any possibility of landslide.

Trenches will be wetted before filling the foundations and displacing stones will not be placed up to pour a concrete coat of 10cm thick, as a minimum.

All stones should be surrounded by the mixture without touching their extreme sides. Foundation dimensions will be according to the foundation plans.

5. Framed concrete works

CONCRETE

Type: Concrete type to be used will be defined by its compression strength ($f'c$), which is measured in standard cylinders ASTM, after 28 days and according to the maximal size of aggregate. In table A, it is detailed the conditions that will allow the constructor to determine the necessary mixtures. (See table A)

Cement: Cement should be Portland, type I, unless other type is described in plans.

Fine aggregate: Fine aggregate to be used will be natural clean sand with grains without revetment, which should be resistant, strong and hard, free of prejudicial quantity of dust, clods, soft or scaly, schists, alkalis, acids, organic materials, salt, clays and other harmful substances. Otherwise, supervision will indicate what the most appropriate quarry to provide the best specifications is.

Coarse aggregate: Coarse aggregate will be gravel or stone, whose state could be natural, crushed or split with compact grain and hard quality. Also, it should be clean, free of dust, organic material, salt, clays and other harmful substances. Besides, it should not have disintegrated stone, mica or free lime. In addition, it will be very well graduated from the $\frac{1}{4}$ " mesh to the maximal size described in the table A.

Concrete: It is a natural mixture of coarse and fine aggregate. To be used, it is necessary to graduate it very well between the 2" mesh and N°100. Besides, concrete should be free of dust, harmful substances like other aggregates, and organic material.

Additives: It will be permitted only the usage of additives approved by the work inspector or the projector, which should be used according to the manufacturer's directions. The use of calcium chloride will be not accepted. Additives to be used will be those indicated in the item of finish.

Water: Water for the preparation of concrete should be potable, fresh and clean. Non-potable water could be used only when by previous tests to its use, it is established that mortar cubes made with this water have equal or higher strength to the 90% of strength of those made with potable water.

Materials storage: Cement will be stored in a dry place, isolated from the soil and protected of moisture. Aggregates of different granulometry will be stored in an isolated way, free of modification in their contents of moisture, clay and organic material. Storage

in all terms and/or materials should fulfill the required security rules in regard to the placement, height, order and others to avoid any interruption in the performance of people and/or machinery.

Measurement of materials: The procedure to follow will be in such way that each component of the mixture can be controlled. Ratio should be fitted to the technical specifications described in plans, otherwise the professional responsible of the work should consider those specifications indicated in the National Construction Regulation.

Mix: All concrete will be prepared in mixers. In case of using pre-mix concrete, concrete will be prepared and transported according to the STM or 94 standard. In case of using mixers in foot of works, these ones will be used according to their maximal capacity and at the speed specified by the manufacturer, keeping a minimal time of mix equivalent to two minutes. It will be not permitted the pre-mix of concrete which has hardened. Concrete will be prepared as near as possible to the final place.

Transportation: Concrete will be transported from the mixer to the poured places as soon as possible, avoiding any segregation or loss of components. It will not be permitted the placement of segregate concrete.

Placement: Before pouring concrete, all dirt, dust or strange material of the space to be occupied by the concrete will be removed. Concrete should be poured continuously into coats, whose thickness does not fill concrete over other concrete that has hardened or started to set. Maximal height for the placement of concrete by free fall will be 2.5m if there is not any obstruction such as framework or bracing of forms, and the maximal height for the placement of concrete will be 1.5 if there are obstructions. Higher heights, it is necessary to use chutes to deposit the concrete.

Compacting process: Compacting process will be always made by immersion vibrators. In work, it will be necessary - at least - two vibrators.

Curing: All concrete will be cured by wet way. Curing should be started as soon as possible without damaging the surface and extending without any interruption during seven days, as minimum. In the case of vertical surfaces, columns, walls, plates and covering, the curing should be made by applying a fading sealing membrane (acrylic curing device).

Tests: Concrete strength will be tested. In order to get it and according to the ASTM C 31 standard, cylindrical samples will be taken in the minimal quantity: two samples per each

30m³ of placed concrete, and not less than two samples per day for each type of concrete. In any case, each type of concrete will be tested with five "tests" at least. Test will involve the rupture of two samples of the same age, according to the established in the ASTM C 39 standard. Average of the two values will be called result of the "test". This result will be considered satisfying if the average of any three successive results is equal or higher than the required f_c and if any individual result is below 35 kg/cm² of the required f_c. Constructor should have a registration of each two manufactured samples, where the correlative number, date of elaboration, type of concrete, strength of each sample and result of the "test" are pointed out. Test should be made by a laboratory independent from the constructor's organization and approved by the inspector or projector. Constructor should include the total cost of tests in his budget.

Deficiency of Tests: Eventually, if there is not the required strength, the inspector or Projector can order by his own criteria, the execution of load tests, which should be carried out according to the projector's directions. Projector should determine the criterion of evaluation. If there are not satisfactory results of load tests, it will be necessary to make the demolition or reinforcing of the structure, according to the projector's decision.

TABLE A

Concrete for beams, columns, cutting walls, tiles and others in general (as long as it has not been specified others) will have a rupture strength of the Standard ASTM cylinder whose f_c is 210 kg/cm², by compression process after 28 days.

	Beams, tiles and columns	Walls and tiles	Joists
Aggregate: maximal size (inches)	1"	¾ "	¾ "
Minimal quantity of cement (bags per m ³)	8	8	8.5
Maximal water/cement relation (liters by cement bags)	22	22	22
Maximal slump (inches)	3"	3"	3"

- If steel is too congested, it will be used two types of concrete according to the location, for which it is necessary to have two mixers.

Observations:

1. Required concrete according to its cylindrical strength in standard ASTM cylinders (f'c) after 28 days.
2. Cement bag is equal to the quantity of cement in an original container of factory without any damage, whose weight is 42.5 kg, or a quantity of cement in bulk whose weight should be similar that the before one (42.5 kg).
3. It will be demanded a control of concrete, in other words, the laboratory dosage in weight and specialized and permanent control.

5.1 Reinforced steel

Material: Steel described in plans based on its reinforcing to the flowing (fluencia) (f'y) should be according to the respective standards described in the Appendix A.

Manufacturing: All reinforced steel should be cut according to the dimensions indicated in plans and manufactured in total accordance to the details and dimensions of plans. Tolerance of manufacturing in any dimension will be approximately of 1 cm.

Storage and cleaning: Steel will be stored in a dry place and isolated of the soil and protected against wetness, keeping it free of earth, dirt, oil or grease. Before installing steel, it will be cleaned by removing oxide scales or any other strange substance. If there is delay in the concrete void, the framework will be inspected again, making a cleaning if necessary.

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1. Required concrete according to its cylindrical strength in standard ASTM cylinders (f'_c) after 28 days.
2. Cement bag is equal to the quantity of cement in an original container of factory without any damage, whose weight is 42.5 kg, or a quantity of cement in bulk whose weight should be similar that the before one (42.5 kg).
3. It will be demanded a control of concrete, in other words, the laboratory dosage in weight and specialized and permanent control.

5.1 Reinforced steel

Material: Steel described in plans based on its reinforcing to the flowing (fluencia) (f_y) should be according to the respective standards described in the Appendix A.

Manufacturing: All reinforced steel should be cut according to the dimensions indicated in plans and manufactured in total accordance to the details and dimensions of plans. Tolerance of manufacturing in any dimension will be approximately of 1 cm.

Storage and cleaning: Steel will be stored in a dry place and isolated of the soil and protected against wetness, keeping it free of earth, dirt, oil or grease. Before installing steel, it will be cleaned by removing oxide scales or any other strange substance. If there is delay in the concrete void, the framework will be inspected again, making a cleaning if necessary.

Straightening and rebending: Bars should not be straightened or rebent to avoid material can be damaged. It should not be used bars with undulations or bending, which are not pointed out in the plans or those with fissures, ruptures and other damages. It will be allowed only the steel heating when all the operation is known and approved by the inspector or projector.

Placement: Placement of framework will be made according to the plans and with a tolerance that does not exceed 1 cm. This placement will be assured against any sliding with wire ties located on the intersections of bars and other points, if necessary. The lap required for the framework will be obtained through concrete spacers of ring type or other approved one with a minimal area of contact with the forms.

Joints: Joints of non-structural elements and critical joints are showed in the plans. To use other joints, it is necessary to revise the directions instructed in the "Steel joints" section.

5.2 FORMS:

Material: Forms can be timber, metal or any other material appropriate to be used as molds of volumes for the concrete to be filled. The selection and design will be responsibility of the contractor, as long as they are in accordance to the work requirements related to the security and finish quality.

Manufacturing: Manufacturing will be made to materialize the sections and structural shapes of concrete in their exact dimensions. It should be considered the cumbers specified on the design, otherwise it will be provided the different deformations that the forms can have with the load of fresh concrete. Otherwise, beams with lights whose extension is longer than 6 meters and ceilings with higher extensions than 4.5 meters will receive a minimal cumber equivalent to $1/380$ of clear span.

The construction will be resistant, rigid, and enough compact to avoid the exit of cement mortar and appropriately fixed and braced to not be deformed. Forms will be designed to be removed (stripping forms) without damaging the concrete. The way that determines the forms should be aligned and braced altogether in such way that after being filled the concrete, concrete has a soft surface without warping, formed plans, projections and deformations.

Before filling, the quality of forms will be subject altogether to the inspector's approval.

Re-usage: Forms can be used again. In case this happens, their pieces should be in good conditions if there is any difference of surface in the finished concrete. Before filling, all forms should be cleaned. All strange or loose materials should be removed and surfaces should be examined to avoid have those zones which will be treated with material from the adherence to the concrete, trying not to stain it. In that case, the inspector or projector will approve that material.

Stripping forms: Terms for stripping forms should be described and programmed by the resident engineer, who is responsible of the work and can order the realization of concrete tests to have enough criteria in the moment of taking the decision. Terms will be coordinated and approved by the inspector or projector if the resident think it is the most convenient.

If it is necessary to use again the forms in a very quickly way to earn time, forms should be designed to be on time placed on beams and ceilings at the moment of the stripping forms.

Minimal terms of stripping forms, which are considered as minimal ones and does not guarantee the appropriate development of the operation in any circumstance, is showed below:

MINIMAL TERMS FOR STRIPPING FORMS

Vertical load of walls, columns, beams or other elements	12 hours
Sloped sides of walls and slopes beams	18 hours
Solid tiles framed in two directions**	
Lights with an extension up to 4 meters	4 days
Solid tiles framed in one direction*	
Lights with an extension up to 3 meters	4 Days
Lights with an extension from 3 to 6 meters	7 Days
Lights with longer extensions than 6 meters	10 days
Beam end and lightened ceilings**	
Lights with an extension up to 3 meters	7days
Lights with an extension from 3 to 6 meters	14 days
Lights with an longer extension than 6 meters	21 days

**** Terms are related to the head of stripping forms, considering that beams will keep shored.**

*** In case temperature remains below 10 °C, all terms will extend in six hours.**

Tolerances: The following tolerances will be accepted:

Lead : 5mm in 3 meters is the accepted maximum in all height but if it is longer than 12 meters, the tolerance is 20 mm.

Section : In defect = 5mm. In excess = 12mm

Coating : In defect = 3mm. In excess = 10mm

APPENDIX A

STANDARDS OF MATERIALS

- 1. The following standards are listed whose last effective edition will be considered.**
- 2. In case that ITINTEC makes new standards for the following materials, these standards will replace the respective ASTM standard.**
- 3. Inspector or projector can demand the constructor the manufacturer's certificates that show the fulfillment of the accordance of materials to the standards to be mentioned.**

MATERIAL	DESCRIPTION	STANDARD
(1) CONCRETE		
a) Cement	Specifications for Portland cement	ASTM C 150
b) Aggregates	Specifications of aggregates for concrete	ASTM C 33
c) Additives	Specifications of chemical additives for concrete	ASTM C 494
(2) TESTS FOR CONCRETE		
a) Manufacturing of test cylinders	Specifications for the manufacturing and curing of cylindrical samples of concrete for strength tests	ASTM C 31
b) Compression tests	Specifications for the cylinder test method	ASTM C 39
c) Slump tests	Specifications for Slump measurement	ASTM C 143
(3) REINFORCED STEEL		
a) Steel in round and corrugated bars	Specifications for reinforced steel of concrete	ASTM C 615
b) Welded mesh	Specifications of welded steel mesh for reinforced concrete	ASTM C 185
c) Strands	Specifications for high-strength strands, not lining and relieves for pre-tautened concrete	ASTM C 416
d) High-strength wire	Specifications for high-strength wire, not lining and relieves for pre-tautened concrete	ASTM C 421
(4) Masonry		
a) Sand	Aggregate for masonry mortar	ASTM C 144
b) Lime	Air hydrated limes for construction	ITINTEC 339.002
(5) Structural steel		
a) Steel in sections, platforms and smooth bars	Specifications for structural steels	ASTM A 36
b) Electrodes	Specifications for electrodes to weld ASTM A 36 steel	ASTM A 5.1
c) Bolts	Specifications for bolts and nuts with a low content of carbon	ASTM A 307

STEEL JOINTS BY LAP

BEAMS, SLABS AND JOIST, CUTTING WALL,

COLUMNS

OF MANUFACTURE

Diameter			Zone	Zone	Zone	Zone	BORDERING	TIE RODS
			1	2	3	4	MASONRY	
Length of joints	3/8"	30	40	35	35	30	35	50
	1/2"	40	55	45	45	30	45	60
	5/8"	50	70	55	55	40	55	75
	3/4"	60	90	70	70	50	70	95
	1"	80	160	125	125	90	125	180

Location of joints : Note A: See draw (below) in any joint zone

Maximal percentage of steel should be jointed in a section

50%	50%	50%	75%	50%	75%	50%
-----	-----	-----	-----	-----	-----	-----

(altered)

Cement, aggregate quality and water should be according to the regulation of ASTM 1961, Book 4.

In regard to the preparation, tests, etc, of concrete, these ones should be executed according to the Regulation of the Committee 218 ACI, 1983.

Cement to be used will be Portland cement of regular type or type I, which should be according to the directions of plans and technical specifications of structures.

6. PLASTERING, STUCCO AND MOLDING

6.1 General Statements:

This part involves the works of wall finishes that are described in the Table of Finishes. All plastering and lining should be finished very clear in flat surfaces and shapes should be fitted to the finished measures indicated in the plans.

During the construction, it is necessary to have a special care to avoid any damage in the finished plastering, with the necessary precautions.

6.2 Threads:

Mortars of cement and sand will be used in ratios 1:5. Sand should be uniform, free of clay, organic materials and saltpeter.

- 1.0 cm. Threads or concrete surfaces

Surfaces will be cleaned and moisturized before the thread, according to the situation.

Surfaces should have the enough ruggedness to exist good adherence.

Finish of thread will be flat and straight, for which it should be necessary to work with belts of reference of lean mortar (1:7), which are placed continuously and vertically along the wall.

Convenient plumbed belts will excel from the exact thickness of the thread with a maximal space of 1.5m, starting as near as possible from the parameter corner. When finished the thread, belts will be picked, filling the space with that mixture more used than that one for the rest of thread.

Sand for coarse threads will have a granulometry, which is comprised between the mesh N°10 and the N°40 (grains are not bigger than 2.0mm nor smaller than 0.4mm). Sand for fine threads will have a granulometry, which is comprised between the mesh N°40 and the N°200 (grains are not bigger than 0.4mm nor smaller than 0.08mm). Surface of coarse thread will be finished with timber plate and that one of fine thread will be finished with metal plate. If there is a second coat of thread (plastering), the first one will have a rough coat, for which the surface should be grooved to get a good adherence to the next coat.

Intersections of wall should be made in right angle, being demanded to be in perfect line.

Intersection of a threaded wall and floor will be distinguished by a space of 2.5 cm in walls and columns, which have frost threads with plates and they should be presented ready to receive the paint directly. Resident should take care and be responsible of all damage or harm in the finish of plastering.

MORTAR

Mortar of cement and sand in a ratio of 1:5 will be used.

EXECUTION

Before starting the respective works, surfaces to be received by the plastering will be suitably moisturized and all holes and cracks filled.

Finish of thread will be flat and straight, without undulations or defects, for which it is necessary to work with reference belts of lean mortar (1:7), which are placed continuously and vertically along the wall. Convenient plumbed belts will excel from the surface of the wall, the exact thickness of the thread with a maximal space of 1.5m, starting as near as possible from the parameter corner. In not case, the thickness of plastering should be bigger than 1.5cm.

TYPE OF PLASTERING

The following type of plastering will be carried out:

- a) In all walls, columns, beams, etc., interiors and fronts described in the budget, it will be executed a finish work in only one stage.

Mortar will be extended, by making it equal with a ruler between two belts of lean mixture. Before this gets hard, it will be made the rubbing, passing again and very carefully the timber float and scrubbing with a brush.

- b) Ceilings will be of cement, for which it is necessary to use fresh cement of first quality, considering the leveling based on central points and curb in joints with glass window openings.
- c) Parapets and scratch coats will be made in stucco with a cement mortar by only one coat. Threads of the footing topside will be swelled to be at the level of the glazed tile.

7. FLOORS

7.1 False Floor

All spaces of the building will have false floor in contact with the land. These false floors will be 4" thick or according to the determination of the project, by using concrete in a ratio of 1:8 of cement and concrete. Concrete will be poured into the well-leveled, dried and wetted soil, which should be compacted at maximal density, by using rulers. This floor will be executed as soon as the over foundations are finished, if possible.

7.2 Previous works

Before starting the placement of floors, it should be necessary to clean carefully false floors and structural tiles to allow the good adherence of finishes.

It will be traced on tiles in crude the distribution of granitic stones, stone stall, according to the situation, with draws indicated in the plans to get works to be at right angles, perfectly, and with minimum of squares.

To prepare the surface of concrete, it will be necessary to use a solution of hydrochloric acid in water at 10%. Then, the procedure to follow is to clean the surfaces of concrete completely, by removing and getting rid off all unusual material, leaving it swept.

When necessary, hydrochloric acid will be applied, leaving it to act 20 minutes approximately. It will be washed with clean water to get rid off all trace of it. Afterwards, before the casting or plastering, it will be necessary to apply a heavy whitewash of pure cement.

VENETIAN TILES FLOOR

Tiles should be of first quality, manufactured with cement and whose dimensions are 30x30cm.

Mortar for slump should be of cement-sand in a ratio of 1:4 and for the setting of the tile, it would be necessary to use a prepared material of the same color than that of the tile.

After cleaning the floors, they will be wetted considerably and the coat of mortar should be extended with an appropriate density at the respective environmental level.

After placed the tile, it should be necessary to press to avoid any void and get a surface at level perfectly, or with the slope indicated in plans.

It will be not worked over surfaces which exceed those where tiles can be placed before the mortar has started to set.

To ease the execution of the floor works, it will be necessary to put reference points at level with squares of tiles, which will serve as base to level the rest of the floor.

After set the used mortar, the floor will be washed and joints will be filled with a whitewash of cement, without having a consistency of paste, then the floor will be cleaned, by removing all excess of materials of setting, stains and other unusual substances.

Inspector Engineer will order the demolition of those floors, which by being hit by a girder of board, instead of by a dead sound, produce a sound with resistance, which should mean the existence of a void because of the tile has not been cohered appropriately due to the use of a mortar so dried.

SHOWER FLOORS: Shower floor will be of non-slipping glazed tile, whose dimensions are 15x15cm.

To place and set, it would be necessary to consider the same specifications than those of glazed tile footing. Rowlock will be revetted by a glazed tile of the same quality than those of the respective bases of wall.

COVERING: In roofs, it will be necessary to use a paste of 20x20cm of dimension, and the overload will require an ashlar stone and a cement mortar, besides of a impermeable tarpaulin (Torodin), as it is showed in the plans.

FOOTING AND SUB-FOOTING

This chapter involves the execution of all sub-footings and revetments according to the Table of Finishes.

- Venetian tile and timber sub-footings: They will be made by a mortar, cement and fine sand in a ratio of 1:3 from 4" high for Venetian tile and by cupped-head nail of 1 for timber.
- Glazed tile footing: Glazed tile should be Peruvian, of first quality, 15x15cm (dimension) and according to the established in the Table of finishes.

It will be rejected those pieces with failures or defects in borders or surfaces, because this work require a finish completely satisfactory. It will be possible to leave a space of 0,1 x 0,05cm deep with the threaded elements.

Pieces will be set with cement mortar in a ratio of 1:3 over a primary grooved thread. Joints will be lined perfectly in two ways and set before of the 48 hours for the setting of the white porcelain material.

In corners, white RODOPLAST and terminal of glazed tiles will be used.

SHOWER ROWLOCK: They will have the same height than that of the dimension of the glazed tile to be used (0,15cm).

Besides, it will be made by a simple clay brick, which is set by priming on edge with a cement-sand mortar in a ratio of 1:3.

To the revetment, it should be necessary to use terminals or rodoplast in the frontal or back. To the slump and setting, it would be considered the established for glazed tile footings.

TIMBER CARPENTRY

This chapter is referred to the execution of doors, carpentry fixture and others, which has been described in plans as of timber.

In general, but in case of other specifications in plans, all carpentry to be executed will be made in national cedar, without big or loose knots. The special three-play timber will be A-A class.

Timber should be of first quality, straight, without sumagaciones, cracks, soft parts or any other defects that can affect its strength or damage its aspect.

All elements will be in accordance to the cuts, details and measures, which has been specified in the timber carpentry plans.

Timber elements should be protected carefully to avoid any hit, dent or stains up to the submission of the work. Resident of work will be responsible of changing those pieces which are damaged by operators or tools, in other words, those of which by any action can not reach the specified quality of finish.

All work should be submitted brushed and sandpapered to provide a smooth, uniform and good-aspect surface.

Finish of all carpentry, but in case of other specifications in plans, will be of a mahogany-colored enamel.

Fine furniture such as closets, which are indicated in plans, should be made by specialized factories.

METALLIC CARPENTRY

This chapter is referred to the execution of gates, glass doors and windows made with polished, anodized and natural-colored aluminum.

LOCKSMITHING

This part is referred to the provision and installation of locksmithing according to the Finish Table. Any door, window, glass door or fixture that is not included in the Locksmithing Table should have their appropriate locksmithing, respectively.

In case of work resident has to approve the locksmithing that does not fit to those indicated in the Locksmithing Table, the Inspector Engineer can approve it as long as they are of similar quality than the required ones.

After installed the locks, they will be tested with keys to observe their good and easy operation.

Knobs, door pulls and tie rods should be wrapped and protected up to the final inspection.

Work resident is responsible of all locksmithing up to the conclusion of the work. Besides, he should replace by himself, any element that is defective, damaged or lost.

Dimension, type and quantity of hinges by sheet are indicated in the Finish Table.

Accessories such as latches, tie rods, etc, which are not indicated in the Locksmithing Table, should be subject to the Inspector Engineer's approval. Otherwise, this is the following indication to do:

LOCKS: They will be of the following type:

- A. Main doors will have an exterior fixed knob, which is unlocked with a key, and an interior one, which is fixed with a key.
- B. In toilets and storerooms, locks will have an exterior knob with a security push button and an interior one, which is unlocked with a key.

HINGES:

They will be of door latch type and aluminized in those rooms indicated in the Table of Finishes.

In the plywood doors, three door latch hinges will be placed whose dimensions are 3 ½" x 3 ½" and aluminized. In exterior doors, it will be placed four ones.

PAINT

General Statement: Paint will enter to the work in original and sealed containers. Inspector will reject those of different conditions.

It will be avoided the adding of painting thinning substances that have not been approved by the inspector. Before using the paint, it will be beaten and mixed enough.

Colors of paint are determined in the respective work plans. Stains or defects will be modified by the work Resident. In general, to the placement and preparation of paint, the specifications will be according to the manufacturer's conditions. Work should be submitted with the required cleaning to be approved by the inspector.

SURFACE PREPARATION

Surface should be very dried and clean, for which it would be necessary to use sandpaper or bristle-brush, according to the case. By cleaning the earth or dust, oil and grease stains will be removed with turpentine substitute.

PLACEMENT

Placement will be made by brushes, rolls or paint sprayers. Priming will be made as soon as the surface has been cleaned. The first coat of paint will be applied after the previous one has been dried and it keeps going up to get a uniform paint, without any trace of brush or difference of color tonality.

It will be removed the mold or fungus completely by a solution of trisodium sulfate or any other appropriate detergent. Then the surface is washed with water and then when dried, it will follow the paint.

In plastering, bricks and other similar substances, residual cement, plaster and oil will be removed. If there are some saltpeter stains in surfaces, they will be neutralized by a solution of zinc sulfate (1 ½ kg per water gallon), being necessary to brush the loose crystals when the surface is dried.

All rupture or hole in the plaster paste or other finishes will be filled with the same enriched material and then, sandpapered carefully to get a similar surface than that of others. It will be not accepted any defect that damages the surface aspect. Pasted-plaster surface will be painted after 30 days. Timber elements will be sandpapered in the bit thread way.

PRIMING ELEMENTS

It will be used "plastering" (enlucita) priming element or similar tasted quality one, except oil paint.

TYPE OF PAINT AND VARNISH

In ceilings and walls, it will be used synthetic washable latex of the Vencedor type or similar. Colors will be indicated by the Architect. In regard to the priming coat, it will be made (2) two-paint coat, at least.

COLOR SAMPLE BOOK

Resident will show the inspection the color sample book to be selected, at the bottom of the surface to be painted in the light of the environment and over a surface of 0,50m x 0,50m.

GLASS

They will be flat with a minimal thickness of 4mm and without air bubbles or failures that can mar the image. Resident will be responsible of all ruptures up to the submission of the work. It will be placed aluminum bolted molding in glass doors and windows of shops and other rooms.

Several semi-double-thick glasses will be placed in surfaces whose main side does not pass 1.20m. In other surfaces, double-thick glasses will be placed.

In small toilet windows, it will be placed rainy-type glasses. Those glasses should be cut IN SITU, which should be defined without splinters. After placed and up to the submission of the work, glasses will be protected with white paint to avoid impacts.

Covering glasses of will be hardened with transparent glasses of 8mm and fixed to the structural part of the building, according to the mounting plans, assuring the proper stability of each crystal. Likewise, it will be assured the rigidity of all elements, as well as the movements of bays in the covering. Therefore, it is necessary to use a silicone applicator, drills, wrenches, etc.

CAUTIONS BEFORE INSTALLATION

Before the installation, it is necessary to make the following actions:

- a) Verify the horizontal and vertical direction of bays.
- b) Verify the plumb of spaces or inferior and superior channels.
- c) Locate the axis of opening to make the respective trace, especially in the union points of TEMPLEX crystals.
- d) When making the trace, it is necessary to consider a distance of 3 to 4mm between crystal and crystal and between crystal and wall to the dilatation of crystals.

CAUTIONS DURING INSTALLATION

During the installation, it is necessary to make the following actions:

- a) TEMPLES crystals should not have contact with, drag or lie over a hard surface (concrete or metal).
- b) To the fixed-metallic fixture installation, it is necessary to place insulation packing such as cork or neoprene to avoid the contact of metal and glass.
- c) Fitting of bolts, nuts and metallic plates over the TEMPLEX crystal should have an appropriate pressure that allow the stability of unions, as well as the light slides of crystals inside of fixtures.
- d) Fitting fixtures should be resistant to the deformation or rupture, especially to the wind bracing.
- e) Fixed crystals should be installed to support the efforts of movable crystals such as jamb gates and windows, especially in the rotation points.
- f) Leave the necessary 3-4mm plays between crystal and crystal and crystal and wall respectively, to the dilatation of crystals, sealing with silicone those plays.

SILICONE

It is a pasty material with only one component, which is vulcanized when exposed to the air humidity, making a mass of strong rubber, which serves to seal the plays between crystal and crystal and crystal and wall, respectively.

COLORS

Colors to be used are transparent and bronze.

APPLICATION

1. Clean previously all surfaces of dirt and pollutants such as grease, oil, dust and water
2. Install the supporting material (adhesive tape)
3. Apply silicone continuously, by using the appropriate applicator to fill and seal the plays.
4. Cut excess of silicone

8.0 SANITARY INSTALLATIONS

8.0 COLD WATER

8.1 (Polyvinyl chloride) PVC PIPE

To the system of cold water, it will be used polyvinyl chloride (PVC) pipes and fixtures, which should be rigid of 10-class (150pounds/inch²), threaded and with a limit of security in the pressure of inferior rupture from 1 to 5 at 20°C.

It will be used a threaded pipe whose diameter can be up to 1½ ", in case of bigger diameters, it will be used spigot and bell. To the installation of screwed pipe, it should be necessary to work according to the conventional procedures, having the advantage of cutting the pipe by saw. Screw will be made by a threading machine, being suggested to insert a rigid element such as a timber or metal plug to the pipe to avoid the distortion and/or out-of-line of the pipe. Surface of fastening should be protected with rubber or similar element to avoid damaging tooth of tools to be used. It is prohibited to use caulking yarn and paint to the impermeability of unions.

All works related to pipes and fixtures should be made over timber bench of 0.80m high, with bench or jaw vise.

It is necessary to have provisional plugs for all and every one exit. To change of diameters, it should be necessary to use bell reductions, especially eccentric ones. Besides, it is prohibited to use of brushings (it is allowed its use only for the installation of device).

To the pipes pass through the structural elements, it will be according to the established in the article X-III-5.6 of the National Construction Regulation.

IMPORTANT STATEMENT

During the construction, pipes should be filled of water totally, since the moment of installation up to the final submission of work, being possible to remove plugs only for the pressure tests, after this, they should be replaced.

8.2 Galvanized iron pipe

It would be necessary some specification if the plans describe that. To the system of cold water, it should use pipe and fixtures of screwed galvanized iron if the work pressure is equivalent to 125 pounds per inch ².

To the installation, it should be according to the conventional labor rules related to this pipe. It is necessary to indicate the importance of a good execution, especially in regard to the union of pipes, which will remain fixed in floors and walls.

Unions should be sealed with a (mineo) or litharge paste or another similar product to the "smooth-on".

It is prohibited the use of caulking yard or paint in the process. If the Inspector Engineer knows that this kind of material has been used, he will order to remove them of the installation. That removed pipe should not be used again. Recommended length of thread to make a good work is:

1/2"	3/4"	1"	1 1/4"	2"	2 1/2"
17/32"	9/16"	21/32"	3/4"	29/32"	1 1/16"

To get this, it is necessary to use bolt-pipe machine with appropriate dimensions, lubricating with the necessary frequency after each line, at least.

All the heavy work of preparation of pipes should be made over solid timber benches of 0,80m high. It will be necessary to have a portable small bench for the work, as well as to make a cleaning of bur, at the moment of finishing the screwing process. Before the installation of pipe, in all cases of installation, it should be used a double-wrench or pipe vise and wrench. It is not recommended to pry the thread of the installed pipe, even it is fixed.

It is necessary to have provisional plugs in the storeroom for all outlets since the work starts. To all variation of diameters, it should be necessary to use bell reductions, especially,

eccentric ones. It is not allowed to use brushings to the variation of diameter, only for the outlet of devices.

Pass of pipes through structural elements will be according to the established in the article X-III-5.6 of the National Construction Regulation.

8.3 Fixed Pipe

It is that one projected through walls and/or false floors. It will be lied over, avoiding to pass below devices, walls or over foundations, but derivations or specific branches for each device.

Traverse should be verified over the land carefully, considering the existence of sewerage manhole (registro), electrical pipes, etc, to avoid non-necessary breaking that originates bigger loses of load. After that, the procedure to follow is to cut the pipe, which should be fixed to the floor or wall temporally, with concrete dies, which should be spaced suitably and placed according to the work progress.

Those will remain covered afterwards by the thread and floor, respectively. It is not allowed to have, in any case, loose pipe, which can be exposed to damage by mechanical action. Pipe should be tested before being fixed finally.

8.4 Point of cold water:

Point of cold water refers to the installation of each outlet of cold water, which is addressed to the supplying a sanitary device, cock or special outlet. This is considered from the outlet of wall to the limit determined by walls of the toilet room.

8.5 Shutoff valves

It will installed gate valves of 2" diameter as maximal, in those places indicated by the plans, besides they will be of bronze with screwed unions, trademark and work pressure equivalent to 125 pounds per inch ², which should be stamped in a body of the valve.

Valves of bigger diameters (2½ " and bigger ones) should be of cast iron with bronze framework and unions of regular flanges.

Valves with screwed unions should be installed between two universal unions, which will be screwed again and with bronze cone slump. Valves in walls will be hosted in box with

timber frame and door with enough spaces to ease their discharge. They should not be fixed, it is recommended to place them in walls. If it is not possible, they will be in the floor free to be discharged in masonry box, with frame and caps of bronze angles, the cap framed by the same material than that of the floor.

All valves will have a bronze or aluminum disc of 5cm diameter with the respective number push-recorded and fixed to the valve with a cooper wire N°16.

8.2.0 TESTS AND DENSIFICATION OF PIPES SYSTEM

8.2.1 Tests:

Before covering pipes, it will be made the first test, which could be made by sections and whose result should be informed to the Supervisor. The second one should be made after covering pipes, being necessary to make them at the end of all works to the performance of the work.

To carry out the execution of these pipes, water pipes should be filled through a hand pump. Pressure will be increased up to reach 150 pounds / inch ², which should keep itself for sixty minutes without any loss. In case of any pressure loss leakage, it should be founded and corrected to start over the test. This test can not be approved as long as it does not fulfill the required conditions.

8.2.2 DISINFECTION

Disinfection of the system will be made after accepting the last test of the system. System should be washed with water inside, and should be drained off totally. It should be necessary to apply mixtures of solutions composed by chlorine or calcium hypochlorite, filling the pipes slowly with the disinfectant in a ratio of 50 parts per a million of waste chlorine in specific points of the system.

It is necessary to reach a value of 5 P.P.M of waste chlorine, otherwise it should be evacuated the pipes and repeated the operation to reach the established value. When satisfactory, pipes should be washed to remove all disinfectant.

8.3.0 SEWERAGE SYSTEM

8.3.1 PVC Pipe

To the sewerage and ventilation system, it should be used PVC SAA pipe for interior fixed sewerage systems.

PVC pipe (SAL) should resist up to a hydrostatic pressure equivalent to 10kg/cm² at 20°C. To the installation of spigot and bell pipes, it is necessary to use a saw or handsaw to cut it. From the smooth side of the pipe, it is necessary to remove the existing bur and all irregularity by a slitting or knife file. Then it is necessary to clean it with a dry and clean rag to apply the sticking material. The sticking material should be applied with a bristle brush, which can not be of Nylon or other synthetic fiber, over the two contact surfaces.

Pipe should be inserted inside the bell, assuring the pipe is very well fixed, then it is necessary to make a quarter turn to assure the uniform distribution of the sticking material. If the union is made correctly, it will be seen a sticking cord between the two unions. It is necessary to wait 15 minutes for the setting before the handling of pieces and 24 hours before applying pressure to the line.

Sticking material should be stored away of fire, in a dry and dark place to its better conservation. Cans should keep sealed when they are not in use. The efficiency to be obtained from each can of 1/4 gallon will be:

Pipe diameter	2"	2 1/2"	3"	4"	6"	8"
Average N° of union	90	70	60	50	32	20

To the transition to pipes from other material, it is necessary to use those special materials provided by the manufacturer.

All work of preparation of pipes and fixtures should be made over a timber bench of 0.80m high, with bench or jaw vises. It is necessary to have provisional plugs for all and every outlet.

8.3.2 IMPORTANT STATEMENT

During the construction, pipes should be filled of water totally since the installation up to its final submission.

8.3.3 Pipe gradients:

Gradients of main sewerage collectors will be indicated in the observations of the respective plans. It will be the 1 %, as minimum, for all branches and collectors not described or explained in plans.

9.0 ELECTRICAL INSTALLATIONS

These specifications are related to the electrical installations, in this part it is described the materials to be used for the execution of works. All material that is not described by these specifications should be subject to the appropriate standard of installation and according to the established in the electricity national code (System of Usage, Volume V, Part 1, Edition 1985-1986 and the general construction regulation).

ELECTRIC PRODUCTS TO PROTECT THE ELECTRIC SERVICE CONNECTION

Electric connection to be installed by the provider of electrical supply (electrical company) will be composed by a PVC pipe.

FEEDERS TO DISTRIBUTION SWITCHBOARD CONDUCTORS

They will be of soft electrolytic cooper, with concentric lay and insulation of special PVC (polyvinyl chloride) of the type THW for 600 w, whose section is 50mm² and manufactured according to the ICEA standard S-61-402 for insulation.

ELECTRICAL PRODUCTS

They will be PVC pipes of the standard American type, heavy (50mm) and nominal.

DISTRIBUTION SWITCHBOARD

Distribution switchboard will be those that can fix metallic cabinet with door and Yale lock, and should be single-phase and equipped by thermal magnetic switches.

CABINET

Cabinet for distribution switchboard will have enough capacity to provide free space to the hosting of leads and switches and other elements equivalent to 10cm in each side to easy the handling of mounting and lay.

Boxes will be made by galvanized iron plates, whose minimal thickness will be 1/16". These boxes will have in their four sides circular openings of different diameters to fit the outlet of PVC-SAP pipe of feed, as well as the outlets of PVC-SEL pipes of secondary circuits.

Frontal plate will have a hammered lead-shellac finish. For each switch, there is a small card where the circuit number and the description of charge will be described. Besides, there will be a directory card behind the door, where each function of circuit will be described.

Bars will be of electrolytic cooper, with rectangular section and whose capacity will be at least, 1.5 times more than the required one by the main switch to protect the feed cable to the distribution switchboard.

MATERIALS

ELECTRICAL PRODUCTS

They will be composed by plastic pipes with mechanical and electrical characteristics required by ITINTEC. They will be of a light and heavy material.

BOXES

They will be made by galvanized iron-plate stamping whose minimal thickness will be 1/32". Ears to fix fixtures will be fastened to them in a mechanical way even better; they will be of one same piece with the body box. It will not be accepted welded ears. Besides, these boxes should be according to the established in the chapter 4.6 of the National Electricity Code, Volume V and Part 1.

LEADS

Leads will have thermoplastic insulation tw for 600 v. Besides, they will be of smooth cooper of 99.9 of conductivity, made according to the ITINTEC standard N°370.048, which

fulfill the ultimate recommendations established by the National Electricity Code, Art. 4.2.2 and tables 4-III; 4-IV; 4-VI; 4-VIII; 4-VII and 4-IX.

Gage, insulation type and manufacturer name will be marked permanently and in regular intervals in all lead length.

Municipality of Puno Province

Report nº 095-98-DSA/MPP

**To: Dr. Carlos Tapia Castillo
Municipality Director**

Subject: Requirement of work tools

Date: August 19th, 1998 (Puno)

I inform you we do not have the necessary work tools to carry out the public cleaning service in the center area of the city of Puno. Besides, it is required to improve the performance of such service, therefore it is necessary to provide the following tools to the trash collectors and sweepers:

- 05 floor mops
- 25 metallic dustpans
- 40 large nylon broom

Therefore, I request your Head Office the respective authorization to obtain the above-mentioned tools.

Sincerely,

(Seal and signature)

**Felipe Larico
Division of Environmental Sanitation
Municipality of Puno Province**

