# Comprehensive Modernization Guidelines

# (REVISED SEP 1, 2002)

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Form AVP-500133

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1. **Security Items For Non-Dwelling Structures:**
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6. GENERAL REQUIREMENTS

**A. Site Improvements:**

##### A1. Grading, drainage and grass

A1.1 Require rough and finish grading work (regrading) where grounds are damaged or in poor conditions by erosion, tire rut and tenant parking on lawns. This may require excavating and filling work as necessary to restore original slopes. In older steep projects, topsoil becomes eroded and is washed down. On flat ground projects, a ground settlement or subsidence result is pounding problems. This occurs specially around dwelling and non-dwelling structures because of the splattering effect of rainwaters on soil. Soil is splattered around unto the walls, unless a concrete apron or pavement is designed and constructed around the building or unless roof water is collected in gutters, down into leaders and onto splash blocks or paved swales. Rain dripping from the eaves erodes, soil, walls and footing, leaving foundations exposed. These opened spaces under the buildings serve as breeding nests for vermin. Soil moves to lower levels, covering walks and settling down in catch basins and underground storm sewers obstructing drainage.

A1.2 Specify checking of topsoil at 4 inches and 6 inches depth, specify removal to predetermined depth and require storage away for reuse. Require excavations and lightly compacted filling work in 8 inches layers. Restore drainage slopes and contours. Add topsoil, if necessary, and compact as described previously.

A1.3 Specify closed turf/grass, also called “sodding” (not checkering”, nor sprigging or seeding) around building envelopes, to avoid mud splattering of painted walls and to avoid erosion and restore original good project appearance. Use “checkering”, sprigging or seeding away from buildings, especially along open and large spaces where trampling is minimum and time allows grass to grow and develop a closed turf. Closed turf reduces and avoids wild grass. When planting following the contours, require closed turf to avoid erosion of embankments and sloping grounds.

A1.4 Large grass areas should be designed to facilitate not to impede, easy lawn mowing operations. Do not use concrete blocks, concrete test cylinders, or barriers of any king for supposed “beautification” purposes that make mowing difficult by large equipment.

A1.5 Avoid grass nooks and corners around building envelopes that can’t be cut easily with machines and require bothersome hand cutting and trimming.

A1.6 Do not grass small areas in building fronts. They are difficult to maintain. Consider paving, cobblestones, or other acceptable paving methods.

A1.7 Specify leaf grass cutting 2 inches above the soil; avoid cutting grass leaves close to ground; without leaves, roots will die and rot promoting shallow root and thin grass re-growth which is exposed to insect attack and won’t close turf, as desired.

A1.8 Provide concrete paving around building to protect soil against erosion and undermining of buildings footings. Paving must be at least 3 feet wide.

End of section A1.

**A2** **Paving of swales versus grass swales**

A2.1 Courses of runoff waters should be paved in concrete swales. Prefer the use of concrete swales 3 to 4 feet wide with a 2 inches water line below the edges. This should allow rising mowers and maintenance vehicles to move freely over them without getting tuck in muddy and grassy earth swales.

A2.2 Do not use half-concrete piping for drainage of rain around buildings, play and sitting areas and large lawn areas. They are accident and safety hazards to playful children and elder people watching over them. Any half-concrete piping should be used along project boundaries to collect and divert waters outside the projects into existing courses of waters, creeks, or rivers.

End of section A2.

## A3 Surface waters versus underground drainage

A3.1 Prefer surface drainage to underground drainage, as possible, for maintenance reasons and savings in construction costs. It is easier, and more economical, to maintain surface drainage systems than underground structures or systems which easily clog up solid with trash and dirt in a few number of years. Topography and project sizes are critical factors on determining which system to use. Restore or improve the original systems, as possible, and improve or modify with combined systems, where necessary.

A3.2 All drainage systems must drain into existing, legal and natural courses of surface runoff, which should never be reduced, but rather enlarged.

A3.3 Whenever in hilly grounds, a sloping or paved swale or open box culvert is designed, provide concrete baffles, sized half-width, adequate spaced and staggered from side to side to break down the impact force of flowing or rushing waters at the foot of the hill/slope. Serious damage and erosion problems may occur if baffles are not properly designed.

End of section A3.

## A4 Catch basins, gratings and piping

A4.1 Design gratings, grilles and strainers on yard drains and catch basins of adequate size or sections, and weight to be removed and reinstalled by at least two maintenance men, but not easily removed by playful children.

A4.2 Any grating separation or opening of iron grille, strainers, and frame openings should be not more than 1-inch wide, enough to drain water but retain on the surface stones and objects that can be picked up easily by cleaning staff. This separation is a safety feature and will not allow feet of running toddlers and small children to get caught, trapped and injured.

A4.3 In designing catch basins, specify the basin bottom several inches below the inlet elevation of the pipe. This should provide a collection space for debris and soil which maintenance staff should be able to remove with long, deep spades on a monthly regular basis. In this manner, clogging of underground piping is reduced in heavy downpours.

A4.4 When lowering the bottom of the catch basins as indicated in item 4.3, specify drilling several 1 inch diameter holes adequately spaced to allow rain collected to drain into a French drain, filled with stones and built underneath. In this manner, stagnant waters promoting anopheles-breeding places will be eliminated. The holes should fully pass the thickness of the concrete bottom.

A4.5 Deep manholes or catch basins should be provided with galvanized ladder rungs for easy access to the bottom.

End of section A4.

### A5. Plants flowers, shrubs, trees, tree guards

A5.1 Specify flower plants and shrubs in clusters or around buildings. Use small plants and shrubs under windows to avoid hiding places and Peeping Toms. Do not use spiny plants or sword-like “mayas” leafs for safety reasons. Mayas are potential deadly plants and should not be allowed.

A5.2 Specify large shade trees, non-fruit bearing, and non-deciduous leaf shedding. Leaf shedding results in undue and unnecessary maintenance raking time and cost problems. Consider evergreens, as possible. Consider branch and root spread and locate trees so that branch and root spread is at least 10 feet away from building walls, balconies or away from underground sanitary sewers. Roots sense and seek sewer waters for growth. Fine roots find small pipe cracks and openings and get inside piping growing up to full obstruction of flow and cracking piping.

A5.3 Plant flowers and shrubs appropriately in clusters near, but appropriately away from buildings to avoid hiding places under windows and near exterior doors for safety and security reasons. Clusters are very much appropriate to fill in large open lawn areas, leaving space around to allow ease of riding mowers.

A5.4 Don’t specify small trees and shrubs around play and sitting areas. Small trees will take many years to grow up and provide shade. Shrubs may be easily stomped and destroyed. Specify the installation of large, matured trees, balled and bur lapped for immediate shade and resistance to damage. Specify 12-14 inches tall, and pruned non-deciduous, non-fruit bearing, trees, with at least a 4 inches caliper trunk 18-24 inches above ground level.

A5.5 Locate matured shade tree at east and west ends of play and sitting areas. Specify large matured shade trees as indicated in previous (Paragraph A5.5).

A5.6 Design sturdy permanent tree guards for large shade trees. Consider triangular shaped galvanized chain link mesh guards recommended by the HUD Grounds Maintenance Handbook 7481.1. See computer photo attached and recommended construction details in Annex A.

End of section A5.

### A6. Barrier fencing, short cutting

A6.1 Provide sidewalks where tenants short-cut over lawn grass.

A6.2 Do not use barbwire fencing, or knife-like cutting barb systems or even sword like local mayas for safety and security reasons, besides insurance problems.

A6.3 Parking barriers alongside street sidewalks should be designed in reinforced concrete walls not higher than 12 inches to avoid car and truck pushing and removal. Design barrier curbs at least 6 inches wide and 6 inches below ground level. Construct in sections not more than 10 feet long and provide “tooth” ends at least 6 x 18 square inch section area buried 18-24 inches deep in soil. Separate sections by open spaces not more than 4 feet apart to allow drainage and mowing machine passage in-between.

A6.4 When constructing parking barriers as indicated previously, it becomes necessary to design and provide management with “controlled accesses” at predetermined locations over the grounds for full access and use of emergency and maintenance vehicles doing repair work on site utilities and building structures. These “controlled accesses” should be at least 10 feet wide with strong end posts 4 feet high and heavy chain extended from post to post with padlock and controlled by maintenance staff. End posts should be designed strong and deep into the soil to avoid car and truck overturning and removal. Should be made either of reinforced concrete columns or large diameter steel pipes concrete-filled with a ½ inches or larger diameter steel rod inside to avoid tenants using steel pipe cutters.

A6.5 In chain link fencing work, specify crimping of nuts, or spot welding, at contract’s convenience. In public housing fence crimping or tack welding of nuts is essential to prevent dismantling or removal of fencing by unauthorized persons with common tools.

End of section A6.

### A7 Boundary fencing, guard houses

A7.1 These facilities are allowed for tenant security purposes. Boundary fences should not exceed local building code requirements, unless otherwise permitted. Concrete walls 8 ft. high to be provided around projects, considering that front fences should be tubular fences. Tubular fences must be of galvanized tubes of 1 x 1 x 1/8 inches gauge. Provide cap at top each vertical tube to avoid water infiltration. Bottom of tube shall remain open.

A7.2 Guardhouses should be of adequate size, according to typical PHA drawings. Toilet and washroom facilities are essential for the use of at least one person. Guardhouse to be designed, including electrical, telephone and plumbing work rough-ins, and is to be built at a later date, when requested by the Police Department.

End of section A7.

### A8. Low walls and retaining walls

A8.1 When designing retaining walls against embankments, don’t use concrete blocks or other type of block construction. Use reinforced steel and concrete-poured walls with appropriately designed and constructed footing

A8.2 Design drain piping adequately spaced slightly over the lower ground level. Design crushed stone fill behind the retaining wall from the top to the drain pipe level to collect and divert ground water through drain piping to release direct pressure against wall.

A8.3 Whenever project buildings are near creek or river embankments, protect the embankments to avoid undermining of building footings. Install railings and safety meshes atop the embankments.

A8.4 Surface of low walls and retaining walls should be designed with smooth cement plastered surfaces ready for painting. Rough surface finishing promotes dirt and fungus growth that otherwise detracts from the otherwise good project appearance.

End of section A8.

### A9 Stairways, steps, rails

A9.1 Any stairway should be provided with at least two handrails for safety reasons, especially for elder persons. Wide stairways should be provided with middle handrails adequately spaced.

A9.2 Stair thread should be wide enough for a safe step, preferably 10 inches. Rise should be comfortable, preferably not more than 7 inches. Surface finish should be non-slip, preferably sand finished with rubber float.

A9.3 Handrail should be round and allow full handgrip of a minimum 1 ½ inches diameter.

A9.4 Strength and rigidity is essential. Outside lateral bracing should be considered to avoid wobbling.

A9.5 Handrails should be designed from galvanized steel piping, not from wrought iron

A9.6 Specify Galvanized outdoor railings and frames.

A9.7 Don’t specify painting of galvanized work in outdoors; it requires constant repainting. Repainting is costly and time consuming.

A9.8 When designers find suitable or desirable to design vertical or horizontal bar grillwork, design opening space not larger than 4 inches, to avoid toddlers and small children from sticking their heads through the openings and getting caught-in.

End of section A9.

#### A 10. Embankments

A10.1 Some projects have high embankments that promote erosion problems, especially upon short cutting. Terracing should be highly considered. To avoid erosion problems from soil washing by rain, consider stone facing of steep embankments. An alternate solution to avoid erosion is planting bamboo or the like plants that have a deep root holding system. Embankments should never exceed the angle of repose or saturation for the particular soil therein. Investigate the type of soil.

A10.2 Any pedestrian walk atop the embankment should be paved and constructed away from the edge. Design and install safety rails.

A10.3 To reduce or avoid soil “liquefaction” (as in caliche) and displacement upon rain saturation, consider the installation of gabions in the embankment sides or terraces or along the foot of the embankment.

A10.4 If rain waters pond in the interior side of the terrace, consider the design and installation of half-concrete pipe of adequate size to divert water to the lower end of the water line.

A10.5 Allow ground cover vegetation, which grow up a deep root system. Don’t allow mowing or trimming vegetation close to the ground. Require a minimum of 6-10 inches of vegetation or ground cover. Ground cover doesn’t need to be a specific species of grass. Any kind of cover or creeper that is strong, grows and extends over the soil growing roots holding soil is excellent against erosion. Installation of burlap provides a means of holding soil in place.

End of section A10

### A11. Walks and malls

A11.1 For the purposes of these Guidelines, walks are narrow and malls are wide to accommodate large number of persons. Narrow walks lead pedestrians to individual buildings and the malls lead pedestrians in and out of major areas of the project.

A11.2 Design walks and malls intersections with diagonal or circular intersections to avoid short cutting on corners over the grass areas.

A11.3 Width is usually 4-5 feet for walks and 8-10 feet for malls.

A11.4 Do not design walks to serve as swales for collection of rainwater. If found in anyone project, recommend reconstruction to eliminate this use. Raise center and slope toward the sides. Do not design side trenches, half pipes or gutters for safety reasons; this promotes accidental sidestepping into the trenches, half pipes or gutters.

A11.5 Any side swales should be located several feet away from walks and malls.

A11.6 Follow standard design of construction joints every 5 or 10 feet and expansion joints every 100 feet. Consider at least a couple of dowels in every joint to avoid tripping hazards by small differential settlements.

A11.7 Avoid smooth trawled surfaces that promote slippery conditions. Consider sand finishing with rubber float.

End of section A11

A12. Lockable lawn faucets (bibbs)

A12.1 Lockable bibs should be distributed uniformly to include each garbage station for periodical washing and cleaning by maintenance staff.

A12.2 All lockable bibs must be supplied from a closed water line loop controlled from inside the administration building area with a main cut-off valve. In this manner, unauthorized usage by tenants should be avoided.

A12.3 All station floors should be designed to drain into the sanitary system, not over the project grounds.

End of section A12

A13. Illumination, safety, security and pruning.

A13.1 At day or nighttime, project grounds should be as fully seen as possible around to avoid hideouts and criminal activities.

A13.2 Bushes and shrubs should be pruned no higher than 3-4 feet, so that visibility increases beyond them.

A13.3 Bushes and shrubs, or clusters should be planted away from dwelling building walls and windows, eliminating eavesdropping and Peeping Toms.

A13.4 Only flower plants and clusters should be allowed near building walls and windows.

A13.5 Tree branches should be pruned high, preferably around 8’-10’ so that visibility around anyone location is clear for at least a couple hundred feet.

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A13.6 Obscure, narrow and bushy passageways should be avoided and eliminated.

A13.7 All site lighting standards should be clear of tree branches for at least 15-20 feet around. Do not plant trees near lighting standards.

A13.8 Whenever illuminating or lighting around dwelling buildings or dormitories, lighting should be designed from the building to the grounds, not from the grounds to the buildings to avoid complaints from the sleeping rooms.

A13.9 All exterior building lighting fixtures or yard lighting fixtures should be designed with vandal proof and shatterproof curved covers made of clear poly-carbonate plastic materials. Curved covers resist better destruction of bulbs against stoning, sling shots and even air or gas pellets. Curved covers should be heat resistant and provide separation between the flat bulb lens and the cover for heat dissipation. The flat bulb lens is usually heat resistant or tempered unbreakable glass lens for protection against rain.

A13.10 All walks and main walks should be well lighted at nighttime

End of section A13

### A14. On and off-street parking and PARKING BARRIERS

A14.1 Where project grounds allow, design off-street parking with one-way or two-way entrances. Otherwise, design entrances one way and exits another way. Where feasible, design parking spaces askew, at an angle, so that entry and backing is easy and unobstructed.

A14.2 Where space allows, design parking on both sides of the driveway, to maximize capacity.

A14.3 Design wheel stops to prevent bumpers from hitting walls, other cars, or even entering over sidewalks. Separate sidewalks from the parking edges.

A14.4 Provide one parking space per dwelling unit, where allowable. Don’t number parking spaces.

A14.5 Provide additional parking spaces for the administration and community building.

End of section A14

### A15 Street curbs, ramps and planting strips

A15.1 To avoid tenant parking over planting strips resulting in bare and rutting strips, specify and design one-concrete block raised curbs in all street-planting strips.

A15.2 Design and specify vehicle ramps within the planting strip areas.

A15.3 Design wheel chair ramps flatter using the latest ADA codes.

End of section 15.

#### A16 Garbage stations, steps, dumpsters

A16.1 Consult with Municipality to design Garbage Station with the appropriate dimensions and characteristics.

A16.2 Garbage stations should be located near buildings but not so close as to promote complaints because of files, malodor, rats, worms or other sanitary or vermin reasons.

A16.3 Construct driveways into garbage containers askew, at an angle, to the street to ease truck entrance and back drive, where possible.

A16.4 To conceal and improve the appearance of the garbage collection area, design planting of shrub clusters of different plants around the 3 container sides. Prune shrubs slightly higher than the bin walls or containers.

A16.5 Provide walls and side or rear steps for deposit of garbage by residents.

### A17 Overhead and Underground utilities

A17.1 Don’t design “aerial” electric service drops into buildings. Design underground service drops between the nearest supply pole and the building for safety reasons, especially during repainting work of building exteriors.

A17.2 When designing modernization work in walk-up or hi-rise buildings, separate the soil and vent stacks of the first floor units from the upper floor units to eliminate the flooding of ground floors due to clogging in the ¨acometida¨ or sanitary drain from buildings.

A17.3 Old projects are usually constructed with galvanized water lines from the tap into the units. Many have been partially replaced by flexible copper lines into the water meter banks and sometimes follow the riser line into the ground floor piping. Independent of existing conditions, all water supply lines should be flexible copper, unless otherwise specify by the water authority (AAA).

A17.4 Where cable TV provisions are available in the area, provide it, for similar provisions as in telephone system. Such facilities should eliminate loose lines exposed on roofs and walls damaging roof waterproofing systems and exterior building structures.

A17.5 Consider telephone systems in a likewise manner as electrical systems, complete from servicing lines up to each individual unit within conduits, completely wired up to the outlet boxes, except service connections done by the utility service company.

A17.6 In older projects, and even newer projects, primary electric overhead lines consist of bare wires. This had resulted in shorting problems because of kites project children elevate. To avoid shorting in old or newer project, in rehabilitation and modernization work specify replacement with insulated cables.

A17.7 Solidly ground metal flagstaffs and metal fences. Grounding should comply with NEC requirements consisting of a cable #6 bare clamped to a 5/8 inches diameter copper weld rod buried 8.0 inches into the soil.

A17.8 Whenever large and wide open box culvert surface systems are used, design and install security fencing on both sides for safety reasons. Don’t cover open drainage systems for alleged safety reasons unless iron gratings easily removable by two men can be installed to facilitate inspection and cleaning purposes. All closed and covered drainage culverts eventually clog-up in a short period of time; removing covers and cleaning is a very expensive maintenance work. Inspecting and cleaning open box culverts, or culverts covered with gratings, is easier and economical for maintenance reasons.

A17.9 Install security fencing alongside of a gushing creek, gully or river at a uniform safe distance from the edge.

A17.10 Whenever rehabilitation or modernization work is done in certain unoccupied building among other occupied buildings, specify and require enclosing the work area with temporary, but strong and safe fencing.

### B Dwelling Exterior Items

### B1 Roofs, parapets, drain piping, waterproofing

### B1.1 Install roof filling with lightweight concrete for drainage slopes and waterproofing for all “flat” or nearly flat roofs, to comply with ½ inch per foot final pitch. Design 1 inch per foot or more in newer non-dwelling buildings. Larger pitches usually do not need waterproofing, for rain will flow expeditiously and will not pond on surfaces. Some old projects have this type of pitched roofs and do not have leaking problems.

B1.2 Do not specify and eliminate when possible, parapets, or any components that interfere with the free flowing of draining water on the roof.

B1.3 Consider membrane or built-up waterproofing systems providing a bonded warranty of at least 10 years. In membrane systems, consider at least two-membrane system (three ply is preferred). In built-up systems, consider a 3-4 mesh with mineral grain impregnate finish load to comply against mesh uplifting standard requirements. Do not leave last mesh unprotected and unloaded against wind upheavals.

End of section B1.

### B2. Roof hatches, vent stacks glass blocks

B2.1 Provide Bilco or approved equal, types of roof hatches with balanced door operation for all walk-up buildings. Hatches should have padlocking facilities installed with non-removable screws and bolts, preferably fixed with factory-installed rivets. Provide on hatch, per building, at buildings of two stories or more.

B2.2 Provide hatches on the ceiling of one stairway. Hatches should be constructed in a manner that access is made with either a short ladder.

B2.3 Don’t design or install ladder rungs in stairway wall of building to access the roof.

B2.4 Soil and vent stacks should be protected with strong inverted “U” curves against vandals placing objects inside vents.

B2.5 Whenever glass blocks exist on older project roofs and waterproofing is essential, require placing another glass block of the same size on top of the existing ones and specify sealing with duct tape around the bases to avoid asphalt of water entering between the blocks. Specify the installation of concrete cants at 45 degrees on all four sides. Do not specify fiber or plastic cants around the glass blocks. Then, proceed with the waterproofing system work.

End of section B2.

B3 Television antenna SUPPORT, Cable TV and SATELLITE dish

B3.1 Where satellite dish is available in the area, provide base support avoiding perforation of the roof. Provide minimum base supports necessary for all the apartments in each building.

B3.2 Specify and design individual TV antennae support systems (bases) with conduits, coaxial cables and outlets for each unit ready for use and operation. Tie down system for these bases must be in such manner that it does not require guide wires.

B3.4 Where cable TV is available in the area, provide facilities in agreement with the cable TV companies including conduits, main connection boxes, etc. as necessary. Cable TV should be responsible of installing cables, connections and providing repairs at no cost to PHA.

B3.5 Install TV and cable TV outlets on the inside of the living-porch wall, below the windows, so that exterior daylight does not affect the screen view. This requires the shortest exterior piping and connections as possible.

B3.6 TV antennae masts and bases on roofs should be grounded against lighting strikes as required by the NEC code. Ungrounded masts and bases have resulted in roof and footing damages as well as damages household equipment because of a roof strike. Grounding should comply with latest NEC requirements.

End of section B3.

**B4. Roof expansion and contraction joints (RE&CJ)**

B4.1 In older projects, roof expansion and construction joints are usually existent for buildings exceeding 100 (plus) feet in length. RE&CJ are properly designed when buildings are structurally separate from each other but joined by a pre-molded expansion filler 1 inch thick extending to roof parapets. Caps flashing are necessary to avoid rain entering inside. In the past, some non-standard expansion and contraction joint neoprene bulbs were inserted on the roof slab but were not extended all the way down to the footings. Try mitigating the movement with the construction of two parapets 6 inch wide on each side of the roof joint separated 1 inch with metal cap expansible flashing on top and with enveloped joints extending to the roof edges and down the eaves

B4.2 Joints in metal flashing should be similar to the locked seam type to allow for expansion and contraction but sealing water off.

B4.3 Do not pitch coping parapets to the face of the buildings; this promotes discoloration and watermarks’ pitch back into roof drains. Pitch copings inside the roofs.

End of section B4

### B5. Walls, facades, wall expansion and contraction joints

B5.1 Avoid porous materials in façade work; they soil easily and require frequent pressure washing for cleaning purposes. Use smooth finished materials for ease of water washing.

B5.2 Where necessary to avoid large continuous plastered surfaces, design V-type construction joints to minimize cracking or crazing of plastered surfaces.

B5.3 Specify that all-porous bricks and concrete blocks used on walls should be wet or soaked before being laid.

B5.4 In laying out masonry work, specify and insist on full mortar bedding of every horizontal and vertical joint.

B5.5 Don’t use wide mortar joints in masonry work; use thinner mortar joints for they offer less chance for leakage and contraction. Leaks in masonry are likely to occur more often in vertical than in horizontal joints, because of wall weight.

B5.6 Don’t use pure lime mortar in masonry work; it’s now obsolete. Don’t use pure cement mortar for masonry work; it is not plastic, is hard to work with and loses moisture too quickly.

B5.7 Remember that marble facades on public buildings in certain areas do not last, long, and are hard to repair, match or even points up.

B5.8 Consider the properties of proposed stones for facades on the basis of durability and ease of maintenance.

B5.9 Don’t use costly stone finishes; above a certain height they can’t be seen or discerned.

B5.10 Anchor windows and doors in walls appropriately. Consider machine bolt and expansion type ¼ inch to 3/8-inch diameter over the “easy and fast types” of concrete nails or other methods selected in the market. Design for hurricane horizontal and uplift forces prevalent in the tropical areas. Consider that damages caused by wind slamming of doors is several time more than the wind pressure, because of the massive weight inertia carried out by heavy solid core exterior doors.

B5.11 Provide permanent identification numbers for building and apartments. Never use painted stenciled numbers.

End of section B5.

#### B.6 Wall Water Proofing and Painting

B6.1 Wall waterproofing and painting are two different types of work and techniques, each with a different purpose. Waterproofing must precede the painting or repainting if the purpose is to prevent wall-leaking problems, isolated or scattered. Don’t confuse both techniques as a single one as is usually done by everyone.

B6.2 Wall waterproofing must be specified after all water pressure washing and plaster repairs have been made and must be made prior to any repainting,

B6.3 Never use or specify waterproofing or elastomeric paints, as substitutes to good structural waterproofing systems or methods, as most paint suppliers recommend and were used in the past. In reality any paint or waterproofing paint coat is only a few mills thick, usually 1.5 mills thick per coat when dry. Two or three coatings of any so called waterproofing or elastomeric paints will produce only two to three mills thick. One mill is just 0.001 inch. Just 2, 3 or even 4 mills thick is an ineffective, wasteful and unnecessarily expensive “waterproofing paint”. Any such application will not last long as evidenced soon after painting with paint “blistering” or falling off the walls in “patches” when no surface conditioner is used underneath.

B6.4 Any paint, including the so-called WP paints, is just for aesthetic or colorful appearances and do nothing to waterproof walls. To properly waterproof walls, it becomes necessary to apply an elastomeric “coating” as thick as 40 mills (0.040 inch) over the leaking affected areas. The affected areas are normally plastered non-load concrete block walls on front and rear walls that form the facades of walk-up and hi-rise buildings.

B6.5 A 40-mills thick coating can last up to 20 years meeting HUD’s interpretation of a durable and “permanent” coating for rehabilitation or modernization purposes. The only way of providing such a thick elastomeric coat is by using a viscous elastomeric or patch-up material that can be applied in any of the following manners: (1) one or two metal trowel applications for a smooth surface finish, (2) apply thick brush applications, two or more as needed, for non-smooth or smooth surface finish or (3) specify several coats of spray painting application air hoppers for smooth or rough surface finish as desired. Specify 1x1 square inch every few hundred square feet sampling and testing for calibration purposes (usually lenticular microscope measuring in 0.001 inches) to insure achieving the specified thickness.

B6.6 After affected areas are waterproof, proceed to specify the painting requirements as follows:

1. Wash wall with pressure machine (3,000 P.S.I.)
2. Correct wall cracks with caulking and patch up plaster as required
3. Apply one coat of surface conditioner
4. Apply 2 coats of flat paint 100% acrylic

Use Surface Conditioners before Waterproofing or even Repainting or Painting Exterior Walls

B6.7 Efflorescence is the result of rainwater leaching carbonate salts out of the concrete mix, which dissolve in water and flow outside, drying out and crystallizing on the surfaces. These white salts are so called *efflorescence*. When you pass your hand over this whitish deposit, this salty powder is the reason why paint won’t stick and form “blistering”, “bubbles” or fallen patches over the paint. Efflorescence must be sealed off to promote adhesion of waterproofing or painting materials. Use and specify a good surface conditioner meeting federal specifications **TT-P-620 (HUD)** prior to the application of the final paint coatings desired. This specification wasexpressly designed for HUD waterproofing and repainting purposes.

B6.8 For steel priming, use iron oxide. For an elastic superior finishing coat, use carbon black pigment.

B6.9 Don’t paint bathroom and kitchen wainscots as in the past because of lack of funds; rather use glazed wall tiling.

End of section B6.

**B7. Stairways, steps, landings, railings, planting boxes, wall ladder rungs**,

B7.1 Install cast-iron nosing on stairs; using epoxy plus mechanical screwing device.

B7.2 Comply with 24 CFR 40 and ADA requirements with the installation of handrails on both sides of stairways, but providing the specified minimum clearance of 36 inches between rails.

B7.3 Where narrow stairs are critical, consider installing handrails over the median wall, and gouging out the wall for the rail to keep the specified width. This will prevent tenants from removing exposed rails to move refrigerators in and out the units during move-ins and move-outs.

B7.4 Install vandal proof lighting fixtures in all stairway landings for safety reasons. Specify Kennall or approved equal, installed with 4 –1/4-inch diameter bolts and expansion shields or anchors as required by the lifetime warranty Kennall manufacturers issue presently.

B7.5 Don’t use aluminum or wood for handrails or cooper sheets for roof flashing; they are theft-prone.

B7.6 Avoid lattices, trellises or similar designs as stairway grillwork for they are an invitation for climbing and resultant vandalism.

B7.7 Don’t drain balconies with short pieces of pipe into the open air, this type of drain affects lower floor balconies and strain tenant relations. In the service porches these waters spoil washed cloths left drying in the wires. Provide downspouts to drain on splash blocks.

B7.8 Use gentle ramps instead of steps for approaches to building entrances. This is of particular importance for the elderly and handicapped.

B7.9 Prefer the use of opened stairways visible from the exterior. Avoid interior stairways for crime and security reasons. Stairways should be protected against rain.

B7.10 Avoid nooks and hiding places under stairways that promote muggings and assaults; wall-up these spaces to eliminate hiding, unseen, places.

B7.11 Planting boxes. Planting boxes in second, third and fourth floor landings often result in maintenance problems because of water leaking through cracks or porous areas into exterior walls and ceilings underneath. Removal of soil and complete waterproofing of interior walls becomes necessary. Provide drainage piping, preferably interconnected to balcony downspouts.

B7.12 Do not provide Gates at stairways in access to upper floors.

End of section B7.

##### B8 Telephone facilities

B8.1 Provide telephone boxes and hy-ribbed plastered chases for conduits in stairway walls accessible to repairmen, in agreement with Telephone Company. Specify waterproofing coatings around the perimeter to avoid rainwater penetration inside the units. Since unit living rooms are all near the stairways, conduit and box installations are easier and economical.

End of section B8.

### C Dwelling Interiors

##### C1 Main and secondary exterior doors, frames and hardware

C1.1 Main door is unit entrance door, either from a corridor, a stair landing or from exterior ground level. Secondary doors are front and rear balcony doors for the purposes of Uniform Physical Condition Standards Identification (UCSI).

C1.2 Main exterior doors should be provided with a key alike dead bolt and Lockset. (See page 10-17 of mod standards 7485.2) When existing projects have two locksets, one deadbolt and one cylinder lock provide replacements with 5-pin tumbler key sets for added security reasons. When exterior doors open to enclosed balconies, a dead bolt is adequate without outside key for access to meet HQS requirements.

C1.3 All exterior doors are required to be solid doors, if made of wood. Do not specify metal doors and frames for dwelling units, only for common, area, offices and community spaces. Dwelling unit’s doors should be at least 1-¾ inches thick with 1-½ pairs of heavy duty hinges preferably, 5x5 square inch, ball or roller bearing, because of weight. Door swing should outreach beyond terrazzo bases in order that doors can be opened parallel to the walls, either opening outside or inside. Lesser side hinges, including usual 3x3” hinges result in door opening askew or at an angle resulting in obstruction of space behind doors in the living room or in the balcony.

C1.4 When in older projects main or balcony doors open to the inside of the living room, rain may enter into the unit under the doors. To resolve this problem, redesign door opening to the outside with threshold and door bottom 1 inch below the unit floor. When main door faces stair landing, raise unit floor 1 inch above landing to avoid rain or wash water flowing inside the unit. This will prevent tenant complaints.

C1.5 All doors, exterior or interior should be provided with door bumpers and holders to allow tenants to keep them safely opened without wind slamming. Install bumpers and holders 5 feet above floor level. If doors can’t be opened parallel to walls as indicated in C1.3, installation of bumpers and holders will not be possible; this is the reason why 5 x 5 square inch hinges are necessary. Do not specify smaller hinges. Do not use floor bumpers and holders, which are difficult to operate by elder persons. In semi-solid wooden doors, the door holders must be installed to the solid part of the door.

C1.6 Only in main doors, install a door viewer having a wide-angle visibility, preferably 100 degrees or more. Install viewers 5 feet high above floor for small housewives.

C1.7 All solid wood and plywood used in interior doors and frames should be Southern White Pine pressured-treated and kiln dried to a minimum of 19% moisture content for two reasons: one, to prevent rotting by moisture and two, to prevent termite infestation.

C1.8 All exterior doorframes should be constructed single rabbeted, from a single wood piece, not from two separate pieces.

C1.9 Main entrance door hinges should be, heavy duty, 1 ½ pairs (three each) non removable pins, ball-bearing for heavy solid doors, 5 x 5 square inch, to allow doors to open fully parallel to walls, as explained in C1.3.

C1.10 Avoid narrow wall jambs between doors and windows for security reasons (24 inches wide min. suggested); a long arm can reach and unlock a door through the window slats.

C1.11 In very old, and some newer projects, many exterior doors were unprotected with a short roof eave, usually as narrow as 12 to 24 inches wide eaves, exposing doors to weather damage. Consider designing durable canopies over unprotected exterior doors.

End of section C1.

### C2 Interior doors, frames and hardware

C2.1 Interior doors should be 1-3/8 inches minimum thick. Specify hollow-core doors with ¼ inches thick plywood facings on both sides. All doors shall follow PRPHA typical (standard) drawing and specifications.

C2.2 Bedroom and bathroom doors should be provided with passage cylinder locks, grade 2. Main entrance doors at dwelling units must have two (2) locks; one standard and one deadlock, operated with the same key.

C2.3 Don’t allow locks striking the wall, especially turn buttons. Specify bumper and holders 5 feet high above floors to allow tenants to keep doors opened and to prevent wind slamming for safety reasons. Don’t Use floor bumpers and holders requiring back bending by elderly persons. Don’t install automatic door closers in main doors of dwelling units, only in office and community spaces. In semi-solid wooden doors, the door holders must be installed to the solid part of the door.

C2.4 All solid wood and plywood used in exterior doors and frames should be pressured-treated and kiln dried in accordance with federal specifications TT-W 570 and TT-W-572 as required by MPS for tropical areas. In addition, pressure treatment prevents rotting when exterior doors are exposed to rain. Also prevents termite infestation. Some tenants are accustomed to hose washing of interiors, including windows and doors; this swells doors and frames.

C2.5 All interior doorframes should be wood, constructed single rabbet, from a single wood piece, and not from two separated pieces.

C2.6 Don’t swing doors against the flow of traffic, especially hallways. Don’t obstruct stairway egress with out swinging doors; it is poor design.

C2.7 Plywood should be Southern Yellow Pine Treated by immersion in accordance with federal specifications TT-W 570 and TT-W-572 as required by MPS for tropical area.

End of section C2.

#### C3. Windows

C3.1 Prefer aluminum jalousies of the Miami type, 1/16-inch gauge (thickness).

C3.2 Window width shall be 30 inches maximum. Prefer 18 inches to 24 inches wide.

C3.3 Provide window operations in two sections with knob operators, not cranking types.

C3.4 Specify operators fastened with hand rivets to frames. Require interior washer for grip; don’t install without washer.

C3.5 Specify window construction sealed with jamb felt and slat vinyl weather-stripping to avoid rain infiltration through jambs and slats to avoid tenant complaints. The added cost is insignificant compared to the continuous tenant complaints of rain leaking through windows. The permissive rain and wind “infiltration” tolerances used in the past may have been suitable for continental housing projects, but not in windy and rainy tropical areas, as in Puerto Rico and the Virgin Islands.

C3.6 Install interior security grillwork in ground floor units, specify installation fastened 6 inches away from the window opening edges and 4 inches away from the wall surfaces, to allow tenant installation and removal of optional screens, if any. PRPHA will not provide insect screens. Provide holding straps at 4 corners, avoiding middle straps that hinder screen installation and removal. Allow required clearance at the window operators. Design/install security grilles horizontally (parallel to window jalousie). This will facilitate window cleaning.

C3.7 Interior security grillwork should be installed with mechanical expansions, using carriage bolts and tack welding.

C3.8 Glass windows are not allowed in dwelling units.

C3.9 Provide interior security grillwork for windows in all ground floor units.

C3.10 All windows will have 3 feet protection wall under sill.

End of section C3.

#### C4 Interior Painting

C4.1 Paint ceilings in flat white, for improved reflection and lighting purposes. Paint living dining, halls and bedrooms with semi-gloss, water-based paint in lighter colors for improved reflection and lighting purposes; avoid dark colors.

C4.2 Specify repainting ox existing units with “compatible” existing paint materials. Avoid repainting with incompatible existing paint material surfaces, such as alkyd over water-based paint, or vice versa.

End of section C4.

### C5. Interior Walls and Plastering

C5.1 Cracking and crazing of cement-plastered walls is something inevitable to occur in this type of construction system. Do not rout, or dig out, cracks in order to refill with mortar; double cracks will reappear on both sides of the repair.

C5.2 Rather than routing cracks, cover them up with white latex caulking and finish smooth or featheredge, immediately with plastic squeegees. Finishing smooth with adjacent surfaces requires featheredging techniques with the squeegee so that cracking is covered fully and surface finish blends perfectly with the adjacent surfaces before repainting.

***C5.3*** When the space is provided for the air conditioning unit, provide security grillwork for first floor units.

End of section C5.

### C6. Interior Ceilings and Plastering

C6.1 Only after roofs have been sealed and waterproofed against rain leaking should ceilings be washed, fungus removed, plaster repaired and a cost of surface conditioner applied prior to repainting. The surface conditioner is essential to seal the ceiling surface and provide a good adhesion surface for the paint; otherwise, paint may peel, blister or fall in patches. The specifications for the surface conditioner are shown in B6.7.

End of section C6.

### C7. Interior floors

C7.1 Don’t specify terrazzo or vinyl floorings in bathrooms and urinal floors.

C7.2 Use non-slip ceramic flooring in lavatory and toilet floors.

C7.3 Use native or calibrated terrazzo tiles placed on adhesive, polished on site, in all existing living, dining, kitchen, hall and bedrooms.

C7.4 Use quarry tiles, terra-cotta tiles in front and rear porches.

End of section C7.

### C8. Kitchen Cabinets

C8.1 Specify kitchen cabinets as per PRPHA typical drawings and specifications. An alteration to its content, materials and construction is not allowed. Don’t specify or allow the use of particleboard in kitchen countertop, shelving and cabinet construction. Specify solid wood and plywood construction meeting the pressure treatment and kiln-drying requirement mentioned elsewhere for door and frame construction.

C8.2 Don’t allow the use of sliding doors; specify hinged doors, provided with magnetic door catches.

C8.3 Specify that the bottom edge of the base cabinet shelf should be reinforced with a solid board, 1x3 square inch, fixed under the edge.

C8.4 Don’t use drawer or door pulls; specify finger pulls to eliminate the pull replacement problems.

C8.5 Don’t install wall cabinets over the range, unless the cabinets are in cantilever overlooking the living room and are sustained on the end walls. Upper cabinets shall stop six inches 6 away from range, typical both sides.

C8.6 Don’t use porcelain iron for sinks or laundry tubs; specify stainless steel for sinks and laundry tubs, insulated underneath to avoid condensation inside under the base cabinet.

C8.7 Specify double basin sink no single basin sinks, 33 x 22, 8 inches deep stainless steel 304, fully undercoated and made with a material that does not contain asbestos. Fixtures should be single handle, equal to Delta-100 or Valley L-103-8 and meet required federal specifications. Provide accessible fixtures in compliance with UFAS. Provide accessible kitchen sinks as per UFAS. Specify silicone adhesive filling under the metal rim to seal water off the plywood edge.

C8.8 Raise base cabinet floor shelving between 4 inches to 6 inches to allow space for cleaning and mopping underneath.

C8.9 Install metal legs under each wall panel or strut carrying vertical loads. Install a pin underneath to avoid legs swaying away under striking shoes.

C8.10 Specify 32 inches clear width opening for stove, typical.

C8.11 Allow mahogany or cedar in kitchen cabinet doors.

End of section C8.

### C9. Plumbing fixtures and accessories

C9.1 Specify water saving toilet tanks, preferably using 1.6 gallons per flush. Specify water restrictors to all faucets and showerheads. Using water saving tanks lesser than 1.6 gallons should be carefully tested, certified and evaluated; The principles of good flushing characteristics is that there should be an adequate amount of water to wash down solids and avoid deposition of organic matter along the sloping pipe surfaces. Just flushing solids out of the basin is not enough. Otherwise, clogging will occur in nearly flat soil branches.

C9.2 Specify seats and covers “Bemin 800-B” or approved equal; don’t specify standard hinges fastened with 6 small screws each. Use the integral type of seat and cover hinge of “Bemis 800-B”, or approved equal seat and covers, which will outlast the standard hinges. The following illustration shows this type of integral type “hinged” of seat-and-cover:

C9.3 For large sized 4 and 5 bedroom units, specify lavatory legs, in addition to the lavatory wall brackets. This should avoid fallen lavatories because of mothers sitting “small children (often 4 -7 years) on them for “sponge or towel bathing”.

C9.4 Specify faucets and mixer valves with renewable seats and washers, or use washer less faucets. If rotating stems, washer should rotate upon stem contact without tearing the washers. Washer tearing is the cause of premature leaking problems.

C9.5 Don’t locate clean outs under the base cabinet. Extend the clean out line to the end wall and locate on the floor or wall side the screw able clean out.

C9.6 Provide the facility for the installation of two, copper water lines (hot and cold) at all kitchens, bathrooms and laundry areas. Replace existing lines if they are not copper.

C9.7 Specify medicine cabinets with a plastic body, stainless steel door, full piano hinge and magnetic catch. Mirror must be in plate glass with a five-year warranty against mercury (quicksilver) loss.

C9.8 Sanitary discharge from first floor units must be separate from the discharge of the upper floors. Washing machine lines must be separate from the kitchen sink line.

C9.9 Remove all existing bathtubs, replace with shower stalls. Specify a product similar to VANDEX to waterproof the bathroom floor previous to tiling. After the VANDEX is cured fill the shower stall area to capacity and observe for 4 hours to ascertain the non-presence of leaks to the lower floor.

C9.10 All bathroom accessories, soap dish, toothbrush holder, toilet paper holder, towel bar, in dwelling units to be recessed (integrated) into ceramic wall tiles.

End of section C9.

### C10. Pantry and bedroom closets and doors

C10.1 Pantry and bedroom closets doors and frames should be of 1-3/8 inches hollow core flush type of plywood facing veneers with standard hinges and magnetic catches, locks and hardware. Avoid the use of sliding and by-folding types as possible for maintenance reasons. Hinged doors have proven to be more durable than the other two.

C10.2 All pantry and bedroom closet doors should be fabricated in sections not larger than 18 to 24 inches wide; wider doors hinder walking around beds, furniture and other household furniture.

C10.3 All pantry and bedroom closet doors should be designed with two-section vents to avoid moisture accumulation inside the closets.

C10.4 All closet shelves and tubes larger than 60 inches long must have an angular support in the middle with bracket.

C10.5 Specify adjustable closet shelves and tubes (48 – 54 inches AFF) at all accessible units, as per UFAS, Adjustable Housing Standard Manual.

C10.6 All plywood used in closet shelves should be mahogany or cedar.

C10.7 All wood used in pantry and bedroom closet doors should be mahogany or cedar.

End of section C10.

### C11. Laundry and clothes drying facilities

C11.1 Laundry tubs and clothes washing-drying facilities should be located in the rear porch or service porch.

C11.2 Clotheslines should be made of vinyl-covered stranded steel wires rather than using solid wires, stranded wires hold more pull than solid wires.

C11.3 Supporting eyehooks should pass through the supporting walls and held tightened with washers and nuts.

C11.4 The total footage of clothes drying lines should be not less than the existing wire footage. Wires should be strung at least 12” apart from each other, when possible.

End of section C11.

### C12. Electrical fixtures, wiring and devices

C12.1 Don’t locate bathroom switches outside the bathroom or behind the bathroom door. Install bathroom and bedroom switches on the interior wall side of the room, close to the striker side.

C12.2 Don’t provide a receptacle for shower heater. Install Ground Fault Interrupter (GFI) breakers rather than GFI double convenience outlet devices, in kitchen and bathroom circuits. With a single pole GFI breaker, you save several costly GFI outlets in kitchens and bathrooms.

C12.3 Require identification of all breaker circuits in the panel door.

C12.4 Rather than locating double convenience receptacle boxes in a horizontal manner, place them vertically. Some equipment require transformers, which are placed vertically because of weight; if placed sidewise, transformer weight is shifted usually on the positive (smaller) pin.

C12.5 Specify fluorescent screw in lamps at kitchens, living rooms and dining rooms. Porcelain bulb cube shall be specified for bedrooms and hallways.

C12.6 Provide new electrical wiring and conduits in all dwelling units.

C12.7 Provide electrical smoke detectors with built-in lithium batteries in all bedrooms and hallways. Specify smoke detectors for accessible units for the hearing and visually impaired as per UFAS, ADA.

C12.8 Communication between smoke detectors should be established.

End of section C12

#### C13. Range-ovens, refrigerators and water heaters

C13.1 Range ovens and refrigerators will not be provided by PRPHA.

C13.2 The HUD and PHA practice has been to provide the electrical capacity and facilities for tenants to install 50A-250V range-oven units, and 20A-125V facilities for refrigerator installation. Where cold and hot water piping is provided, mixer valves should be provided. A jumper piece of piping should be connected between the cold and hot water supply at the water heater location. This “jumper” connection allows tenants to use both mixer faucets for cold water.

C13.3 Provide the units with water tank heaters or in line water heaters. If in line water heater is used, prevent heating element burn out with proper installation.

End of section 13.

### C14 Glazed wall tiling

C14.1 Use standard grade, USA made, glazed wall tiling in kitchens and bathroom walls.

C14.2 Prefer 4 x 4 square inch sized tiles for maintenance reasons.

C14.3 Prefer white colors for easier repair and replacement reasons to colored ones.

C14.4 Wainscot to be 6 feet high in shower stalls and 4 feet high in the lavatory and toilet wall, towel bar walls and switch wall.

C14.5 Install wall tiles between base and wall hung kitchen cabinets

End of section C14

1. **Security Items for Non-Dwelling Structures:**

## D1. Security items

D1.1 Door and window security should not depend on the standard types manufactured by the industry. These are minimum requirements that do not meet tenant security. Modernization Standards are intended on solving design, construction and occupancy problems. Modernization seeks solutions beyond standard types of manufactured items. Security includes special design requirements of windows, doors, and exterior illumination in an effort to prevent, and avoid crime, burglaries or forced entries. The use of security guards at day or nighttime is more expensive and is often required in crime and drug ridden projects.

D1.2 Where crime and burglaries are a problem, consider additional security measures:

1. strong stainless steel safety screens or mesh in window interiors
2. iron grill work in window interior
3. exterior metal doors and frames
4. special security type of windows
5. vandal proof exterior illumination fixtures around building perimeters
6. architectural facades that do not provide ladder designs which promote climbing onto roofs and accessing interior patios or insecure windows or doors

D1.3 Any one of the first three items mentioned before, should be installed on the inside of window frames, not on the outside, for several reasons:

1. They affect the otherwise good appearance or architecture of the buildings
2. They give passersby an impression of institutional or correctional facilities or institutions, which is highly undesirable.
3. They are exposed to faster deterioration or corrosion by weather conditions
4. They require more maintenance work and costs than interior techniques.
5. Outside they may serve as climbing ladders onto the roofs

D1.4 An alternative to safety screens or iron grille work is the use of security type of windows wherein prying bars or sledgehammers are difficult to use.

D1.5 Consider windows with smaller widths, providing closer mullions for rigidity and security.

D1.6 If standard type of aluminum jalousies are used, specify shorter 18 to 24 inches window sections with intermediate mullions, rather than the standard 36 inches wide windows. Shorter widths with closer mullions are stronger windows.

D1.7 All exterior doors should be designed with two locksets: one deadbolt with key on both sides and at least 1 inch of bolt throw into floors and ceilings. Use cylinder locks with outside keys and turn knobs inside. Don’t allow the use of push button locking; some may be opened from the outside with a heavy hand blow on the cylinder.

D1.8 Where double doors are used, specify one door section to be secured to threshold and head frames with the installation of two concealed bolts installed on the upper and lower costs of the door edge. This hardware should comply with types 1045 and 1048 of federal specifications FF-H-00111b, as shown below

D1.9 For stairway and building perimeter lighting, specify vandal proof fixtures, Kennal or approved equal, with rooftop photocell lighting controls for automatic sunset and sunup operation. To obtain the 10-year Kennal warranty, install fixtures as specified by manufacturers with ¼ inch diameter bolts and expansion shields/anchors. Don’t allow contractors to fasten lamp base plate to the “ears” of the ceiling box with 3/32 inch diameter screws which do not provide the pull-out resistance of ¼ inch diameter bolts.

D1.10 Specify pry-resistant “T” lock protection in all exterior doors, single or double.

End of section D1.

### D2. Administration Spaces

D2.1 Follow space standard requirements in 2-7b of Modernization Standards Handbook 7485.2. Determine with A/M the additional space necessary to meet the standards.

D2.2 Consider a reception space accessible from the entrance lobby. Provide a counter partition and a control door for access inside the staff and manager space. The partition should have tempered glass panel above the counter to provide visibility between the two spaces, and providing security from unauthorized access inside the staff space.

D2.3 Provide public toilet rooms separate from staff’s toilet rooms.

D2.4 Project Manager’s office partition should be floor to ceiling for privacy. A horizontal glass or clear poll-carbonate glass should be provided for Manager’s supervision of staff space.

D2.5 Don’t specify permanent type of partitions made with poured concrete or plastered concrete blocks for office layouts; they are difficult and costly to demolish and reconstruct in constant office changes. Specify moveable partitioning.

D2.6 For easy electrical and telephone installations use floor duct systems with flush and screw able covers. Where office layouts; they are difficult and costly to demolish and reconstruct in constant office changes. Specify moveable partitioning.

D2.7 Where exterior glass panels are subject to breakage by vandalism, specify unbreakable clear plastic material, usually made of polycarbonate materials.

End of section D2.

## D3. Maintenance spaces

D3.1 Do not exceed the maximum spaces indicated in 2-7b of the modernization standard manual 7485.2.

D3.2 Spaces should provide a workshop with a working bench table at center and workbenches on wall sides for electrical and plumbing equipment. The central bench and wall side tables should be made of 2 inches hick hard wood planks.

D3.3 Provide an enclosed storage room for supplies and small parts with shelving.

D3.4 Provide grounds maintenance workshop and storage room

D3.5 Provide a 5 feet wide, two-section exterior door for loading and unloading, supplies and materials to the storage room, with ramp and truck deck.

D3.6 Provide an exterior maintenance open storage yard of adequate size for materials that can withstand weather exposure. Design a concrete truck drive way to the street and a 10 feet lockable gate. Fence could be solid concrete or 8 feet vinyl covered chain link mesh, in agreement with A/M. Provide automatic operation perimeter vandal proof lighting fixtures.

D3.7 Exterior maintenance loading and unloading door and maintenance storage yard should be located, preferably, behind the administration office or in a building side unseen from the main for aesthetic reasons.

D3.8 Provide a well-ventilated reinforced concrete structure, or room of adequate size, with shelving, automatic sprinklers on the ceiling and explosion-proof fixtures and switches for storage and protection of flammable liquids, paint, gasoline and solvents.

D3.9 Don’t design custom-made or built-in lockers for maintenance staff; use standard metal lockers, single or double tier.

End of section D3.

## D4. Community Facilities

D4.1 In the construction of new buildings for community facilities, select a location facing project streets. Never design new facilities away from the project entrance or street access. Facilities away from project entrance promote vandalism, burglaries and eventual abandonment by management and tenants.

D4.2 Consider designing administration offices, maintenance facilities and community facilities in a single structure; not separate structures for management control and supervision.

D4.3 Consider standard hot asphalt 3 ply built-up roofing system designated at least for 10-year bonded warranties with galvanized metal flashing and gravel roof fill. Other systems should meet comparable bonding requirements. Usually, flat roofs require roof fills and surface pitch for faster drainage ½ inch per foot or higher than usual designs of 1/8 inch per foot slopes which are no good for drainage purposes and result in ponding and leaking problems. Higher slopes require lightweight concrete fills, 30-pcf density, poured and finished.

###### End of section D4.

**E. General Requirements:**

E.1 The Critical Path Method (CPM) submitted by the contractor shall include the total contract time. The specifications shall not include the clause for Compensation to the contractor for finishing the project ahead of schedule.

End of section E1.

E.2 Contract Documents Specifications shall not specify use of equipment by brand or model.

End of section E2.

E.3 Electrical drawings must have the endorsements (permits) from PREPA, including electrical meter banks vandal proof enclosures, PRTC, etc.

End of section E3.

E.4 Designer must specify that the contractor will work on building by phases, including site. Inspection and approval will be performed at the end of each phase.

End of section E4.

E.5 Designers to coordinate and implement a complete study to determine the presence of contaminants such as lead base paint, asbestos, arsenic, etc. This study must include detection and determination of toxic amount. Contract shall provide specifications for the removal and disposal of the toxic materials. Study must outline the mitigation strategy to be used. All studies must be completed prior to the approval of the final documents.

End of section E5.

E.6 Designer must provide an Activity Center, or Multi-purpose Room, where required.

End of section E6.

E.7 Propane gas facilities will not be provided.

End of section E7.

E.8 Contract Documents and Specifications shall be in full compliance with section 504 (accessible dwellings and public facilities for the physically, hearing and visually impaired), Code of Federal Regulations (24 CFR), UFAS. UFAS Retrofit Manual, ADA, ANSI, Adaptable Housing, etc.

End of section E8.

E.9 Contract Documents shall include: Existing Conditions Plans, Demolition Plans, and Proposed Modernization Work for all categories and building types.

End of section E9.

E.10 All units shall comply with current Housing Quality Standards (HQS), Mandatory and Public Housing Modernization Standards (7485.2) Handbook.

End of section E10.

E11 Contract documents will not contain an early completion payment.

End of section E11.

E12 Contract documents will not contain the instruction to utilize Navieras de Puerto Rico for shipments when necessary.

End of section E12.