

## OUTLINE SPECIFICATIONS FOR PREVI PROJECT COMMUNAL SPACES

### Center for Environmental Structure

#### Excavation:

Slope the parking lot down enough so that at the west entrance to the project, the parking lot is 36cm below the entrance (two steps) as shown.

Excavate the playground 36cm below grade and surround it with two wide stairs as shown.

Slope the pedestrian street 1/100 toward the catchbasins as shown on drawings.

#### Paving:

All paving is concrete tiles, 30cm x 30cm set in sand, and spaced 2cm apart with grass growing inbetween. Include paving under arcades formed by the front of houses in this part of the contract.

Steps are made of concrete tiles and concrete as shown on drawings.

#### Awnings:

All awnings are standard awning canvas made by Lona La Bellota (Avenida Argentina 375, Lima). Use pale blue and white canvas. Hem all edges.

Where awning is completely horizontal, at the west and east ends of the project, provide weep holes, so water does not accumulate.

Wood framing is all made of diablo fuerte, unless diablo fuerte is too difficult to nail. Then use tornillo throughout. Sizes of members and spacing of frames are shown on drawings. Each column has independent footing.

Garbage Can Storage:

Make the garbage can storage out of the same wood as awning frame above. This is a solid box holding five cans made of 3/4" boards, attached to House A, with a hinged sloped wood cover for each can space.



## NOTES ON COSTS - PREVI PROJECT

### Center for Environmental Structure

Labor for carpentry is figured at roughly 30% of costs.

Labor for concrete work, plastering and mortar is included in the unit costs for those items.

Lumber is figured at 11 soles per board feet for treated wood; 9 soles per board feet for untreated wood.

#### Footings/column

Average size of footings:

35 x 25 x 30 = .026 cu. meters/footing

Concrete:  $.026\text{m}^3 \times 734 \text{ soles/m}^3$  19

Excavation:  $.036\text{m}^3 \times 60/\text{m}^3$  2

Steel bar:

1.316/ft for 3/16", 2" wide =

1.8k/m x 1m x 11 soles/kg 20

Bolts 2 @ 25 soles 50

Labor 24

115

115 soles/  
column

#### Ground Beams/meter

Average size:  $.175 \times .20 = .035\text{m}^2$

Concrete:  $.35\text{m}^2/\text{m} \times 734/\text{m}^3 =$  26/m

Excavation:  $.035 \times 60 =$  3/m

Rebars #3 (3/8")  $.376 \text{ lb/ft.} =$

$.5 \text{ kg/m} \times 11 \text{ soles/kg.}$  6/m

Labor 4

39

40 soles/m



Interior Ground Floor/m<sup>2</sup>

Sand: .05 x 70/m <sup>3</sup>	4
Pastelleros in mortar: 60/m <sup>2</sup>	60
Oil and wax: 10/m <sup>2</sup>	<u>10</u>
	74

75 soles/m<sup>2</sup>Patio Floors/m<sup>2</sup>

Sand: .05 x 70/m <sup>3</sup>	4
Pastelleros in sand: 50/m <sup>2</sup>	<u>50</u>
	54

55 soles/m<sup>2</sup>Frames

## 280 frames

wood: 85 bd ft x 11 soles	935
toothed rings: 30¢ x 20 \$6.00	260
bolts: 10 x 25 soles	250
labor	<u>150</u>
	1595

1595 soles/  
frame

## 230 frames

wood: 68 bd ft x 11 soles	750
toothed rings	260
bolts	250
labor	<u>150</u>
	1410

1410 soles/  
frame

## Connection for second floor columns

plate	10
bolts (2)	50
labor	<u>20</u>
	80

160 soles/  
frame

Half Frames (230)

Wood: 27 bd ft x 11 soles	300
Nails	10
Labor	<u>100</u>
	410

410 soles/  
framePerimeter Beams

## 1st floor/meter:

bottom plank: 1 x 11"	25
2 2½ x 4's	55
nails	5
labor	<u>30</u>
	115

115 soles/m

## 2nd floor/meter:

wood: 4 bd ft x 11	44
labor	<u>15</u>
	60

60 soles/m

Floor/m<sup>2</sup>

1" tongue and groove	100
Joists	50
Labor	<u>50</u>
	200

200 soles/m<sup>2</sup>Roof/m<sup>2</sup>

3/4" tongue and groove; rough	70
Joists	40
Building paper	15
Mud	20
Labor	<u>35</u>
	180

180 soles/m<sup>2</sup>



Party Wall/m<sup>2</sup>

Wood: average 728 bd ft/m <sup>2</sup>	32
Nails	4
Bolts	8
Bamboo	12
Paint	6.5
Labor	20
Plaster	<u>65</u>
	147.5

148 soles/m<sup>2</sup>End Walls/m<sup>2</sup>

## Front wall:

vertical members	15
plate & sill	10
bamboo	12
plaster	77
lime paint	13
labor	<u>15</u>
	142

## Back wall:

deduct vertical members	127	Average: 135 soles/m <sup>2</sup>
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Back Patios/m<sup>2</sup>

## End walls:

framing	22
bamboo	12
Paint (outside only)	13
Labor	12
Plaster (outside only)	<u>32</u>
	91

90 soles/m<sup>2</sup>

## Side walls:

framing	22
bamboo (whole)	16
labor	<u>12</u>
	50

50 soles/m<sup>2</sup>

Patio Roof/m<sup>2</sup>Estimate 75 soles/m<sup>2</sup>75 soles/m<sup>2</sup>Partitions/m<sup>2</sup>

Framing	15
Bamboo	12
Paint	13
Labor	15
Plaster (both sides)	<u>64</u>
	119

120 soles/m<sup>2</sup>Alcove Fronts

Average:

Frames 14.5 bd ft at 11 soles	160
Bamboo 2.75 sq. meters @ 12 soles	33
Labor	<u>60</u>
	253

250 soles/  
alcoveWindows

Average 80 soles/window

80 soles/  
windowDoors

Average:

20 bd ft at 11 soles	220
Nails	10
Labor	<u>70</u>
	300

300 soles/  
door



Stairs

Wood 110 bd ft @ 11 soles	1210	
Chicken wire 7 sq. meters @ 15 soles	105	
Building paper 7 sq. meters @ 15	105	
Mortar & tiles 4 sq. meters @ 60	240	
Labor	<u>440</u>	
	2100	

2100 soles/  
stairCounters/m

6 bd ft at 11 soles	66	
Labor	<u>20</u>	
	86	

90 soles/m

Shower Floor/Shower

15cm mortar x 1.5 sq. meters	300	
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300 soles/  
showerWaterproofing

Epoxy paint (2 coats)	40	
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40 soles/m<sup>2</sup>Electrical

180 soles per point for lights & plugs  
100 each for TV and telephone outlets  
290 for general panel

Plumbing

Estimate 10,000 per house



## OUTLINE SPECIFICATIONS FOR PREVI PROJECT

### Center for Environmental Structure

Note 1. For bidding purposes, the contractor should make a separate bid for outdoor communal spaces ... i.e., paving of sidewalk and the awning construction, catch basins, excavation and steps in the communal playground, garbage can storage.

Note 2. Note that we specify diablo fuerte throughout. We strongly prefer diablo fuerte: however, we were unable to determine from our sample whether it is easy enough to nail. If the contractor considers the nailing of diablo fuerte too difficult, he may use tornillo throughout. If tornillo is used, it must be pressure dipped in Duramat JE3 (a preservative derived from pentachlorofinol). We believe, that diablo fuerte is sufficiently dense and oily not to require this treatment. All wood exposed to the outside or in contact with the ground should be treated with Cunilate (Osmos).

Note 3. All plaster is to be white washed with lime paint.

#### Footings and Ground Beams:

Footings under each column and ground beams as shown in foundation plans; poured so they are continuous; reinforced and tied together with No. 3 steel bars. Columns tied to footings with 3mm U-shaped steel straps, inserted in footings during pour; straps bolted to columns by two 5/8" bolts.



Mortar ground beams to make them level, wherever they carry partitions; then place sills on top and nail into concrete every 30cm with concrete nails.

Ground Level Floors:

235mm x 235mm pastelleros laid 15mm apart on 2cm of mortar on top of 5cm of compacted sand. Mortar joints between pastelleros. Oil and wax pastelleros at end of job.

Patio Floors:

235mm x 235mm pastelleros laid 30mm apart directly on 5cm of sand.

Frames:

All frames are made of diablo fuerte. Make sure that connection area of columns and beams and entire gussets have no knots or defects. Beams and columns notched together - with beams extending 12cm past columns. Grain of gusset planks and sizes and positions of toothed rings and bolts, as shown on drawings. First floor main frames are made of 28cm x 8cm columns and beams. First floor secondary frames, and all second floor frames are made of 23cm x 8cm columns and beams. All gussets are 3cm thick on both sides of frames. In addition to bolting, nail gusset



planks to column and beam to prevent warping, and nail in 8cm x 3cm diablo fuerte at the bottom of gussets to close gap between them. Notice that 1st floor gussets are shown with 40cm wide triangular gusset plate. If 50cm wide planks are available, this triangular gusset plate should be 50cm wide.

Smaller columns in veranda and front balcony are 8cm x 10cm diablo fuerte, gussets are 2.5 thick and nailed to columns and beams.

#### Perimeter Beams:

All wood in perimeter beams is diablo fuerte.

Perimeter beams are horizontal box beams, made of two  $6\frac{1}{2}$  x 10cm members forming the sides, 23 x  $2\frac{1}{2}$ cm board at bottom, and diagonal floor sheathing forming the top. Nail members together at spacings not to exceed 10cm with 8d nails. Where floor boards cross perimeter beam, nail each board with two 8d nails.

Where second storey full frame columns connect to perimeter beam a 5cm x 3mm steel strap wraps around blocking in perimeter beam with a  $\frac{1}{2}$ " bolt to hold the strap to column and  $\frac{5}{8}$ " bolt, or  $\frac{5}{8}$ " steel rod threaded at each end for bolts, to hold blocking in perimeter beam. See detail.

Perimeter beams of two adjacent houses are connected with a  $\frac{3}{4}$ " bolt, or  $\frac{3}{4}$ " steel rod threaded at each end for bolts, going through beam-blocking-beam at points not to be more than 3 meters



apart and at ends of house. Where possible, make these connections where second storey columns connect to perimeter beam in one house (or both houses if it happens that they coincide), to save bolts.

Perimeter beams at roof are 10 x 10cm diablo fuerte (see drawings), and are not connected between houses.

#### Second Storey Floors:

Second storey floors are tongue and groove 2½ x 10cm diablo fuerte boards, laid diagonally, and continuously across 5 x 13cm diablo fuerte joists. Nail each floor board to joists and blocking with two 8d nails wherever they cross. Joists are blocked at beams with 2½ x 13cm diablo fuerte blocking. Toe nail joists to beams with three 8d nails.

#### Roof:

Roof sheathing is tongue and groove 2 x 10cm diablo fuerte boards, laid diagonally, and continuously across houses. Joists are 5 x 10cm diablo fuerte toe-nailed and blocked with 2½ x 10cm blocking at beams. Nail the same way as second storey floor. Lay building paper on sheathing, and then 5cm of mud for covering. Building paper is Techado Papko No. 50.



Party Walls:

Party walls between houses are two totally independent walls, except at Patios.

Each wall is made up of plaster on horizontal half bamboo lathing nailed to a frame made up of  $6\frac{1}{2}$  by  $6\frac{1}{2}$  plate at top, 4 x  $6\frac{1}{2}$ cm sill at bottom a  $6\frac{1}{2}$  x 8cm diagonal, and intermediate 4 x  $6\frac{1}{2}$  studs. (See drawings.) The whole wall bypasses main columns of house; the frame being set between the 12cm extensions of main beams. All members are securely toe-nailed together. Nail each half bamboo into studs with cup side toward house to take plaster.

At patios, connect plates to plates of adjacent house nailing through blocks every 40cm.

End Walls:

End walls have plaster on both sides on horizontal half bamboo (3cm diameter - cup toward outside) tied with hemp twine to vertical whole  $2\frac{1}{2}$ cm bamboo studs which are notched and nailed into 4 x 8 plate at top and sill at bottom. When bamboo stud is next to vertical framing for doors and windows and corners, nail the bamboo into these members through blocking.



Where arched shapes are shown at fronts of houses, frame in 4 x 8cm wood to form the diagonals; plaster over bamboo lathing, and set 10cm diameter circular blue glazed tiles (to be selected) into the plaster as shown on elevations.

Back Patio Fence and Walls:

- a. Between back patio of one house and back patio of another house - exposed horizontal whole bamboo between diablo fuerte studs.
- b. Between back patio and street, horizontal half bamboo - exposed on the inside, plaster toward street.
- c. Between back patio of one house and interior of another house, exposed whole bamboo toward back patio and regular party wall (one leaf) toward house.

Partitions:

Partitions are plastered on both sides, on one-quarter horizontal bamboo lath, which are tied with hemp twine, to vertical whole bamboo studs. Bamboo studs are notched and nailed into 4 x 8 diablo fuerte plate at top and sill at bottom.

Alcove Front Partitions:

Exposed vertical whole bamboo - and diablo fuerte frame (see detail).



Windows:

All patio windows are sliding; made with white translucent polypropylene sacking framed in diablo fuerte frames. Exterior windows are hinged at top, made with polypropylene sacking on bamboo latticing and diablo fuerte frames. Polypropylene sacking is available from SACOS del Sur SA., Lima.

Doors:

Doors are made on site out of tongue and groove diablo fuerte boards on a diablo fuerte frame (see drawings for dimensions). Purchase standard thumb latches and locks for front and back doors, and simple pull latches for all three interior doors - master bedroom, toilet room, and shower room. Front balcony doors have latch which is possible to lock from inside the house.

Patio Roof:

Patio roof cover is standard awning canvas made by Lona La Bellota (Avenida Argentina 375, Lima). Use pale blue and white for seven houses and red and white for seven houses. Sew a canvas 10cm wide backing strip along edges and 2 center positions, and sew in 1cm brass ring every 40cm along these strips. These rings are then strung on 3mm galvanized wire which run along the long edges and along the 2 center positions. Wires are attached to pulleys mounted on the corners of the patio frame and pulley



pull is located at the patio balcony so that the patio roof can be opened and closed from this balcony.

Stair and Patio Balcony:

Stairs are made of 3cm thick treads and 2cm thick risers on 5 x 30 stringers - diablo fuerte. Patio balcony floor is tongue and groove diablo fuerte. On top of the stairs and balcony floor lay building paper, then chicken wire, then mortar, 2.5cm on stairs; 4cm balcony, and then pastelleros spaced 15mm apart on treads and balcony floor. Mortar joints.

Shower Stall:

Shower stall is raised off the wooden floor to conceal drain, and is made of mortar. Walls of stall are mortared, and all surfaces of the shower stall painted with white epoxy paint for waterproofing. Also paint rest of shower room floor, and the toilet room floor with two coats of white epoxy.

Kitchen:

Install 3cm x 60cm diablo fuerte counter in kitchen. Paint the counter and 10cm of walls in back of counter with two coats of white epoxy.



Plumbing:

Purchase and install standard fixtures as follows:

Kitchen sink  
Laundry sink  
Shower Head and Drain  
Wash Basin in Shower Room  
Toilet

All pipes are plastic and are located as shown on drawing.