Chalaire and Associates, Inc. **Engineering Consultants**

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INVITATION TO BID

BUILDING REPAIRS PROJECT

For: Heritage Village Condominium Buildings
All Buildings, # 1 through # 75
3800 North Military Trail
West Palm Beach, FL 33407

You are invited to bid on the concrete restoration project as defined in the attached project documents.

Please attend a pre-bid meeting on _____**at**_____at the property. You will receive a copy of the project specifications at that time.

The project is comprised of the following work:

1. Concrete repairs
2. Balcony railing bolt replacement
3. Rust spot, stucco repairs, crack sealing, unused fastener removal
4. SGD, shutter, accessory removal as needed to access repair areas
5. OPTIONAL: Waterproofing ALL balconies

Please include in your proposal all items from the attached BIDLIST.

Please specify any related work for each item not included in your bid. Total estimated contract value based on the estimated quantity, if provided, is requested. Provide unit pricing, lump sum, or T&M pricing where requested. Please use the project BIDLIST as a reference. There is space provided for additional pricing information.

Include in your proposal a suggested time frame to work the project and any off season discounts that may apply.

Please provide a copy of the bid to the Association and also email a copy to our office. Bids will be accepted until _____**.**

Bids will be opened privately. All bids will be reviewed by the Association. The owners reserve the right to reject any or all bids without notice, to waive technical errors and informalities, and to re-advertise.

If you have any questions, please give us a call.

Terri Chalaire, PE
FL PE 65587

Heritage Village

Bid Item:	Estimated Quantities LF	SF	CF	ea	Est Contract Value $	Unit Price $ / unit
Permit						
Mobilization						Lump Sum
Demobilization						Lump Sum
Concrete Repairs: - **(Any required stucco is included)**						
Edge spalls (d=6"; w = 9")	400					$ /LF
Partial deck (half slab)		TBD				$ / SF
Thru deck		6000				$ / SF
Ceiling spalls (half slab)		TBD				$ / SF
Beam / Col Spall			700			$ / CF
Concrete Rust Spots (cut back steel reinf)				150		$ / ea
Unused Fastener Removal				100		$ / ea
Epoxy gravity feed (slab cracks)	TBD					$ /LF
Epoxy pressure injection (overhead cracks)	TBD					$ /LF
Stucco repair **(NOT at concrete repair areas)**		1500				$ / SF
Replace Railing Bolt - Old Concrete, Easily Removed				240		$ / ea
New Railing Bolt Into New Concrete				960		$ / ea
Angle Bracket (Where Broken During Rem'l or Sides)				1200		$ / ea
Entire railing removal and reinstallation - 6' balc				210		$ / ea
Entire railing removal and reinstallation - 8' balc				210		$ / ea
SGD removal - IMPACT (x LF door)	56					$ /LF
SGD reinstall - IMPACT (x LF door)	56					$ /LF
SGD removal - NON-IMPACT (x LF door)	56					$ /LF
SGD reinstall - NON-IMPACT (x LF door)	56					$ /LF
Plywood Weatherwall (SGD removed)	200					$ /LF
Plastic Interior Protection Wall (SGD not removed)	TBD					$ /LF
Accord Shutter removal (Complete Shutter Unit)				TBD		$ / ea
Accord Shutter reinstall (Complete Shutter Unit)				TBD		$ / ea
Accord Shutter removal (Bottom track only)				80		$ / ea
Accord Shutter reinstall (Bottom track only)				80		$ / ea
Remove Screen Material (APPROX 4 units affected)		2000				$ /SF
Replace Screen Material (APPROX 4 units affected)		2000				$ /SF
Tile removal / cementitious coating removal		800				$ / SF
Wood, Carpet, Vinyl, Glue, Paint removal		200				$ / SF
Waterproofing (at repair areas, if existing, not anticipated)		TBD				$ /SF
OPTIONAL: WP ALL Balconies After/During Repairs		*12,870*			*LS-------->*	
All WP SF price shall incl 2 coat Sika 710/715 system or similar*						
Misc Electrical Repairs (Licensed Electrician)						$ /HR
Estimated Total Cost						

Any item not listed above but listed in the Repair Specifications Scope of Work is intended to be included at no additional cost.
TBD = To Be Determined

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CONCRETE REPAIR SPECIFICATIONS

(PRELIMINARY / BIDDING)
2/29/24

For: Heritage Village Condominium Buildings
All Buildings, # 1 through # 75
3800 North Military Trail
West Palm Beach, FL 33407

PROJECT INFORMATION:

Approx Year Built:	1988
Code Built To:	SFBC
Occupancy Type:	Group R, R-2
Code Repaired To:	8th Edition of FBC 2023, Existing Buildings
Type of Repair:	Section 502 Repairs
	Section 606.2.1 Repairs for less than substantial structural damage

Rated Assemblies being repaired, altered or replaced: NONE

SCOPE OF WORK

The purpose of these specifications is concrete repairs, railing bolt replacement or reinforcing, and optional waterproofing. Repairs or replacements of shutters, sliding glass doors (SGD's) or windows are not included.

1. Repair spalled concrete and slabs, beams, or any cast-in place walls, as required. Most repairs will be at balconies. Repairs include visible spall damage and contaminated concrete continuous and adjacent to spalled concrete.
   a. Balconies have one mat steel and will be "through-depth." Partial depth concrete repairs involving rebar will not be performed.
   b. Do not remove delaminated tile to check for a spall.
   c. Only proceed where there are visual indicators (cracked and loose concrete, cracked or heaved or tile surfaces, exposed reinforcing bars.)
   d. Tile or floor coatings removed to access work areas will not be reinstalled or replaced as part of this project.
   e. Remove any items such as screen enclosures & framing, shutters, sliding glass doors (SGDs), or windows ONLY as needed to access repair areas. It is anticipated some of these items may need to be removed. Removing accessories may cause unavoidable damages, or reveal hidden damages.
   f. Reinstall removed items in a safe condition, with new SS fasteners and sealant in the holes. Provide a Condition Report promptly if items are not anticipated to be reinstalled safely, which should contain the Building #, Unit #, large or small balcony, the problem, and if repairs or replacement is needed.
   g. Re-waterproof repair areas, only if they had existing waterproofing. This is not anticipated as most balconies do not appear to have existing adequate waterproofing.
2. Replace all bolts/fasteners at balcony railings, with new SS fasteners.
   a. Where there are no concrete repairs, and existing bolts are easily removed from existing threaded sleeve, install a new bolt.
   b. Where there are no concrete repairs, and existing bolts break off during removal, install an angle bracket in accordance with the attached drawing. The

concrete should be excavated, similar to rust spot repair, to allow removal of ¾" minimum of remaining bolt. Repair with MasterEmaco N425 (Gel-Patch).

c. Where there are concrete repairs, and there is new concrete, install the railing post with a new 11" bolt in epoxy in accordance with the attached drawing.
d. Where there is limited access at balcony sides, install an angle bracket in accordance with the attached drawing.

3. Repair cracked stucco at building walls.
    a. Where stucco is cracked AND delaminated, replace stucco.
    b. OPTIONAL: Where stucco is cracked-only, coordinate with Association if they want all stucco cracks sealed. Cracked-only stucco repairs are normally sealed during a painting and waterproofing project.
    c. Where stucco is delaminated-only, do not do any repairs. It can remain in place.
4. Seal non-structural, non-spall, slab cracks or shrinkage cracks from top-side.
5. Repair rust spots. These are mostly from construction "chairs" or slab bolsters.
6. Remove unused fasteners at balconies or building walls. Seal all unused fastener holes.
7. Verify requirements for and provide any "as-builts" diagrams or drawings that may be required by the building department or for contractor invoices.
8. Provide supervision for workers and coordinate with owner and engineer.
9. OPTIONAL: Waterproof ALL balconies. Waterproof entire balcony horizontal and vertical edge surfaces. This will require removal of any existing floor coatings / tile.

LIFE SAFTEY / EGRESS PLAN

Some building departments have a Fire Agency Review that requires a Life Safety / Egress Plan for the period of construction work. Balconies are considered to be secondary escapes even during a repair construction project. The permit does not always automatically give the contractor the right to restrict resident access from construction zone area hazards.

The following plan has been approved by the Boca Raton Fire Agency, and may be approved by the local jurisdiction having authority for this project:

1. If the building has fire sprinklers, the balconies can be secured at the sliding glass doors to restrict resident access.
2. If the building does not have fire sprinklers, one of the following must be done:
    a) The residents must be temporarily evacuated. The balconies can be locked off at the sliding glass door to restrict any possible access.
    b) The balconies must be maintained at all times with a walkable surface and safety railings. Concrete excavations must be covered with plywood covers over exposed rebar when works is not occurring. The balcony sliding glass doors can NOT be locked off to restrict resident access when works is not occurring. The residents should receive advance warning and be told that access is only for extreme emergencies and they would enter the construction zone at their own risk.

CONCRETE SPALL REPAIRS

SHORING

Install shoring at any obvious unsafe areas before and during work. Install shoring where there are visible spalls at the SGD areas of cantilever slabs.

Wherever slab excavation areas greater than 2.5 feet wide uncover rebar, or there are visible spalls at SGD areas at cantilever slabs, shoring will be required. Minimum requirements for typical installations are in the attached drawings.

1. Slab repair areas require shoring to support concrete placement. Shore posts against plywood for concrete placement should have 4 x 4's at top of posts against the plywood.
2. Other slab areas in cantilever slabs outward from excavations in the direction of primary rebar require additional shore posts at 5 ft spacing each way.
3. Other slab areas in interior slabs away from excavations in the direction of primary rebar require additional shore posts at 5 ft spacing each way between column supports. In 2-way slabs this will be in 2 directions.
4. In residential areas, shore posts against slabs should have wood pads at top and bottom of posts. Interior posts must have pads to protect ceiling finishes.
5. Apply sufficient loading to secure each shore post in position for load carrying capability.
6. Check tightness of shoring a minimum of once a week. Fasteners should be used to secure posts to forms or slabs.
7. Shoring may need to be changed before proceeding with additional excavations that impose additional loads onto other areas or other shoring.
8. Ask engineer if there are any questions regarding adequacy of shoring.
9. The engineer may limit excavation areas based on shoring capability.

MEASUREMENTS BEFORE EXCAVATIONS

If SGD's, windows, shutters, or railings will be removed to access repair areas, measure and record existing concrete opening dimensions beforehand. Contractor should use these dimensions later for new concrete placements to be sure removed items can be re-installed or replaced.

EXCAVATIONS

Engineer approval is allowed, but NOT required prior to excavations. Engineer is allowed to but not obligated or required to "mark-out" areas. A good GC knows how to identify concrete spalls.

- Do not excavate concrete unless there are visual indications of spalls.
- Do not excavate cracked concrete without visible spalls (detached/loose concrete, exposed rebar, etc.)
- Do not excavate hollow sounding concrete without visible crack or spall.
- Do not excavate concrete for investigations.
- Do not excavate darker concrete from a previous repair, even if there is rust on rebar.

A. All Repair Areas
   1. Remove spall damaged concrete. Start excavations in the center of spall areas where spalls are visible. Excavate into adjacent concrete areas to expose rusted rebar and continue excavations behind rebar. Remove concrete behind and all around steel bars to provide a minimum of ¾" clearance between excavated concrete and rebar. Remove concrete in all directions along rebars until all cracked and loose concrete has been removed. Do not attempt to remove deteriorated rebar.
   2. Remove additional contaminated concrete. Within excavation, continue excavation along rusted bars to remove contaminated low-PH concrete. Continue excavations of solid non-cracked concrete along rusted steel bars in all directions as long as rusted bars continue to be exposed. Excavate in basic vertical and horizontal rectangular patterns as best as possible in accordance with drawings. The limit of excavations shall be as indicated in guidelines or, when approximately 2" to 4" of non-rusted white powder-coated rebar is exposed without indications of surface rust. Near non-rusted rebar, removal of concrete can be less than 180º around its circumference. Finished excavations should have rectangular-shaped bottom corners and sides should be near 90 degrees square, not tapered. Side walls should be greater than 45 degrees. Avoid angled and feathered edges at the finish surface of the repair perimeter. Do not remove deteriorated rebar.

3. Do not saw cut concrete. Saw-cutting may be allowed per industry standards; however, it is not required or desired, and strongly discouraged. If saw cutting occurs, ANY cut rebar will require repairs that include additional excavations and added rebar lap splices at the contractors expense. Smooth surfaces produced by saw-cutting require additional scarification by chipping to produce a roughened surface.
4. Mechanically fracture or otherwise scarify excavation, including any saw-cut edges, to expose a new 1/8" - 3/8" fractured aggregate surface.
5. Large excavated areas with large amounts of non-rusted rebar will be considered unnecessary and at the contractor's expense. The exception is to make rectangular-shaped repair areas to avoid or limit re-entrant (inward pointing) corners. Excavations for installing appropriate lap bars are also acceptable. Occasional excess excavations for the contractor's convenience are acceptable, but are at the contractor's expense. Concrete "islands" or "peninsulas" greater than 12" width, which remain, shall NOT be excavated, unless directed by the engineer.
6. Chipping hammers shall not exceed recommended sizes. A 15 lb. or 9 lb chipping hammer is preferred, and may be required by the engineer at some locations.
7. Cold joints between placements will require a fractured surface and bonding agent.
8. Where repairs are completed in sections, wait until at least 80% of design strength is reached before proceeding with adjacent areas.
9. Clean repair areas of loose materials and chipping dust by vacuuming or water-flushing.

B. Slabs
1. Slab edge excavations must be full thickness.
2. Slab areas, with only one mat of steel bars must be full thickness excavations.
3. Slab repairs, not at edges, with two mats of steel bars can be "half slab" repairs.
4. Ceiling "half slab" excavations should be limited to areas between shore posts. Repairs should proceed with partial concrete placements in stages between shore posts. Shore posts can be moved after new concrete gains 80% strength, typically 5 days.
5. Ceiling repairs should be avoided as much as possible. Large areas of ceiling spalls should be converted to full thickness slab repairs as much as possible.

C. Beams
1. Max through-section excavation allowed is 25% of the beam overall cross sectional area and exposure of 1 horizontal rebar or 2 at a lap of a single bar. Two horizontal bars will not be exposed unless approved by engineer.
2. Max excavation allowed along the beam length is a max of 2 ft or exposure of 2 stirrups on one side. Repairs should proceed with partial placements in stages between shore posts. Shore posts can be moved after new concrete gains 80% strength, typically 5 days.
3. Remove concrete around rusted rebars to provide 1.5" minimum clear between rebar and internal fractured concrete surfaces.
4. Repairs should be scheduled early and frequently to avoid project delays.

D. Rebar Inspection
1. Notify engineer of any questionable placement of existing steel.
2. After excavation, clean visible rust areas all around the steel bars' circumference to remove scaling rust. Rust may be removed using only wire brushes & hand tools. Minor surface rust remaining will be acceptable. New surface rust occurring after cleaning will be acceptable.

E. Adding New Rebar (if required)
1. Where bars are partially saw-cut from excavation work, add lap splice of new steel rebar of same diameter. **This is required even for small nicks in bars, and is not subject to the 20% loss of cross section typical lap splice requirement criteria**.

2. Where reinforcing steel loss is 20% or more of its cross section, add lap splice of new steel rebar of same diameter.
3. Placement of splice bars shall be at least 1" away from thinned damaged bar, or directly against damaged bar. Overlap lengths should be measured from where the existing steel has at least 80% of its original sectional area. If placed directly against damaged steel bar, wire-tie at least every 4" along overlap length.
4. At SLABS and BEAMS lap splice minimum overlap lengths are as follows:
    a) #3 bars - 15"
    b) #4 bars - 20"
    c) #5 bars - 25"
    d) #6 bars - 30"
    e) #7 bars - 35"
5. At COLUMNS, vertical bar lap splice minimum lengths should be within at least 2 column tie bars and as follows:
    a) #3 bars – 8"
    b) #4 bars – 9.5"
    c) #5 bars – 12"
    d) #6 bars – 14.2"
    e) #7 bars – 17"
    f) #8 bars - 19"
6. At BEAMS AND COLUMNS, stirrups or tie bars splices shall be same size as existing and in accordance with attached drawings. Lap bars can be bent into hooks, and connected to adjacent steel sufficient to carry tension loads. New bars can be doweled in, based on engineer's direction.
7. Allowable alternatives for adding rebar limited to partial repairs only can be:
    a) SMALLER bar diameter based on the amount of thinning of original bar as shown in attached drawings.
    b) DOWELING – Drilled hole should be minimum 1 ½ x bar diameter. Drilled hole should be filled from the bottom (using tube placed into hole) with approved non-shrink grout or epoxy gel, without air pockets or voids. The embedded rebar end must be pushed in so that grout or epoxy gel visibly oozes out of the hole.
    c) MECHANICAL CONNECTORS – Approved connectors are acceptable.

    These alternatives require Engineer's inspection and approval.
    These alternatives are not allowed for large area replacement slabs or beams.

CONCRETE PLACEMENT

A. Steel Coatings

Clean and prime-coat (with at least 80% coverage) any exposed reinforcing steel (and metallic conduits or pipes) with an anti-corrosion agent per manufacturer's requirements.

B. Concrete Cover – New Repairs

1. Bend new splice sections to match shape of existing steel and to provide concrete cover. Slab edges should have at least 1.5" cover to vertical surface of edge form. Bend bar hooks and cut off ends of reinforcing steel as required to achieve cover. Existing and added steel in slabs should achieve a minimum 3/4" cover to slab surfaces.
2. In severe cases, with engineer approval, steel rebar can be cut out and replaced.
3. With engineer approval, bars can be cleaned then coated with 2 layers of thin epoxy paint.

C. Concrete Cover – Existing Deficient Cover

1. Questionable concrete cover for existing concrete areas, from the original construction, should be brought to the attention of the engineer.

2. All efforts should be made to reposition bars deeper into concrete repair areas to achieve code required concrete cover. To help achieve proper depths, rebar can be bent or relocated. Where possible, additional concrete can be excavated deeper into repair areas to allow for relocating bars deeper.
3. Concrete repair areas should not be expanded laterally into adjacent existing non-damaged areas solely because of lack of concrete cover. Additional concrete should not be excavated along rebar solely due to existing lack of concrete cover.
4. Where concrete cover is less than code required, but > 3/8", placement of approved acrylic polymer modified structural repair mortar around the steel in question can provide equivalent corrosion protection. Field added aggregate should not be added to the acrylic polymer modified mortar mix.
5. Where concrete cover is < 3/8" and rebar cannot be moved deeper, partial coating of the rebar with approved epoxy is required. Apply two thin coats of epoxy paint. Coat only the portion of the bar with < 3/8" cover.

D. Use of Design Mix Concrete
1. Design "ready-mix" concrete can be used for repair areas of greater than 10 continuous SF of full depth slab, or greater than 3 continuous CF of beams. *Design "ready-mix" concrete cannot be used for columns or partial thickness slabs.*
2. Delivery sheets from the manufacturer showing the Mix ID must be provided to the engineer or inspector for each truck delivery.
3. Delivery sheets will be used as a basis for approval to place concrete. Concrete shall not be placed unless the Mix ID matches specification. Discrepancies must be clarified to the engineer's satisfaction before approval to place concrete is given.
4. Slump test results will be used as a basis for approval to place concrete. Concrete shall not be placed unless the slump test result delivery falls within the allowable range as listed on the Mix ID data sheet. Water shall not be added at point of delivery.
5. All testing shall be done in accordance with Ch. 16 of ACI 301 and as follows:
   a) Perform one slump test for every truck or batch containing 5 CY or fraction thereof, prior to placement, at point of first with the engineer present.
   b) Obtain one set of strength test specimens for testing, one at 3 days, one at 7 days and two at 28 days, for every truck, or batch containing 5 CY or fraction thereof. Test specimens shall be properly sealed, labeled and set aside.
   c) Additional testing will be required at engineer's request for any questionable concrete or question regarding the concrete meeting the specifications.
   d) All concrete testing shall be coordinated and paid for by the contractor.
   e) The contractor must provide copies of all test results to the engineer.

E. Concrete Repair Mortar Aggregate

Where the depth of the repair exceeds 1", the repair mortar mix must include, or be extended with 1/4" or 3/8" aggregate per manufacturer's instructions. Aggregate to be well graded, rinsed clean, and water saturated, or have low water absorption. Manufacturer's recommendations have priority if there is a discrepancy with this section.

F. Placement

1. Construct forms for new concrete to match existing surfaces. Provide for water runoff according to the original design. Record opening dimensions. Verify and maintain opening dimensions for accessories to be reinstalled later.
2. Clean, flush, and saturate excavated areas with water prior to concrete placement. Remove un-absorbed water.

3. Prime coat (with at least 80% coverage) excavated areas with bonding agent within 24 hours before concrete placement. Fill holes and voids. Follow manufacturer's instructions, except that greater than 80% coverage is acceptable.
4. Concrete placements must be continuous. Layering is not allowed. Where cold joints are necessary, the edge of previous placement must be treated as existing concrete, requiring a rough fractured surface and bonding agent.
5. Place concrete and finish surface to match adjacent areas.

AFTER CONCRETE PLACEMENT

A. Concrete Curing
1. Cover and maintain dampness of exposed surfaces of the placement by frequent water-spray, for at least 5 days or according to material manufacturer's instructions. Watertight curing coating applied after initial concrete setup is an acceptable alternative.
2. If ambient temperatures during concrete curing will be at or above 90° F, provide for cooling of materials and placement according to manufacturer's instructions and ACI practices.
3. Removal of forms and shoring and installation of accessories can be done after test results show concrete has reached 80% of design strength. Removal of forms and shoring prior to confirmation of strength test results requires engineer's approval.
4. Remove unnecessary or abandoned fasteners at areas nearby new concrete. Remove all loose material and fill holes with skim coat mortar or stucco, to match surface and texture of surrounding areas.
5. Provide a first coat of concrete prime paint to all vertical and overhead repairs, as best as possible at least 3 weeks following new concrete placement.
6. Follow with touch up finish paint as requested by owners. Paint details shall be coordinated with owners. Color matching, texture, and paint sourcing and material costs will be the responsibility of the owner.

B. Shrinkage Cracks - New Concrete
1. Shrinkage cracks are anticipated for new concrete and stucco placements as part of restoration work. Though these cracks do not cause any structural concerns, they should be sealed all through the concrete thickness to protect the embedded steel bars.
2. Sealing of shrinkage cracks in newly placed concrete should only be done after a minimum of 30 days has passed since the concrete placement. Shrinkage cracks can occur and grow at any time during the curing process.
3. Provide a containment reservoir for the gravity fed epoxy. Apply gravity fed epoxy to crack. Allow epoxy to penetrate crack and completely fill crack space without voids. Just prior to full curing of epoxy, scrape off excess by using a suitable trowel type tool.
4. The quantity and extent of shrinkage cracks is partially dependent on the quality of the damp curing and protection from the wind and sunlight. The cost for the repair of shrinkage cracks for new placements should be built into and included with the cost of the new concrete or stucco. Sealing of shrinkage cracks for new work is to be at no extra cost to owners.

C. Concrete Cracks Not From Concrete Repairs

Where cracks are not caused by steel corrosion, and there are no spalls, use epoxy to seal cracks. The cracks should be brought to the attention of the engineer for method and materials.

1. Clean the area of loose or deteriorated concrete and any contaminants.
2. On horizontal surfaces, install gravity feed epoxy.

3. On vertical surfaces, install injection ports at appropriate intervals to accomplish full penetration of the injection adhesive. The spacing of the injection ports shall be determined by the size of the crack and the depth of the concrete substrate. Spacing shall not exceed 8". Install injection ports by using surface mounted injection ports. Center the injection port over the crack and secure in place using the epoxy gel.
4. Completely seal the exposed crack located between the injection ports and boundaries as required, by applying the epoxy gel into the crack. Apply the epoxy gel at an approximate thickness of 1/8".
5. If the crack extends through the member, and if accessible, install tape on opposite side to prevent leakage of epoxy.

D. Misc Existing Holes and Old Un-needed Fasteners

1. Where accessories need to be removed and reinstalled, remove all fasteners and fill holes with an appropriate repair mortar. See Accessories section for reinstallation details. This work shall be included in the unit pricing for accessory removal and reinstallation unless separate pricing is provided for in the contract.
2. In concrete repair areas, where unnecessary or abandoned fasteners show, mechanically remove all such unnecessary fasteners. Fill in holes with appropriate repair mortar. This is not required in areas away from concrete repair areas. **This work is NOT the same as a "Rust Spot" caused by rebar or rebar chairs.** This work shall be included in the unit pricing for concrete repairs unless separate pricing is provided for in the contract.

RUST SPOTS

1. Where the end of a rebar (or rebar chair support) has caused a rust spot on the concrete surface due to insufficient concrete cover, excavate concrete and cut the end of the rebar to allow 1" concrete cover. Fill hole with an appropriate repair mortar.
2. Where shallow rebar, running parallel to the surface, has caused a rust spot on the concrete surface but has not yet caused a spall due to insufficient concrete cover, do not excavate concrete. Clean the rust from the surface. This area may spall and require repairs in the future.

DELAMINATED STUCCO REMOVAL

A. Preparation
1. Tap out stucco areas with light tapping pole such as hard wood broom stick. Note that stucco on solid concrete will sound different than stucco on concrete block, and different than stucco on wire lath and plywood. Become familiar with the structural components before tapping. Tap good areas with well bonded stucco to determine a base line for good stucco soundings.
2. Mark wall at the center of delaminated stucco areas. Look for cracks showing separation in delaminated areas and at edges of delaminated areas.
3. When tapping ceilings, note that the stucco is likely to be thinner and directly applied to solid concrete.
4. When tapping walls, note that concrete block is adjacent to solid concrete columns. At those joints there will be different soundings.
5. Verify there is a clear and distinct hollow sound of the delaminated stucco that will be removed.
6. Mark interior areas of delaminated areas with X's.
7. Do not mark straight lines for saw cutting.
8. Do not saw cut stucco at delaminated perimeter areas.

B. Demolition
1. Use a light-weight chipping hammer at delaminated center areas to remove loose stucco. Verify that stucco was not bonded to the substrate. Verify the stucco was easy to remove. If stucco was well bonded to the substrate, stop removing it.
2. After center area has been excavated and substrate has been exposed, continue peeling loose stucco away from substrate in all directions. Use light weight chipping hammer or hand tools to peel off substrate. Remove delaminated stucco in all directions towards perimeter areas.
3. Continue removing loose stucco in all directions until there is a distinct difference and well bonded stucco is found. There should be a distinct difference between loose-bonded stucco and well-bonded stucco.
4. Stop excavating at all perimeter areas when well bonded stucco is found. The perimeter will not be straight lines. The perimeter will be irregular shapes.
5. Test all perimeter areas for any remaining small cracks or small loose stucco. Remove any loose stucco as found.
6. Clean all debris from perimeter areas looking for small micro-cracks that need to be removed.

NEW STUCCO INSTALLATION

A. Preparation
1. Stucco should not be installed until all surfaces are clear from irregularities or other imperfections that may compromise the finish look.
2. MASONRY: Verify joints are cut flush, no bituminous or water repellent coatings are on surface, and surface is ready to receive stucco.
3. CONCRETE: Inspect all concrete for spalling, repair all spalled areas in accordance with the specifications. Allow repaired areas to cure a minimum of 10 days.
4. Verify surfaces are flat, honeycombs are filled flush, no bituminous, water repellent, or form release agents on surface, and surface ready to receive stucco.
5. If lath is to be installed, do not continue furring and lath over expansion joints.
6. Roughen and clean masonry and concrete surfaces to achieve mechanical bond.

B. Application
1. Stucco thickness shall match existing at adjacent surfaces as best as possible.
2. Ensure finished stucco work is true to line and plane, and is level and plumb.
3. Mechanical mixers must be used. Hand mixing is not allowed. Keep mixer and all tools clean. Follow all manufacturer's instructions regarding mixing times, time between coats, curing, etc, and discuss with engineer for approval if application is different than specified. Do not let foreign particles or objects enter the mix.
4. Non-proprietary stucco mixes (non-bag mixes) shall be mixed in proportion of at least one part Portland cement to a max of 2.5 parts sand by volume, and shall be in accordance with all code requirements, regulations, and requirements by jurisdiction having authority.
5. Proprietary mixes (bag mixes) are allowed. If proprietary mixes are used, such as Sakrete, Magna, Sika, etc, follow all manufacturer directions. Scratch and Brown coats can be applied using the same material, if indicated on proprietary mix literature.
6. Dampen surface without visible water on surface. Apply commercial grade or better bonding agent, and allow to dry according to manufacturer specifications.
7. Stucco should be 3-coat work. Coats should be SCRATCH, BROWN, and FINISH.
8. If proprietary one-coat stucco is used, which is a combined scratch and brown coat and finish coat, follow all manufacturer's instructions. Pay particular attention to lath detail, and all curing recommendations. Additives or modifiers must be approved by engineer.

9. Interrupt stucco application only at jurisdictions of stucco planes, openings, at control joints, or at expansion joints.
10. Application of stucco shall conform to ACI standards and recommendations and shall conform to ASTM requirements.
11. Apply scratch coat (proprietary or non-proprietary) with sufficient pressure to key stucco into lath or on to bond substrate. Thickness to be 3/8 inch. Cross scratch horizontally to provide for a key into brown coat.
12. If sanding or powdering occurs, remove stucco and re-work stucco with proper proportions and curing.
13. Delay between coats shall conform to ACI 11.3.2 including cure time and "double back" applications.
14. Apply brown coats to a thickness of 3/8" using sufficient pressure to key into previous coat. Float or lightly broom surface to provide bond with finish coat. Tool brown coat to provide a V-joint at intersection of stucco with frames or other items of metal, wood, or plastic that act as stucco grounds.
15. Dampen previous stucco coats which have dried prior to time for application of next coat. Dampen with water as required for uniform suction. The contractor is responsible for determining the most effective procedure for curing and time lapse between applications of coats based on climate and job conditions. Stucco, which is cracked due to improper mixing, timing and curing, will not be accepted. Remove and replace defective plaster, including plaster base materials, if damaged during removal of defective plaster.
16. Apply exterior finish coat to a thickness recommended by manufacturer to achieve texture matching surrounding, using sufficient trowel pressure to bond finish coat to brown coat. Apply finish in number of coats and consistency required to achieve texture to match surrounding. Let dry, then mist with water several times a day for 2 days to prevent cracking.
17. Color may be added to the finish coat is approved amounts, and only if included in project documents and approved by owner or owner's representative. We strongly recommend that any color approvals be in writing.
18. Curing shall conform to Chapter 13 - "Curing" of the ACI- committee report – Portland Cement Plastering.
19. All stucco and concrete repair areas shall be prime painted. Apply primer paint after stucco has fully cured, approximately 3 weeks is recommended. Apply primer by spray, brush, roller at a rate recommended by manufacture. Primer to be supplied by contractor.
20. Add touch up color matched paint if requested by owner and painted provided by owner. Match color, surface, and texture, as best as possible to surrounding areas. Apply touch up finish paint after primer cured based on primer manufacture instructions. Touch-up finish paint shall be provided by owner, unless otherwise indicated in the project documents.

C. <u>At Construction Joints and Transitions</u>
1. Where wall sections change, from concrete block to solid concrete, install Sto brand repair mesh, or equivalent, into stucco layer lapped 4" on each side of transition joint. This includes transitions from columns to block, and from slab edges to blocks.
2. Where wall sections change from concrete block to wood frame construction extend wire lath into block area lapped 4 inches on each side of transition joint.

STUCCO CRACKS REPAIR

Cracks in tightly bonded stucco do not cause structural concerns. Seal to prevent water intrusion. Cracks in tightly bonded stucco generally do not require removal of stucco.

A. <u>Shrinkage Cracks - New Stucco</u>

1. Shrinkage cracks in stucco placements can happen as part of restoration work. The quantity and extent of shrinkage cracks is dependent on the quality of the stucco mix and dampened surfaces during placement.
2. Filling in shrinkage cracks in newly placed stucco should only be done after as much time as possible has passed since the placement.

B. Cracks

1. All cracked areas should be tested by tapping for delaminated loose stucco.
2. If delaminated, loose stucco is found at either side of the cracks, the cracks should NOT be filled in. The delaminated, loose stucco should be removed.
3. Filling in stucco cracks in stucco should only be done after verifying that the crack is not part of any delaminated loose stucco, or is not at a construction joint.

C. Cracks At Construction Joints and Transitions

1. Where wall sections change, from concrete block to solid concrete, the cracks should NOT be repaired. Stucco should be removed approx 5" on each side of the joint. Install new stucco with Sto repair mesh, or equivalent, into new stucco layer lapped 4" on each side of transition joint. This includes transitions from columns to block, and from slab edges to blocks.
2. Where wall sections change from concrete block to wood frame construction, the cracks should NOT be repaired. Stucco should be removed approx 5" on each side of the joint. Install new stucco with wire lath lapped 4" on each side of transition joint.

D. Preparation

1. Remove debris and contaminants from crack. This is best accomplished by blowing out the crack with compressed air and/or vacuuming of the crack.
2. Any black mildew stains should be removed and cleaned with a bleach solution.
3. Ensure surfaces are cleaned, rinsed and dried, and free from dirt, grease, oil, loose or peeling paint, chalk, salt or other contaminates. Remove loose and deteriorated material by chasing the crack with a utility knife or similar instrument. **Do NOT "V" notch crack.**

E. Application - Material depends on type of paint to be used and time available.

OPTION – Urethane Caulking

1. Use NP-1 urethane sealer to seal shrinkage cracks.
2. Follow manufacturer's directions of NP-1 urethane caulking to fill cracks.
3. With solvent wetted sponge, finish areas with grout as best as possible to match surrounding areas.

OPTION – Acrylic Caulking

1. Use Polyseamseal water-based acrylic sealer to seal shrinkage cracks.
2. Cut tip of Polyseamseal at a 45 degree angle.
3. Pressure-squeeze Polyseamseal into shrinkage cracks, then apply pressure with a 6" wide flexible knife to insert the Polyseamseal deeper into the crack. Scrape excess onto knife. Accumulate Polyseamseal onto crack after scraping, and repeat to insert deeper into crack. Wet-sponge finish the Polyseamseal to match as best as possible the surrounding area.
4. After 24 hours, repeat the process to add more Polyseamseal after shrinkage.
5. Wet-sponge finish the Polyseamseal to match as best as possible the surrounding area. Do not grind.

OPTION – Water-Base Flexible Paintable Exterior Grade Crack Fillers

1. Follow manufacturer's directions to fill cracks.
2. With wetted sponge, finish areas with grout as best as possible to match surrounding areas.

APPROVED MATERIALS

1. Ready mix concrete materials shall meet the following minimum requirements:
   a) Strength 4000 psi min after 28 days
   b) Cement content ≥ 560 lbs./yd, W/C ratio ≤ 0.40
   c) Total water soluble chloride ion (Cl) content ≤ 0.05% by weight of cement
2. Bag goods concrete materials shall meet the following minimum requirements:
   a) Strength 4000 psi min after 28 days
   b) Tensile bond strength, 28 days, ASTM C-882m > 1000 psi
   c) Shrinkage, 28 days, ASTM C-157 < 0.06 %
   d) Rapid chloride permeability, ASTM C-1202 < 1000 coulombs
3. New reinforcing steel shall be Grade 60.
4. Approved materials must be used in accordance with manufacturer's application guidelines.
5. In addition to materials named elsewhere in the specifications, the following materials are approved:

PRODUCT	TYPICAL APPLICATION	LIMITATIONS
CONCRETE		
CEMEX design mix code 1582569	Pump mix	Full depth > 10 SF or 3 CF
Rapid Set – Concrete Mix Very Rapid Hardening Concrete	Formed work, setting posts, footings. Horizontal slabs, beams.	Min depth: 2" Max depth: 24" Sets in 15 minutes, ready for traffic in 1 hour
Sikacrete® 211	Horiz, Vertical, and Overhead Surfaces, full Depth, Factory Blended Aggregate	Min depth: 1" Max depth: 8"
Sika 211 – SCC Plus	Horiz, Vertical, and Overhead Surfaces, full Depth, incl Aggregate and Migrating Corrosion Inhibitor	Min depth: 1" Max depth: 8"
SikaQuick 1000	Leveling, slope correction, installed prior to coatings	Min depth: 1/4" Max depth: 2"
Sika Top® 121 PLUS (2-part poly-mod leveling mortar with FerroGard901 penetrating corrosion inhibitor)	Leveling and pore-sealing mortar installed prior to coatings.	Min depth: 1/12" Max depth: 1/6"
MasterProtect HB200	Elastomeric, crack-bridging acrylic protective coating for walls.	Concrete should be fully cured. Treat cracks greater than 1/32"
Sikadur® 35, Hi-Mod LV, Low Visc.	2:1 2-part LV epoxy for gravity feed or injection of cracks.	When mixed as epoxy mortar, can be used for interior only, 1.5 inch

		lifts.
Sikadur® 32 Hi-Mod, LPL	Pressure injection of cracks or gravity feed cracks.	20-30 min. pot life
SikaRepair® 223 + Latex R	Overhead and Vertical Repairs	Min depth w/o aggregate 1/8” Max depth w/o agg. 1.5” per lift *See mfg. data for use w/ diluted Latex R *Can be extended w/ aggregate for >1” repairs
Sika Quick VOH	Overhead and Vertical Repairs Fast Setting	Min depth: 1/8” VERTICAL: 3” per lift OVERHEAD: 2” per lift.
SikaQuick / MasterEmaco® N 425 (Formerly Gel Patch)	Overhead and Vertical Repairs	Application: ¼” - 2” per lift Placement time: 20-30 minutes Do not extend with aggregate.

REBAR DOWELING AND ANCHORING

Sika® AnchorFix-1	2-part epoxy for doweling rebar	Gel time approx 4 minutes, cure time approx 35 minutes, cartridge system.
Sika® AnchorFix-3001	2-part epoxy for doweling rebar	Gel time approx 3-4 minutes, cure time approx 3-4 hours, cartridge system.
Sika AnchorFix-3030	High performance 2 component chemical anchoring adhesive for threaded rods, bolts, rebar.	Store out of sun. Review data sheet before use.
Sika AnchorFix 2	High performance 2 component adhesive anchoring for threaded rods, bolts, rebar.	Store out of sun. Review data sheet before use.
Sika /MasterBuilders MasterFlow® 110 AN (formerly SONOPOST)™	Railings, Posts, Anchor Bolts	Min. depth w/o aggregate 1/4” Max. depth w/o aggregate 2” If used w/aggregate, min. depth 1/2”

SEALANTS

Sikaflex® 1a (1-part polyurethane elastomeric sealant)	Polyurethane sealant for vertical and horizontal joints	Final cure: 4 - 7 days Min depth ¼” Max depth ½”

Sikaflex® 2cNS, NS EZ Mix	Urethane sealants	Final cure: 3 days Application Life: 3-4 hours Min depth ¼" Max depth ½"
MasterSeal® NP-1™ One-component, gun-grade, polyurethane sealant.	Exterior and interior applications; bonds well to many materials including concrete and masonry without a primer.	Do not allow uncured MasterSeal to be in contact with alcohol-base materials, or solvents.
LOCTITE® POLYSEAMSEAL® Acrylic Caulk with Silicone	Seals gaps and cracks around windows and doors frames. Bond well to drywall, plaster, concrete, masonry and painted surfaces.	Do not apply outdoor when rain or freezing temperatures are expected within 24 hrs. Apply at temperatures bet. 40˚F - 100˚F

WATERPROOFING

Sto Watertight Coat 81241 (Gray), 81242 (White)	Flexible, Cementitious Waterproofing Membrane	Applied in 1 coat (1/16") with Sto Repair Mesh at cracks and transitions.
SikaTop Seal 107 (Gray or White only)	Flexible, Cementitious Waterproofing Membrane, Less Decorative	Applied in 2 coats, 40 mils per coatCoverage is 40SF/gal.
Sikagard® Flexcoat with optional Sikagard Flexcoat ATC (Acrylic Top Coat for color)	Flexible, Cementitious Waterproofing Membrane, More color options	Applied in 2 coats at a coverage rate of 250 SF/unit/coat (Total 60 mils)
Sikalastic® 710/715/735 AL Traffic System. To be used with Sikalastic primer.	Elastomeric polyurethane waterproofing pedestrian vehicular and deck coating	Primer, then 710 Gray Base, then 715 or 735 Gray, Charcoal, or Tan Top Coat. Treat cracks w/ 4" detail coat. 72 hours to traffic. See Manf. Details
Sika Ferrogard 908	Penetrating Sealer & Corrosion Inhibitor	Roller, brush or spray, 2 coats, applied wet-on-wet is optimal

JOINT SEALS

Sika / EMSEAL Thermaflex. Expansion Joint System (Edition May 2009)	High strength watertight parking deck and stadium expansion joint systems.	Sealant will not perform well where there is unsound substrate or improper blockout preparation. Min. substrate temperature for installation 45˚F.
Sika / Wabo®Evazote UV Low Density, Closed Cell, Cross-Linked Nitrogen Blown Joint Seal.	High depth exp. joint system for sealing bridges, parking decks, stadium, buildings and water treatment facilities.	Do not allow any component to freeze prior to installation. Store all components out of direct sunlight and in dry location

		between 50˚F to 90˚F.
Sikadur® Combiflex® Joint Sealant (Edition 5/5/2011)	High strength exp. joint system for irregular and difficult joints and cracks.	Min. surface temp. 40˚F. Max. Epoxy application thickness 1/8”
Closed-Cell Backer Rod And Soft Backer Rod	Backer rod is a reticulated closed-cell polyethylene foam join-filler and backing for sealants for joints of varying widths.	Do not puncture, fold or stretch. Do not use with HOT applied sealants. Service temperature -45 to 160 ˚F.

ANTI-CORROSION

Sika® Armatec® 110 EpoCem	Bonding Agent for New to Hardened Concrete and Anti-Corrosion Rebar Protection	2 coats for anti-corrosion of rebar, allow to dry 2-3 hours. Place concrete within 6 hours of application to concrete as bonding agent.
Aquafin Rebar Primer/Bond-CI	Cementitious, Anti-corrosion Coating for Protection of Steel Reinforcement and Bonding Agent	2 coats for anti-corrosion of rebar, allow to dry approx. 2 hours. Place concrete after coat has dried and within 7 days of application.
Sika Ferrogard® 903	Penetrating Corrosion Inhibitor	2 coat min. 100 SF/Gal min each coat.
Rust-Oleum® Appliance Epoxy	Use for low rebar cover areas as directed by engineer.	

Any request for use of materials not listed above must be submitted to the engineer for approval 7 days prior to proposed usage.

ACCESSORIES

A. Protection
Any SGD’s, screen systems, shutters and railings, whether kept in place or removed, must be protected from damage at all times during work. Tile must be protected when not removed.

B. Temporary Removal of Accessories to do Repairs and Access Work Areas
The need for temporary removal and reinstallation of accessories is anticipated. This can include:
- Railing systems

- Shutters
- Screen framing
- Windows or Sliding glass doors (SGD)
- Awnings or Canopies
- Gutters

There are no code restrictions on temporary removal and reinstallation of existing original configuration SGD's or windows on exterior walls that protect interior areas for the purpose of building repairs.

There are no code restrictions on temporary removal and reinstallation of existing original configuration screen framing systems or railings for the purpose of building repairs.

There are no code restrictions on temporary removal and reinstallation of existing added SGD's, windows, shutters, awnings, canopies or gutters that were properly permitted for the purpose of building repairs.

- There is the possibility aged deteriorated accessories removed need to be repaired.
- There is the possibility aged deteriorated accessories removed need to be replaced.
- Any reinstalled accessories must be structurally safe condition.

Non-Original & Unpermitted Added SGD's/Windows/ Shutters

- There ARE code restrictions on temporary removal and reinstallation. There is a possibility the building department may not allow them to be reinstalled, even if they appear to be in good condition.
- There is also the possibility additional engineering will be needed to re-install un-permitted systems safely, or that they may not be able to be reinstalled at all during the project, at the engineer's discretion, and possibly subject to Association control.
- Where non-original/unpermitted SGD's or windows have been added at an exterior balcony edge, AND the original configuration SGD/windows have been removed, it is possible new SGD's/windows will need to be installed at the original configuration locations, and the unpermitted systems, near the edge, will NOT be re-installed as part of the work. If new SGD/windows are needed, plywood opening covers may need to be installed.
- **Dealing with non-original, unpermitted, possibly unsafe, added systems will usually add to engineering costs, additional construction costs, and will cause project delays.**

C. Pre-Removal Condition Reports

Contractor is required to provide a Condition Report for any accessory that is not anticipated to be able to be reinstalled safely. The report should contain the Unit #, the problem, any safety or integrity issues, deficiencies in appearance, fit, function, damage, deterioration, and if a repair or a replacement is needed.

D. Removals

1. Shutters
   a. Remove shutters or shutter tracks, as needed to access concrete repairs. Temporarily removed shutters must be wrapped, labeled and stored in Association-approved locations.
   b. The rough concrete opening size (length and width) must be measured and recorded by the contractor prior to any concrete excavations.

c. During concrete repairs, the rough opening size (length and width) should be maintained, so the shutters may be reinstalled without modifications. Any shutter modifications needed, or excess repair concrete to be removed shall be performed without any extra cost to the owner.
d. All existing loose or delaminated leveling material must be removed along the entire length of the opening.
e. Any fully removed shutters are required to be inspected by the engineer for safety before reinstallation. If repairs or replacement is needed, and reinstallation is deemed unsafe by the engineer, the shutters will not be reinstalled. They will be stored on site. Needed repairs or replacements should be accomplished by the unit owner after project completion. An engineer report can be provided upon request.

2. Windows & SGD's:
   a. If SGD's or windows protect an interior area, install temporary protection walls prior to removal.
   b. Pull back and secure interior carpet, and provide temporary coverings and protection for interior floor, wall and ceiling areas. Upon reinstallation of windows or SGD's, repair or replace basic drywall and baseboard areas, including partial walls and ceiling primer painting at reinstalled doors and reattaching carpet. This is at no extra cost to the owner.
   c. Tile repair, wallpaper repair, repainting interior walls with color matched paint and drapery or window treatment reinstallation is not included with the SGD Rem and Reinstall pricing, and if requested, would be extra at mutually agreed pricing.
   d. Measure and record rough opening size prior to any concrete work.
   e. Windows or SGD's must be wrapped in protective wrap, labeled and stored.

After removal of accessories, clean excess caulking and fill existing holes with an appropriate repair mortar. Prepare surfaces for later reinstallations.

E. Reinstallations

Reinstallation of accessories requires new SS fasteners.

1. Aluminum Railing
   a. Excavate all deteriorated rail post pockets grout without damage to the slabs.
   b. Fill excavated pockets with an approved post-setting material.
   c. Place the approved material against the post 1/4" above the surrounding base concrete surface.

2. Shutters
   a. Shutters that have any safety issues should not be reinstalled.
   b. The re-installations of all shutters must be inspected by the engineer for fasteners, waterproofing of fasteners, fit and function.
   c. Where floor tile has been removed, the clearance at the bottom track will not work. If the entire shutter has been removed, aluminum extrusion sections approx the width of the upper tract x 1/16" wall thickness x floor tile and mortar thichness can be added above the upper track. If only the bottom ract was removed, the same aluminum extrusion sections acting as shims can be added below the bottom track. Pricing for providing the proper clearance shall be included in pricing for Accordion Shutter R&R.
   d. Replace all fasteners. All fasteners must be approved stainless steel, minimum size #12 SMS, Rawl "304 SS Tapper" tapcons, or equivalent, embedded in sound

concrete a minimum of 1 ½". On 1st floor through the 5th floor, track fasteners shall be spaced a maximum of 8" apart and 3" min from track segment ends. On 6th floor and all higher floors, track fasteners shall be spaced a maximum of 5" apart and 3" min from track segment ends. Set all embedded fasteners in holes filled with approved sealants.

e. If required for adequate drainage, saw-cut thin slots in the bottom of shutter bottom tracks at 24" O. C. spacing.
f. Any removed shutter bottom tracks will be reinstalled. Shims will be added to compensate for any removed tile. Tile installation and track adjustments should be accomplished by the unit owner after project completion.

3. Screen Framing
   a. Screen framing should be installed flat to concrete as best as possible without framing distortion or adding shims. Shims can be used for uneven concrete. Gaps between straight framing and uneven concrete can be covered with color matched caulking.
   b. Reinstallation of screen framing includes new screening. Screen spines should be round, not square, for removal during hurricane winds.
   c. The installation or reinstallation of all screen framing should not create new drainage problems. If needed for a reported drainage problem, drill or notch 1/4" diameter horizontal (weep) holes through bottom of frame at floor edges at 24" O. C. spacing.
   d. Provide new SS fasteners, waterproofing of fasteners, and fit and function corrections.
   e. Fastener spacing and sizing requirement is maximum 24" O. C. and minimum 1 ½ " embedment into sound concrete, and not more than 6" from ends.
   f. Set all screen fasteners in holes filled with an approved polyurethane sealant. Clean and fill fastener holes from the bottom (using plastic tubing) with approved sealants. There should be no air pockets or voids below fasteners.

4. Windows and Sliding Glass Doors
   a. Removed SGD's or windows are required to be inspected by the engineer for structural integrity and must be approved before re-installation.
   b. If repairs or replacement is needed, the contractor will have provided a condition report. If the contractor and Association coordinate, and repairs or replacements cannot be done, the window or SG cannot be reinstalled. Plywood will need to be installed temporarily. Additional fasteners should be installed to secure against high winds. Joints should be covered on the exterior side with wide blue masking tape to secure against rain water intrusion. The needed repairs or replacements should be done by the unit owner soon after project completion, and are not included in these specifications. An engineer report can be provided on request.
   c. All existing loose or delaminated leveling material must be removed along the entire length of the opening.
   d. During concrete repairs, the rough opening size should be maintained, so that windows and sliding glass doors can be reinstalled without modifications. Any windows or sliding glass door modifications or excess concrete placed to be removed shall be performed without any extra cost to the owner.
   e. After completion of concrete repair work, plumb and square door frame in rough openings using shims as necessary. Secure frames to wall with fastener spacing equal to the original installation, as indicated by the holes in the frame, or as directed by engineer.
   f. The re-installation of any windows or SGD's during the work must be inspected during the work by the engineer.
   g. If the SGD bottom track is deteriorated, install an approved new SGD aluminum bottom door track with a minimum interior riser height of at least 1".

h. All fasteners must be an approved stainless steel, minimum size #12 SMS, "Powers Fasteners" brand"304 SS Tapper" tapcons, or equivalent, embedded in sound concrete a minimum of 1 ½" with spacing equal to the original installation, as indicated by the holes in the frame, or as directed by the engineer.
i. Install bottom track in a bed of mortar, providing positive drainage as required.
j. Set all embedded fasteners (includes side jambs, header, and bottom track) in holes filled from the bottom with approved waterproof sealants.
k. Apply approved sealant to the exterior joint between bottom door track and balcony floor slab (1/4" minimum bead).
l. The contractor will be held responsible for restoring interior walls, ceilings, floors or baseboards caused by widow or SGD R&R. The contractor will be held responsible for repairing interior drywall and prime painting walls and ceilings, including popcorn ceiling finishes as best as possible, with basic finishes. Unless specific separate pricing is provided in the contract, such restoration and repairs will be included at no extra cost.
m. Unless otherwise provided for, the contractor will not be held responsible for unavoidable damages, including but not limited to: replacing floor coatings such as carpet, tile, marble, wood, and vinyl; wallpaper or color matched painting of walls or ceilings; removing and reinstalling draperies, blinds, or other window treatments.

5. Weather Protection Walls And Tropical Storms
   If the National Hurricane Center issues a local tropical storm or hurricane watch:
   a. Install plywood backing and foam sealing around openings.
   b. Install additional fasteners and lateral storm diagonal bracing for plywood walls.
   c. Remove all materials and equipment from balconies and grounds that cannot be secured.

MISCELLANEOUS

A. Preconstruction Existing Condition Inspections by Contractor
   1. Before work starts, the contractor shall be allowed to conduct a pre-existing condition survey at work areas (a.k.a as "nick & ding" inspection.) This is to document existing conditions to later distinguish between pre-existing damages and contractor damages. The engineer has no obligation to conduct this inspection. The contractor has no obligation to conduct this inspection.
   2. If contractor conducts the inspection, takes photos, videos, or produces a report, the engineer shall be provided copies, which may be used to help resolve damage claims.
   3. During the project, the engineer may verify damaged conditions during the course of normal project inspections.

B. Extra Engineering Inspections if Requested or if Required by the Contract
   1. The engineer is available to for SCOPE OF WORK inspections. If needed, the engineer can help the contractor identify spalls and work locations.
   2. The engineer is available to for EXCAVATION LIMITS inspections. If needed, the engineer can help the contractor identify when to stop excavations. Typically, the engineer will audit-check excavation limits during the normal course of inspections, especially if the engineer is processing contractor invoices, however, it is not required. If excavation limits inspections are performed, the contractor must not clean the rusted bar prior to inspection. The limits of excavations are determined by visible rusted steel.
   3. The engineer is available for VERIFICATION OF BILLABLE REPAIR QUANTIIES. The contractor would need to call for inspection after the excavation is complete, prior to cleaning rusted steel bars.

C. Required Engineering Inspections

The contractor must call the engineer's office for the following mandatory inspections:

1. REBAR REPAIRS: The engineer shall inspect all rebar or PT repairs.
2. APPROVAL TO PLACE CONCRETE: The engineer shall inspect and must approve all concrete placement areas prior to concrete placements.
3. PLACEMENT OF CONCRETE: All truck placements of reinforced concrete require on-site engineering observations and approvals during the placements. The engineer may also require observations during bag goods reinforced concrete placements.
4. SGD AND WINDOW RE-INSTALLATION - FASTENERS: The re-installation of any SGD's or windows must be engineer inspected and approved during installation of fixed frame fasteners.
5. SGD AND WINDOW RE-INSTALLATION - FIT, FORM AND FUNCTION: The quality of any SGD or window re-installations must be verified by the engineer after re-installation.

- Inspections shall be requested by calling the engineer's office and requesting an inspection to the person answering the phone. Leaving emails, texts, cell phone voicemails, does not remove the contractor's obligation to call the office for inspection.
- The mere presence of an engineer or inspector on site does NOT indicate approval for anything.
- Stucco, overlays, and non-reinforced concrete placements do not require engineer's approvals before contractor starting the work.
- During engineering inspections, engineer may inspect shoring. Contractor must interrupt current work to add or change shoring if required by the engineer.
- Any verbal approvals or changes to the specifications or previous engineering documents from the inspector are not authorized unless in writing. The contractor can call the engineer's office the next day after an inspection for a copy of the inspector's field log showing approvals.
- The engineer has no obligation to supervise work or workers, or coordinate contractor issues with clients, or to provide punch-list reports.
- The engineer has the right to reject work, even after it is complete, that is not in accordance with contract or engineering documents.
- The contractor shall be liable to the Association for engineering fees for unnecessary, repeat or extra services due to rejected work, work needing corrections, inadequate contractor staffing or errors on contractor invoices.

D. Progress Payment Applications

1. Payment Application for mobilization should NOT be dated or submitted until after contractor supplies and materials are located on the project site.
2. Payment Application for demobilization should NOT be dated or submitted until after contractor supplies and materials are removed from the project site.
3. Payment Application for permit fees should NOT be dated or submitted until after a copy of the permit has been provided to the engineer.
4. Payment Application for mobilization/demobilization/permit, if listed on bid list as one line item, should be in reasonable partial amounts based on #1, 2 & 3 listed above.
5. Payment Applications should include partial lien releases.
6. Payment Applications should only be whole line items, after their completion. For example, an edge repair should only be invoices after the concrete is placed.
7. Payment Applications should only contain items that are listed in the pricing page in the contract or listed in signed change orders. If proposed change orders are outstanding,

unsigned, or in discussion between the parties, do not put those items on the invoice. This will only delay the processing of the invoices.

8. Payment Applications for final retainage should include copies of warranty documents and final lien releases, and proof that the permit is closed. No other items should be on the invoice except for the retainage.
9. Payment Applications should include all completed work up to the "Period-To" date on the invoice. The purpose is to keep the owners timely advised as to the accumulated total project cost.
10. Work quantities for single location may be in more than one invoice.
11. Payment Applications should include drawings or diagrams showing work locations with measurements to the nearest unit shown on the pricing page, or smaller.
12. Engineer verifies work quantities at various times during the project. Engineering approval of Payment Applications is based on on-site inspections and information received. Approvals are not a certification that all work in the approved invoice meets all specifications, and do not indicate the engineer's final acceptance of the work completion or quality. The engineer may reduce, adjust or reject subsequent progress payment approvals based upon subsequent determinations of work completion, quantity or quality.

E. Punch List Inspections

1. The contractor is responsible for inspecting and completing clean up and corrective work on an ongoing basis. This may include creation of a Contractor's Punch List by the contractor and removing items from the list as items get completed.
2. Contractor should communicate with the Association regarding any of their concerns, corrections or alleged punch list items. Association items should be added to the Contractor's Punch List corrected on an ongoing basis.
3. Engineer items communicated to the contactor should be added to the Contractor's Punch List and corrected on an ongoing basis.
4. Near the end of the project, the engineer will assist and review un-resolved, uncorrected, uncompleted items or damage claims regarding contractor liability.

F. Completion per Vertical Stack of Balconies or Units Accessible by Scaffolding

Stack completion shall be determined when all repairs are completed, cleaning and prime painting is completed and work locations are ready to be returned to service. This is when scaffolding / swing stage removed and owner can safely occupy the space.

1. Contractor shall provide a written notice to the engineer and owner stating all work on a stack is complete and ready for any final inspections by engineer and/or owner.
2. Upon contractor's notice, the engineer and/or owner will proceed with final inspections within 3 days.
3. If owner agrees in writing, claims or minor cosmetic work can be completed later through the unit, and scaffolding can be removed from that stack.
4. Remaining claims can be financially settled with an agreed amount of retainage deduction by a written agreement signed by owner and contractor.
5. Contractor will be responsible for reinstalling scaffolding at no extra cost to owner for any un-completed work discovered later.
6. The contractor will NOT be responsible for reinstalling scaffolding for new spalls that originate after scaffolding removal before final completion of the overall project.

G. Project Substantial Completion

1. Substantial completion shall be determined when all structural repairs are completed, cleaning and prime painting is completed, scaffolding is removed and work locations are returned to service for owner's use. This is when the owner can safely occupy or utilize the work areas.

2. Failure to complete the work within time limitations as set by the date of Substantial Completion shall activate any Liquidated Damages provisions in the contract. Such damages shall continue until substantial completion of the project is achieved.
3. Contractor shall provide a Substantial Completion notice to the engineer and owner, stating that all work is Substantially Complete and ready for completion inspection.
4. Upon contractor's notice of Substantial Completion, engineer will proceed with completion inspection.
5. Any unfinished work can be completed by Contractor.
6. Upon contractor providing a notice of completion of unfinished work, Engineer will proceed with another completion inspection to verify all work completed.
7. Upon contractor's completion of all work, the engineer will provide a written Certificate of Substantial Completion to contractor.
8. The contractor will close the permit with the Certificate of Substantial Completion.
9. Any remaining punch list type items or claims can be completed or financially settled with an agreed amount of retainage deduction by a written agreement signed by both owner and contractor.

H. Final Completion

Contractor will provide a written Notice of Final Completion.

1. Engineer will proceed with Final inspection. Engineer will inspect or verify any unfinished punch list type work, correction or clean up items or damage claims.
2. Engineer will provide a report of any unfinished punch list type work, correction or clean up items or damage claims.
3. Contractor will complete, correct, cleanup or settle any remaining items. Remaining items or claims can be financially settled with an agreed amount of retainage deduction by owner and contractor.
4. The contractor is responsible to obtain and provide to the engineer a written Notice From Owner, or other reasonable form or correspondence from the owner, that all clean up type work is completed with no claims, or that all claims are settled and the settlement amount to be deducted from the final retainage invoice, and/or there are no un-resolved issues.
5. The contractor must provide proof to the engineer that all permits are closed.
6. The contractor is required to provide a list of all subcontractors and suppliers that may have a Right to Lien in accord with FL statute 713.165.
7. The contractor must provide an Affidavit of "Statement of Account" from all subcontractors and suppliers that have a Right to Lien or who have filed a "Notice of Right to Lien" for the project, in accord with FL statue 713.16. The owner is required to provide a list of the "Lienors" to the contractor and engineer. All of the "Statements of Account" must show paid in full.
8. Include all required documents with Final Application for Payment for Retainage.
9. In Summary, the Engineer will only approve the final retainage invoice after receiving:
    a. Proof of Closed Permit.
    b. Written statement from owner with no un-resolved issues.
    c. Affidavit of "Statement of Account" from all subcontractors and suppliers showing paid in full.
    d. Current, dated Final Retainage Invoice with no errors.
10. After all requirements completed, Engineer will approve the final retainage invoice and provide a Certificate of Final Completion.

I. Project Scope of Work

1. The contractor is required to know the Scope of Work. The contractor will control the locations where work occurs and will only start new work in areas authorized by the building owner in accordance with the contract details and any change orders.

2. The contractor is required to keep the engineer informed about work locations. Work not authorized by the contract or change orders cannot be approved by the engineer.
3. Contractor has responsibility for field measurements and verification of existing dimensions. Quantities and/or dimensions in the specifications are estimates only. Quantities for unit price items will be based on actual measurements verified and approved by the engineer.
4. All incidental work required to accomplish the work items is intended to be included in the specific contract unit price items.

J. Change Orders
1. Any item not listed in the pricing schedule but included in the specifications is intended to be included at no extra cost. All anticipated work needed to complete the Scope of Work shall be included based on the pricing schedule items.
2. Contractor shall have the opportunity to provide a proposed Change Order with pricing for any proposed work that is NOT in the scope of work, either requested by the owners, or offered by the contractor.
3. Contractor shall have the opportunity to provide a proposed Change Order with pricing for any UNANTICIPATED work discovered that is absolutely required to be completed to ensure structural safety or is otherwise in the critical path for project completion.
4. Contractor is required to provide an explanation in the proposed change order document that explains who is requesting the work, why the work is needed, and/or why the work was not anticipated.
5. Contractor is required to include either a lump sum, or an estimated total value if there is unit pricing, for any proposed change orders.
6. Work should only be performed AFTER the proposed Change Order is signed by the owner. If work is performed without a signed CO, the contractor is at risk of not getting paid for the work.
7. Owners are not obligated to pay for work that is not included in the contract or a signed Change Order, or otherwise approved by the owner in writing.
8. **EXCEPTION: The engineer shall have authority to sign the change order for work determined by the engineer that is absolutely required to be completed to ensure structural safety or is in the critical path for project completion. The owner will be obligated to pay for such work completed.**

K. Project Schedule and Time Extensions
1. A written estimated project schedule or Gantt Chart should be provided by the contractor. Ideally it is attached to the contract as an Exhibit. The contractor shall update the estimated schedule during the work, at least monthly. Typically, schedule updates are provided at project coordination meetings.
2. Contractor's work must progress continuously by stack or floor according to the written estimated project schedule. The contractor will not move resources in use (scaffolding, manpower, etc.) to additional areas unless previous work in areas scheduled is substantially completed.
3. It is expected that different phases of work will be ongoing in multiple locations. It is expected that requests for engineer's inspections will be combined so that different phases of work can be inspected in the various work locations during each inspection.
4. Contractor is responsible for providing openings in access barriers or temporary barrier walls for engineering access to work areas for purposes of reinforced concrete repair inspections. If needed, the contractor is responsible for providing use of scaffolding for engineering inspections.
5. Contractor shall have the opportunity to provide a proposed Change Order for time extensions along with a revised estimated schedule.

6. Change Orders for time extensions should be approved for prorated increases in contract value based on repair quantity estimate increases or for TBD quantities determined.
7. Change Orders for time extensions for weather delays should be approved for delays beyond the contractor's control. Disputes regarding extension time and completion time shall be settled by the engineer.

L. Work Quantities and Contract Value

The quantity estimates in the original contract documents should be used by the contractor during the repair work as a guideline. However, the quantity of repairs will be what is actually required at the damaged area. Actual repair quantities required can only be determined after damaged areas are opened up.

For contracts with unit pricing, the contract value is likely to significantly increase because of hidden deterioration. The total amount of work performed and approved for payment may increase above the initial estimated quantities. The total contract value may increase as work is being done and be higher than the original estimated contract value.

The contractor should notify the owner in writing as soon as possible of any significant repair quantity increases that will likely cause greater than 30% increase in total contract value.

Any forecasts of the final total estimated contract cost should be based on:

Forecast Final Value = contract value to date ÷ current estimated % complete

M. Cleaning and Safety During the Project

1. Contractor to provide protection at work areas, as required, during work to protect from dust and debris entering interior spaces. Provide protection such as blue tape, board, or plastic, as necessary, at all openings, including, but not limited to sliding glass doors, windows, and any vents or other openings that may allow dust or debris to enter living areas. Use reasonable care to prevent dust from entering living areas. Provide protection to adjoining property, as required and in accordance with code requirements.
2. At the end of each workday, secure or store all equipment, machinery, materials, etc.
3. Maintain the material storage and work areas in a clean and safe condition and remove from the site, on a daily basis, flammable cloths and discarded materials that could support combustion and, at least weekly, remove empty containers, boxes and bags. All concrete debris and rubbish must be placed in approved dumpsters on a daily basis and dumpsters emptied as required on a regular basis.
4. Keep approved fire extinguishers on hand for quick access, as required in Section 3309 of the Florida Building Code.
5. Ensure compliance with all safety requirements, as required by law, such as use of safety harnesses, hard hats, and other equipment and procedures, as required.
6. Electrical conduit, boxes, outlets and other electrical fixtures in close proximity to areas of concrete excavations are to be inspected by a qualified electrician for proper grounding, condition of wiring, and for the general safety of workers in the vicinity. All excavation work near electrical fixtures should proceed slowly until the condition of the electrical circuits is determined.
7. On site portable sanitary facilities are required and should be located as directed by the owner and maintained on a weekly basis.

N. Electric Power

Unless otherwise provided for in the contract documents, the Association is responsible for the cost of electric power for the project. The Association is also responsible for providing a reasonable access point to the buildings power supply. The contractor is responsible for coordinating the hook up to the provided power supply. If an electrician is required for any

temporary connections or modifications, the contractor is responsible for coordinating the work, and the Association is responsible for the cost. Any disputes shall be settled by the engineer.

O. Cleaning and Restoration of Property at Project End
   1. Promptly remove all debris, materials, equipment, etc., from the site and leave the premises of the buildings, driveways, and deck areas clean. Clean surface areas of excess epoxy, cementitious materials, bonding agent, coatings, sealants, etc.
   2. Remove excess materials and debris from job site. Leave areas in as clean a condition as when first arrived at job site.
   3. Reinstall all exterior-building components removed or adjusted to providing access for doing concrete repairs. The reinstallation shall be done using the materials and workmanship that would be expected for a new installation, taking into consideration any installation difficulties caused by existing defects or changes in the building. Any reinstallation problems must be brought to the attention of the engineer.
   4. Replace or repair any assets or property damaged unreasonably during the work.
   5. Replace sod, bushes, plants or trees damaged during the work beyond their ability to grow back within reasonable time frames and conditions.
   6. The engineer shall determine any disputes regarding reasonableness of cleaning and restoration of property.

P. Responsibility for Protection of Work Areas
1. The contractor will be held responsible for securing and restricting resident access to work areas where is work being performed. The contractor will be held responsible for securing and restricting free access to interior apartment areas where work being performed requires opening of exterior walls, windows or doors. The contractor must notify the Owner in writing when and if any work areas cannot be safely secured.
2. The contractor will be held responsible for repairing damages due to concrete and coating splatter. Contractor must provide adequate covering for windows, doors, shutters, railing systems, steel columns, light fixtures, etc. during the work. Contractor is not authorized to paint over concrete and/or coating splatter on any existing surfaces (i.e.: aluminum railings, shutter, steel columns, etc.) without Owner's prior written approval.
3. The contractor will be held responsible for interior damages and unreasonable amounts of dust caused by carelessness or lack of protection while performing the work. The contractor will not be held responsible for removal of dust when using reasonable care and protection of the openings.
4. The contractor will not be held responsible for unavoidable other damages, including but not limited to exterior pavement, or landscaping.
5. Any question regarding contractor's responsibility for damages shall be determined by the engineer. The engineer shall determine any disputes regarding reasonableness of repairs.
6. The contractor has the right to perform the repair work for any damages that the contractor is held responsible for causing.
7. The contractor will be held responsible for damages caused by carelessness or lack of protection while performing work. Contractor must provide adequate protection for visible utilities, electric conduits, water piping, cable and phone lines, etc.
8. Contractor will not be held responsible for unavoidable damage that occurs during concrete excavations to hidden utilities located in concrete structures. Once discovered, contractor should limit additional utilities damages as best as possible.
9. The contractor has the obligation to verify all utilities are properly repaired before final completion for any damages that the contractor is not held responsible for causing. The contractor is encouraged to provide repair services for any damages that the contractor is not held responsible for causing (at contract pricing or with a change order).

Q. Warranties

1. A performance bond will be required, unless deleted from or not included in the contract documents.
2. Provide the owner with a contractor's warranty on installation and workmanship for at least (5) five years from the substantial completion date of the project. This warranty shall only apply to new materials placed or work performed and shall not apply to existing areas not repaired.
3. Provide the owner with a material manufacturers' warranties (if available) on the manufactured products used for at least (5) five years from the date of completion of the project. The material warranties shall only apply to material defects and coverage shall include material and labor costs for replacement of defective materials. Any disputes regarding warranty responsibility for defects shall be settled as determined and approved by the engineer. Letters of manufacturers' intent to warranty and copies of manufacturers' warranties must be provided by the contractor and should be attached to the construction contract. Manufacturers' warranties must be provided by the contractor at completion of all work and prior to final payment of retainage from the owners.
4. Shrinkage cracks are anticipated for new concrete and stucco placements in restoration work. The quantity of shrinkage cracks is partially dependent on the quality of the damp curing and early protection from the wind and sunlight. For a period of not less than (1) one year from the date of completion of the project, gravity feed or epoxy injection repair of shrinkage cracks for repaired areas shall be provided at no extra cost to the owners. The cost for the repair of shrinkage cracks should be built into and included with the contract cost of the new concrete or stucco. Epoxy injection repairs at no cost shall only apply to the epoxy injection work and shall not include costs for removal of accessories, repair of coatings, or touch up painting of epoxy injected areas.

Donald Chalaire, PE, SI
FL Reg PE 33089, SI 1126

SITE PLAN &

ORIGINAL CONSTRUCTION

DRAWINGS

(TYPICAL)

HERITAGE VILLAGE

Burg & DiVosta

A Planned Residential Unit Development at
The Villages of Palm Beach Lakes

MASTER SITE PLAN

Prepared by:
gbv architects, landscape architects, planners, inc.

scale 1" = 50'

north

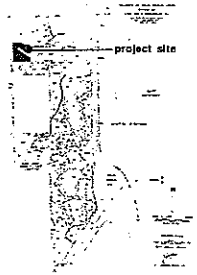
Site Data

Total Site Area	36.4 ac
Total Dwelling Units	300
Density	8.24 D.U./ac
Bldg. Lot Coverage	8.69 ac 24%
Drives, Parking & Sidewalks	9.83 ac 27%
Open Space	19.88 ac 49%
Parking Required (2.0/unit)	600 spaces
Parking Provided (2.5/unit)	757 spaces
Handicap	26 spaces

Legend

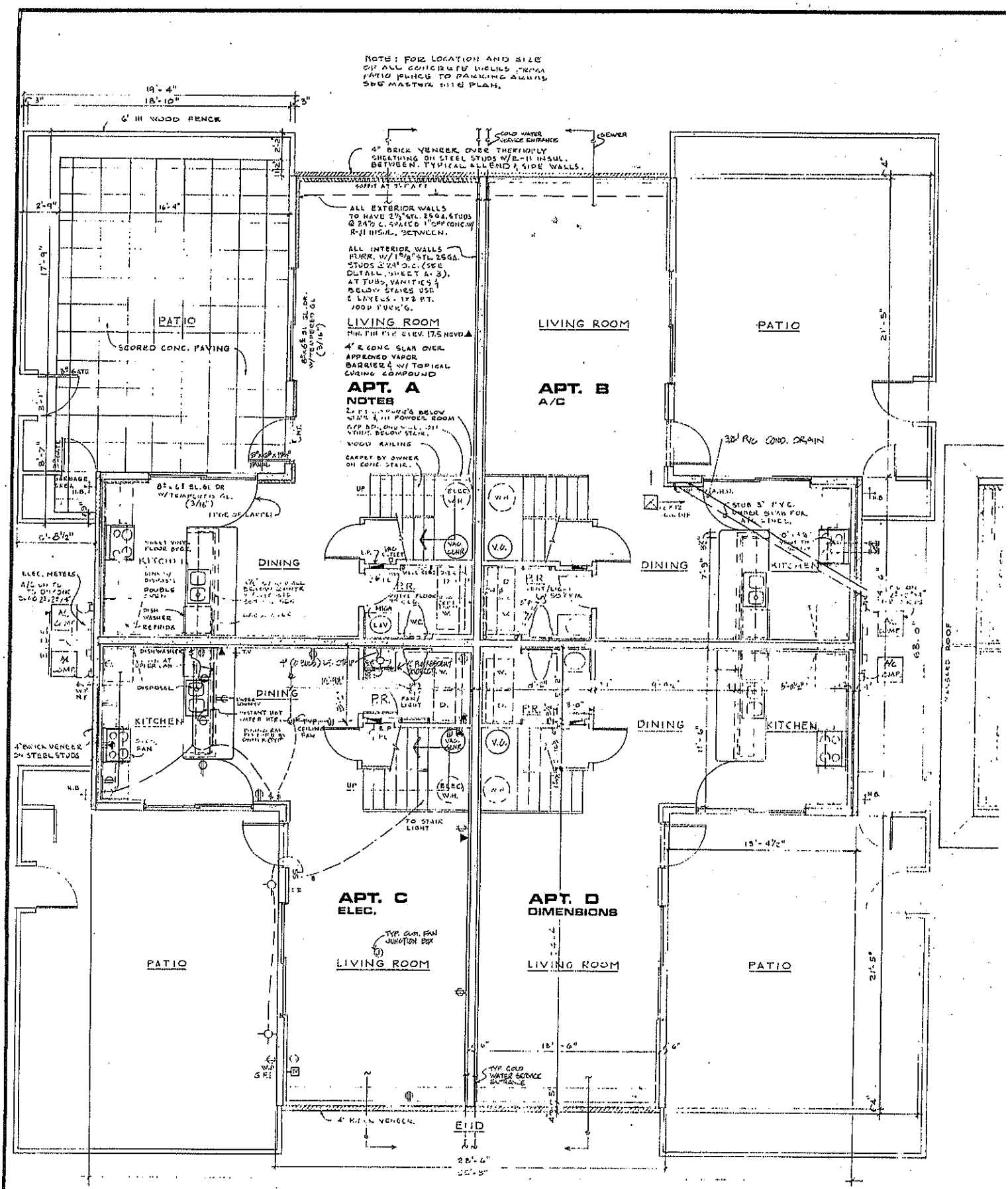
Mailbox
Trash Collection

Location Map

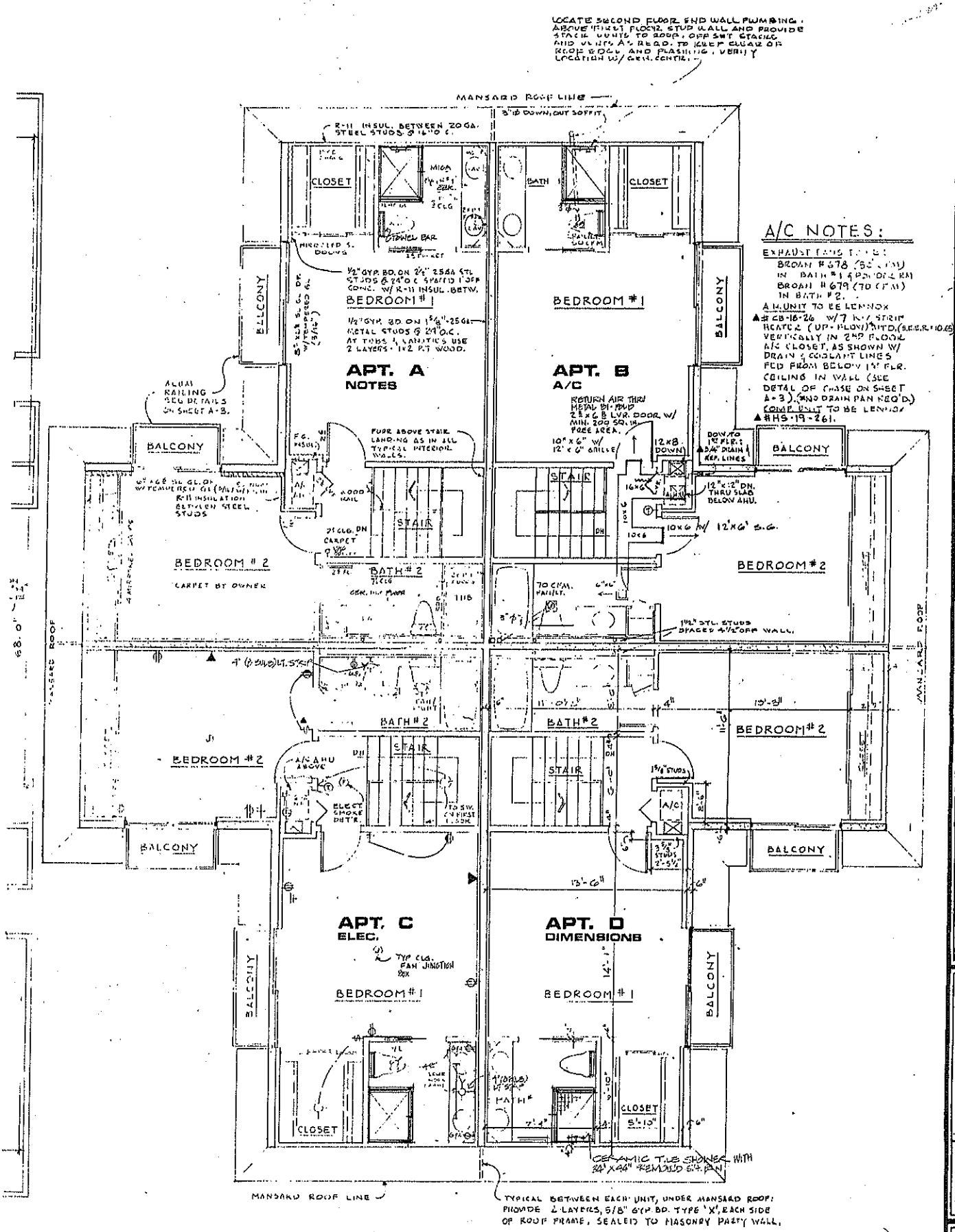


September 2, 1985

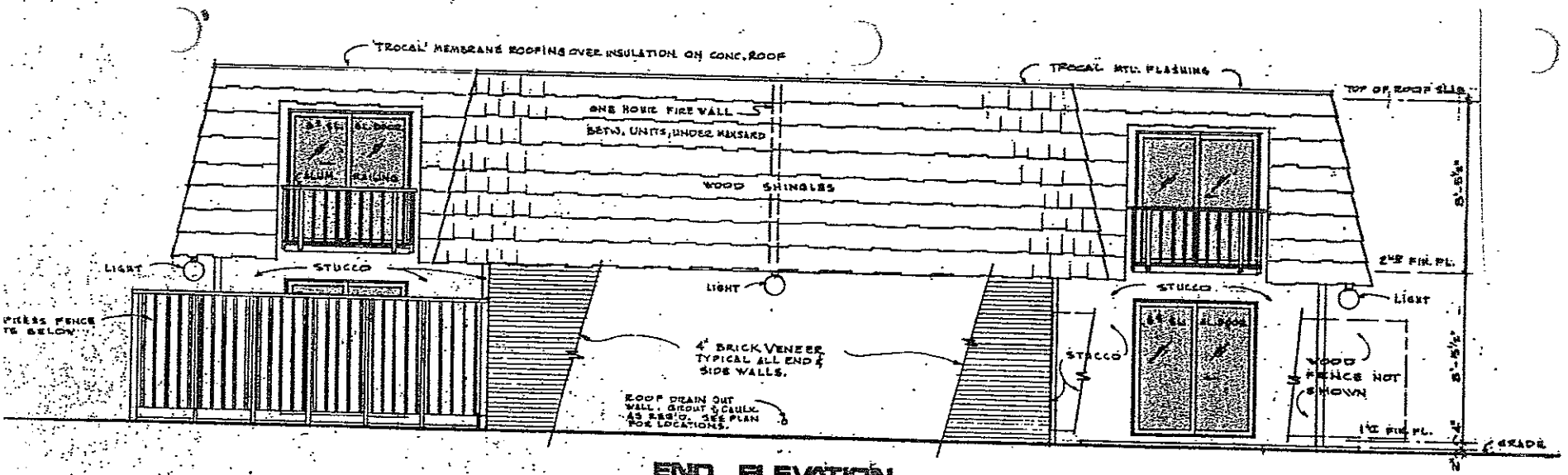
SITE PLAN/BUILDING NUMBERS



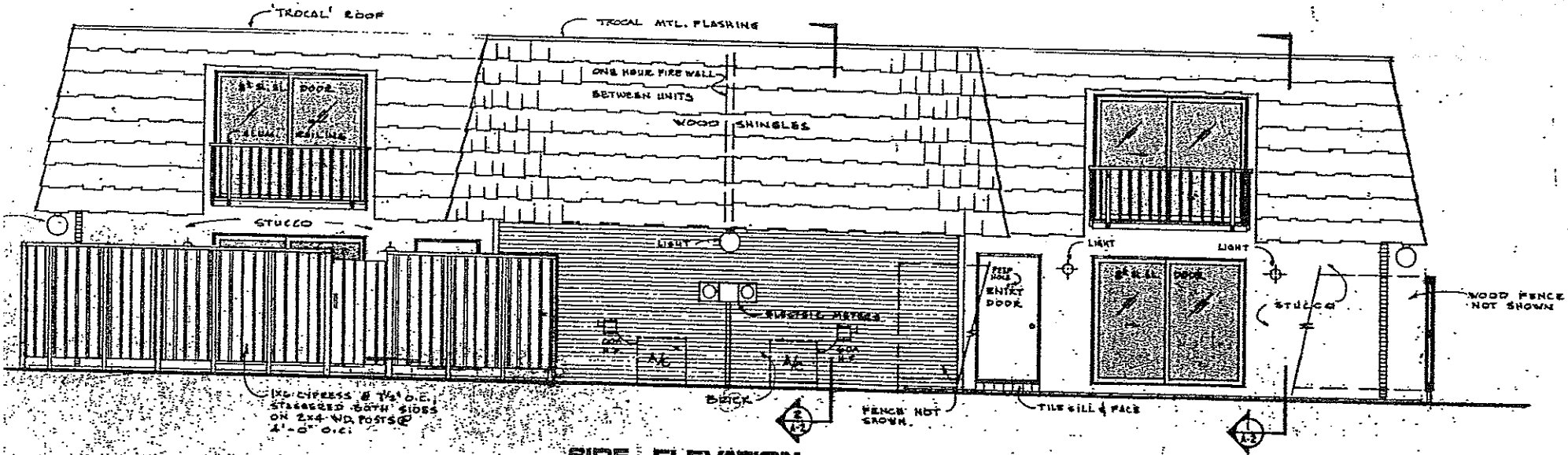
FIRST FLOOR PLAN – TYPICAL



SECOND FLOOR PLAN – TYPICAL

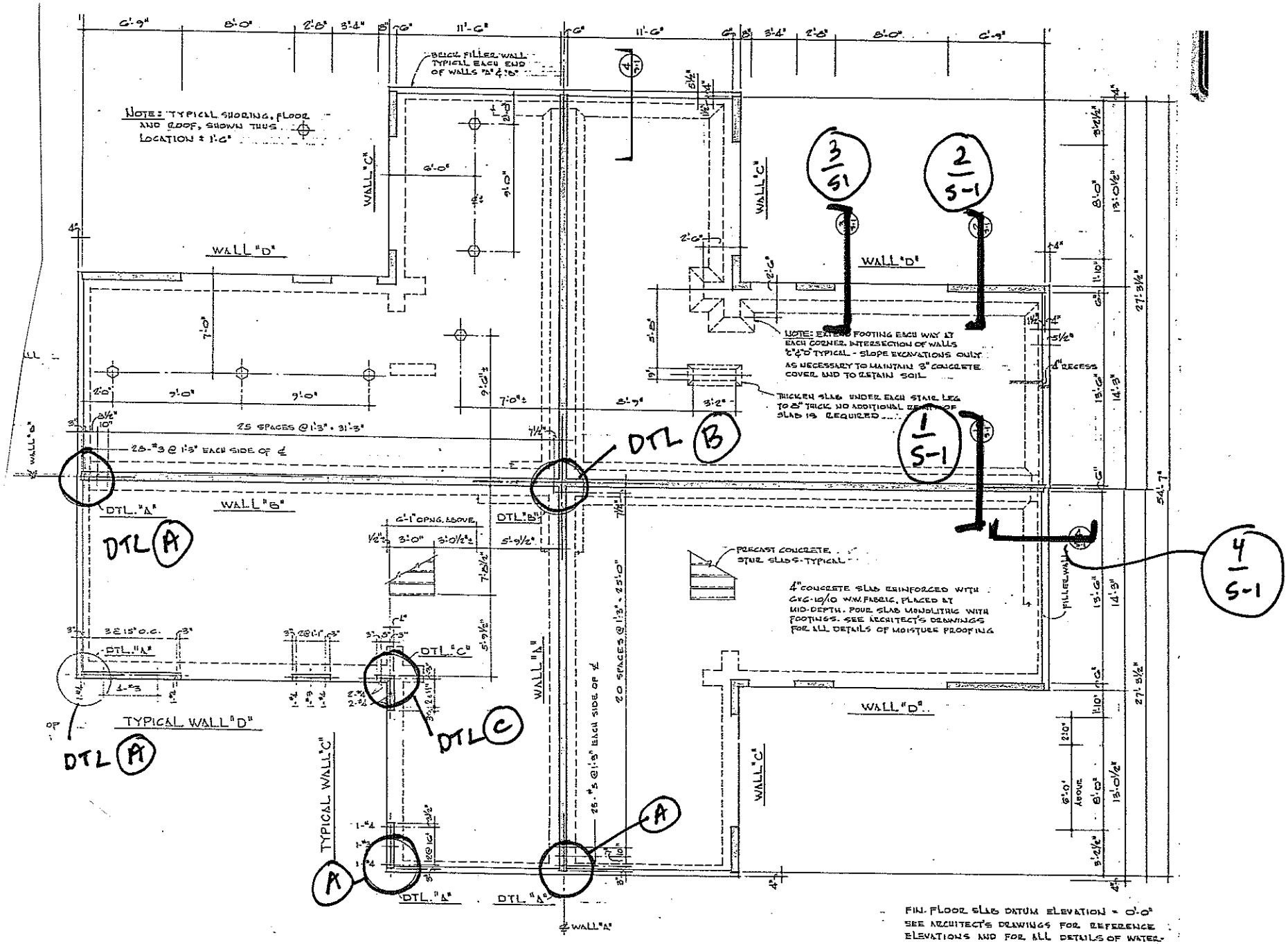


END ELEVATION
SCALE : 1/4" = 1'-0"
OPPOSITE END SIMILAR

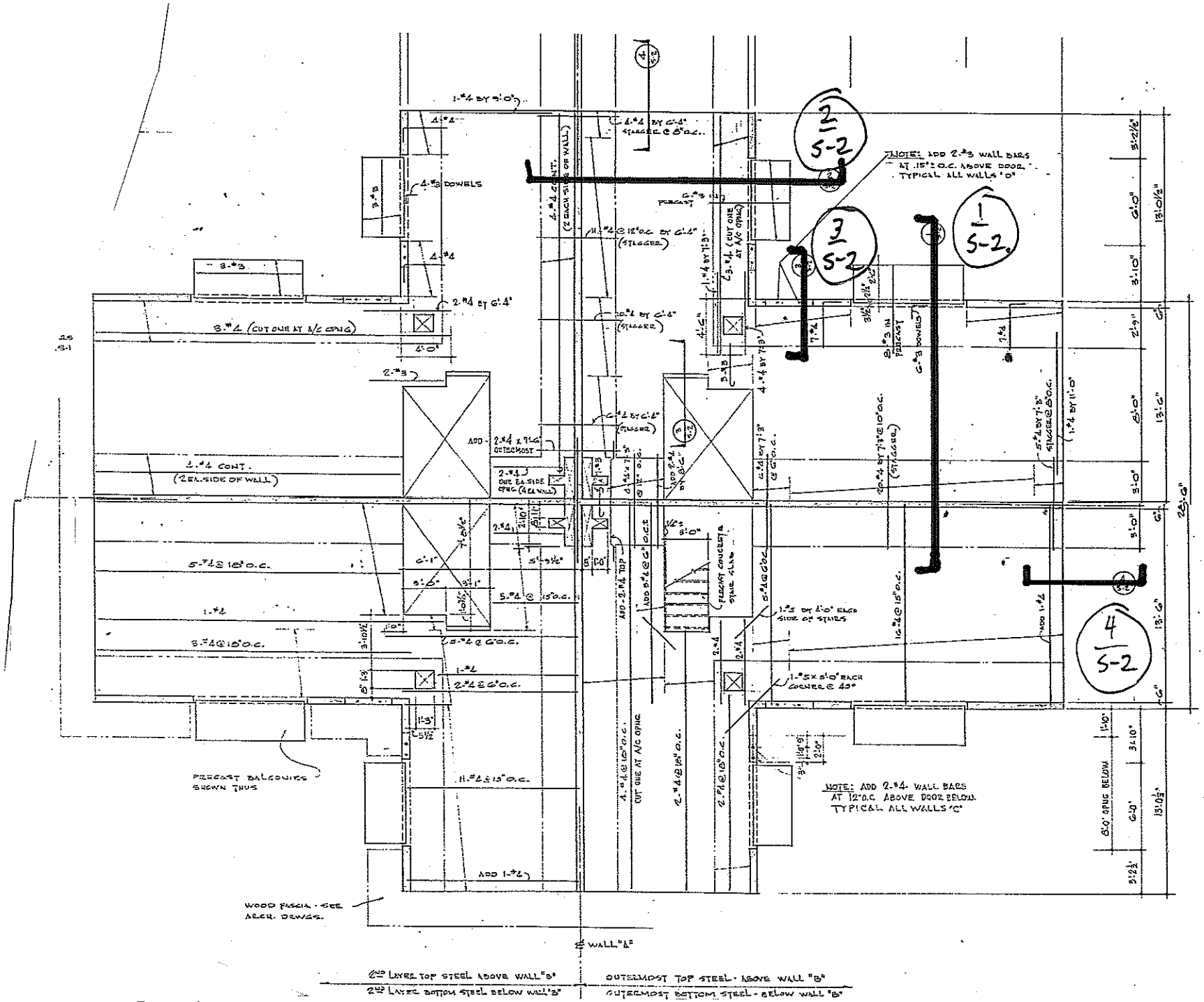


SIDE ELEVATION
SCALE : 1/4" = 1'-0"
OPPOSITE SIDE SIMILAR

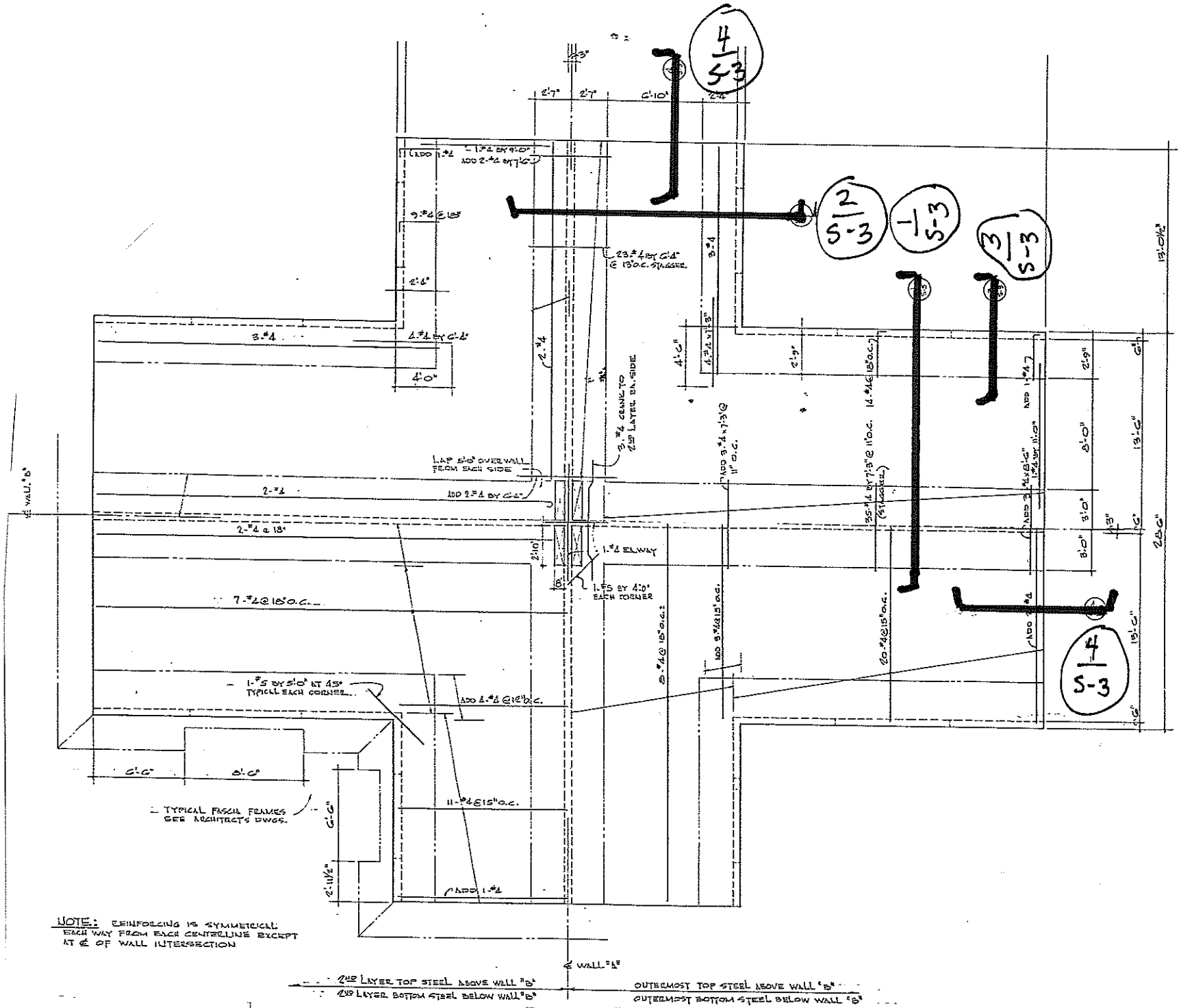
ELEVATIONS – TYPICAL



FIRST FLOOR FRAMING PLAN – TYPICAL

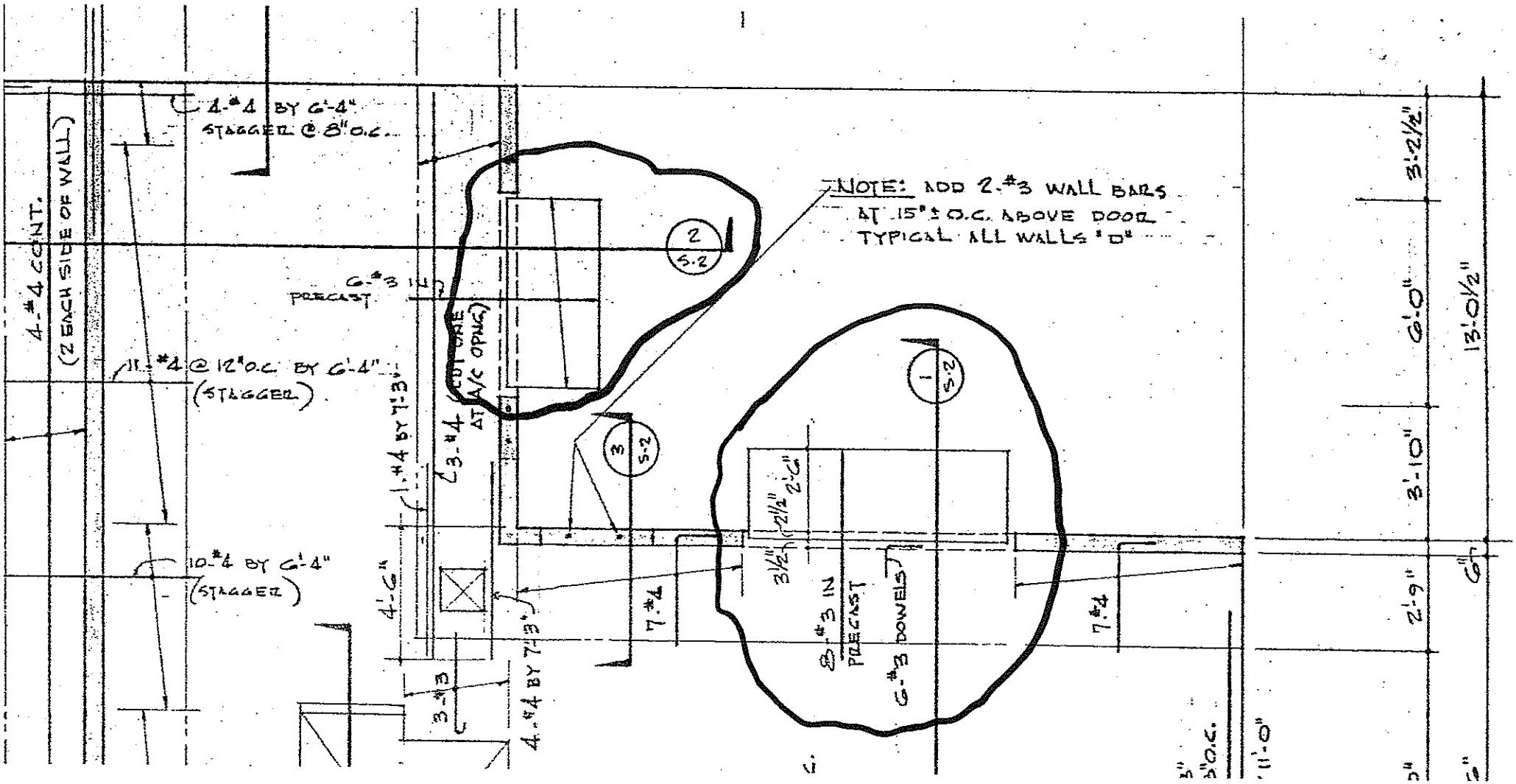


SECOND FLOOR FRAMING PLAN – TYPICAL

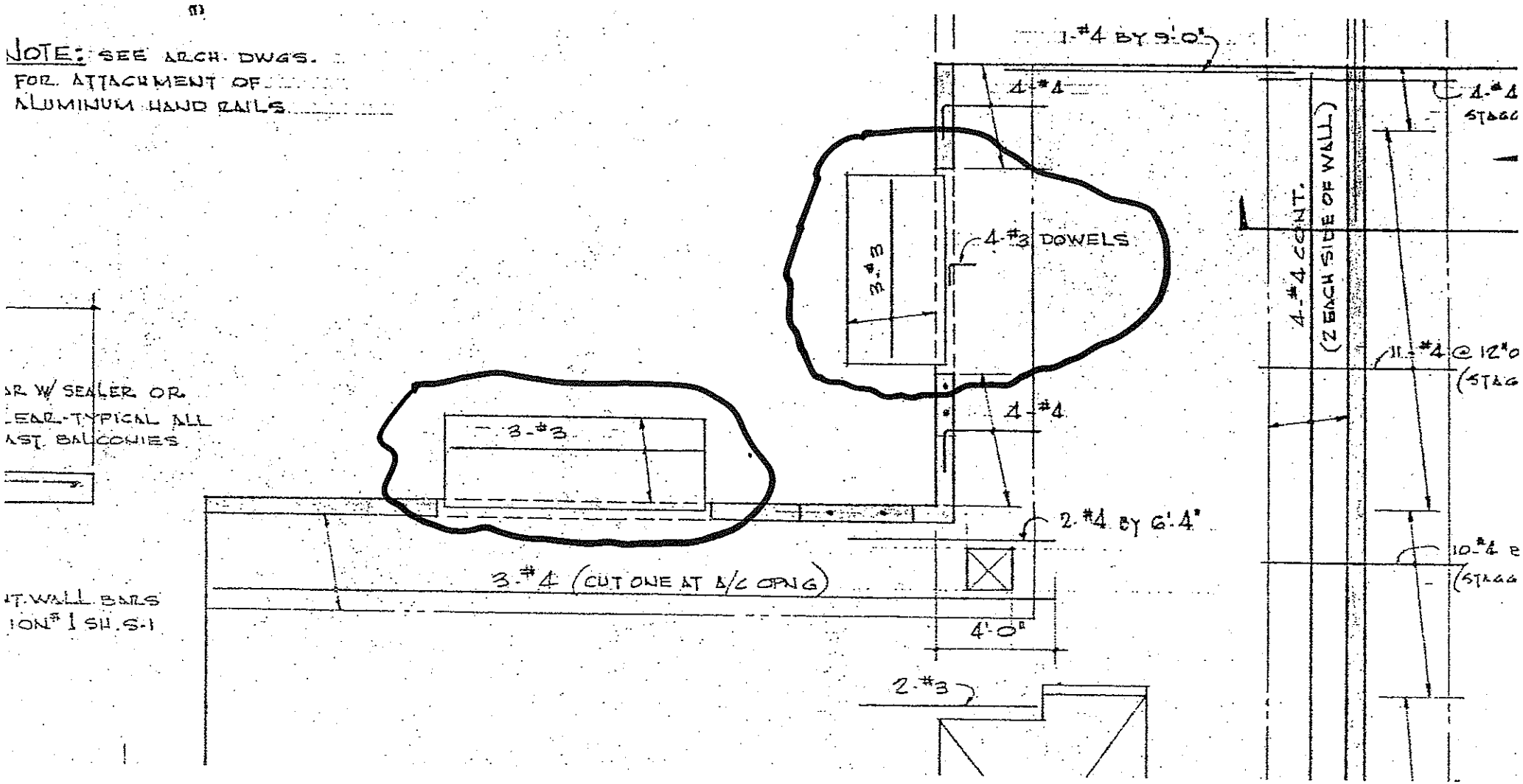


ROOF FRAMING PLAN – TYPICAL

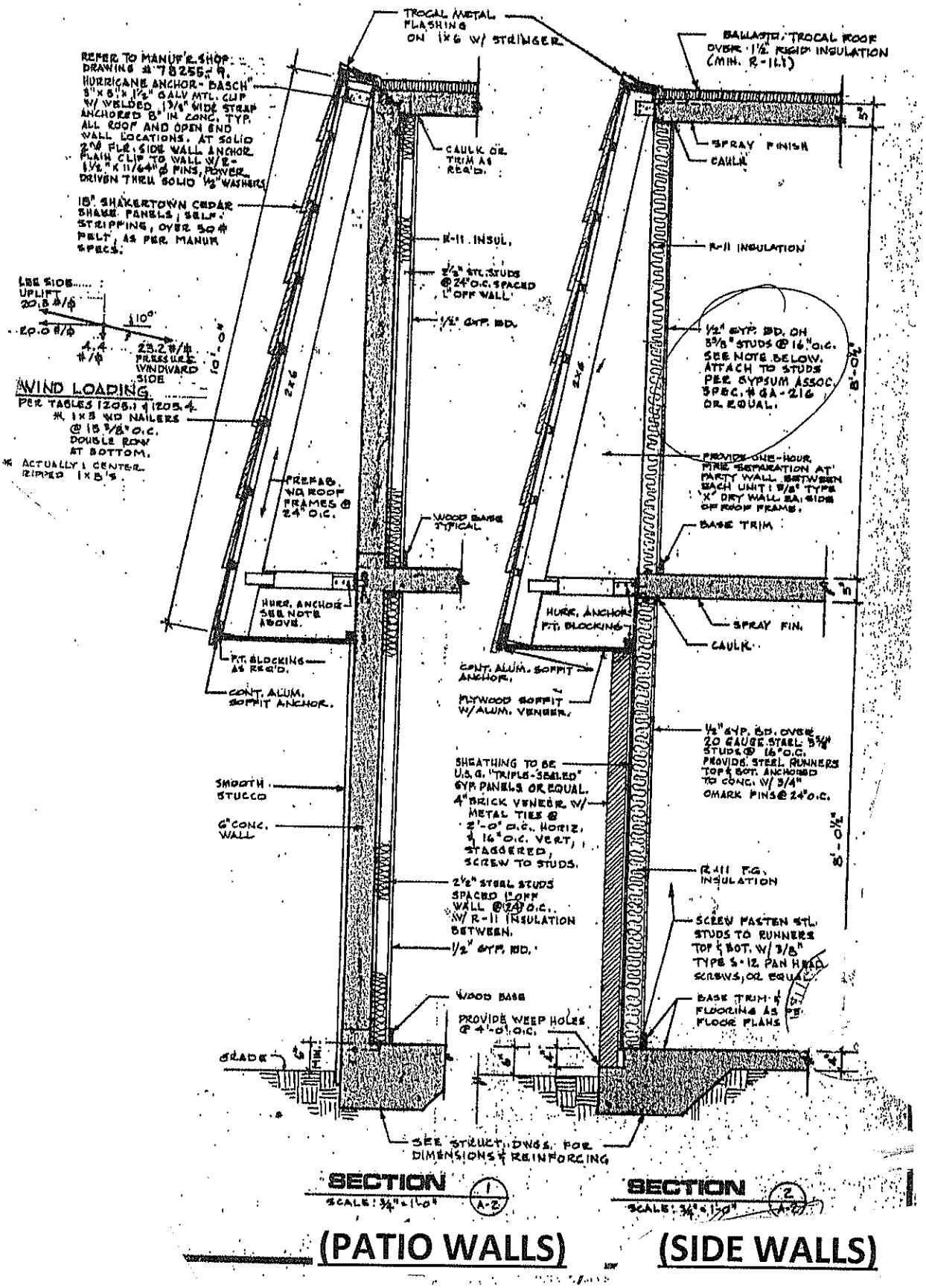
HERITAGE VILLAGE



BALCONY PLAN – DETAIL

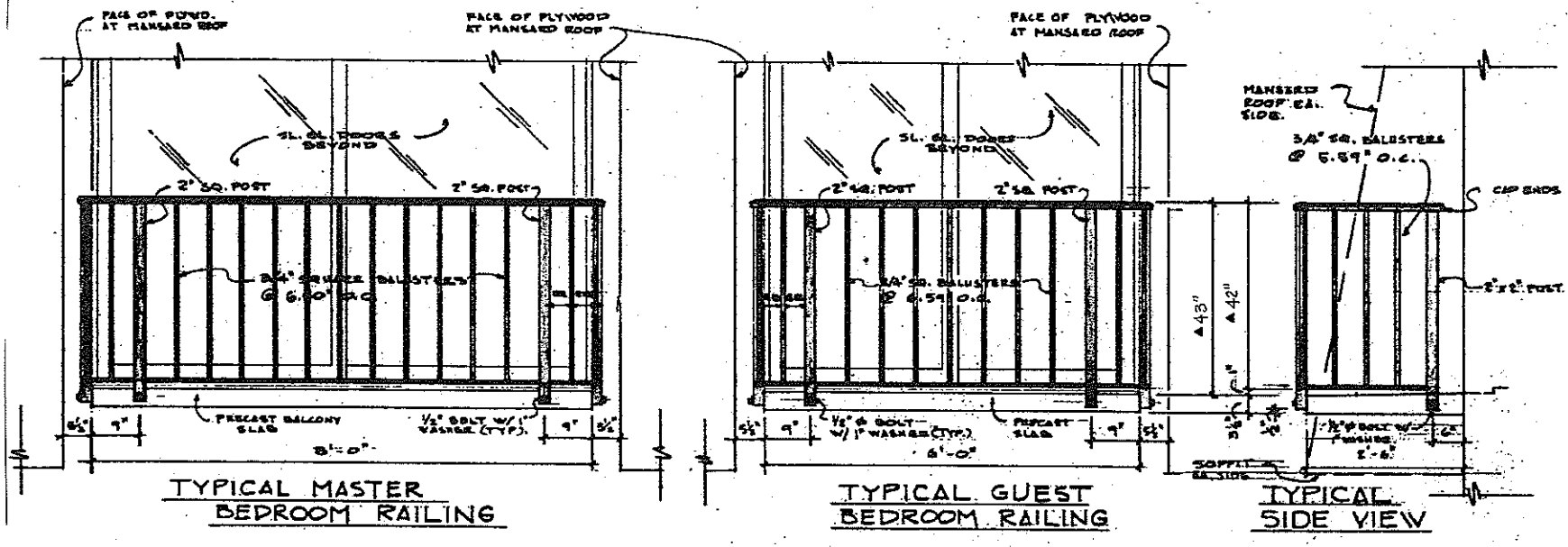


BALCONY PLAN – DETAIL

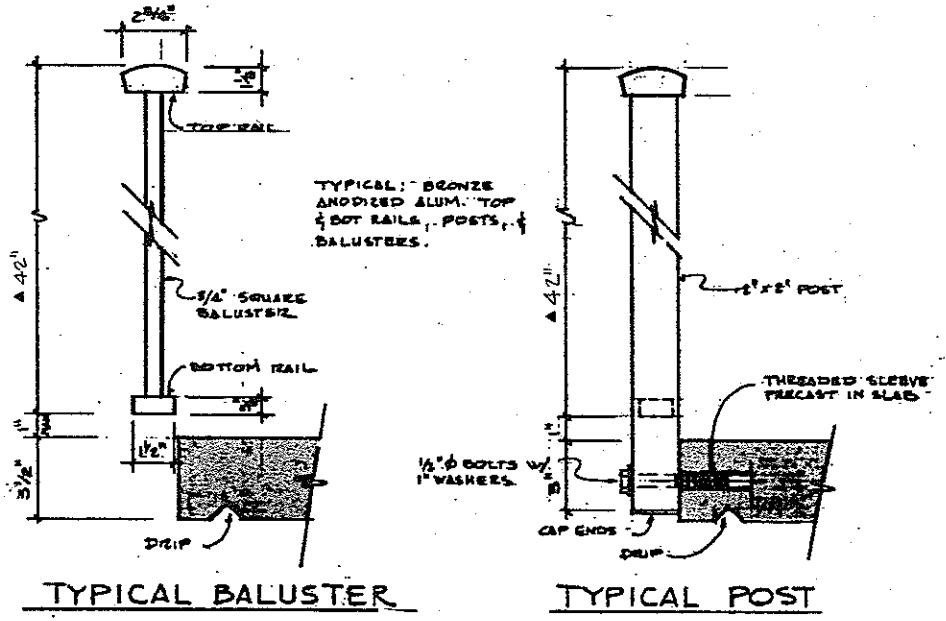


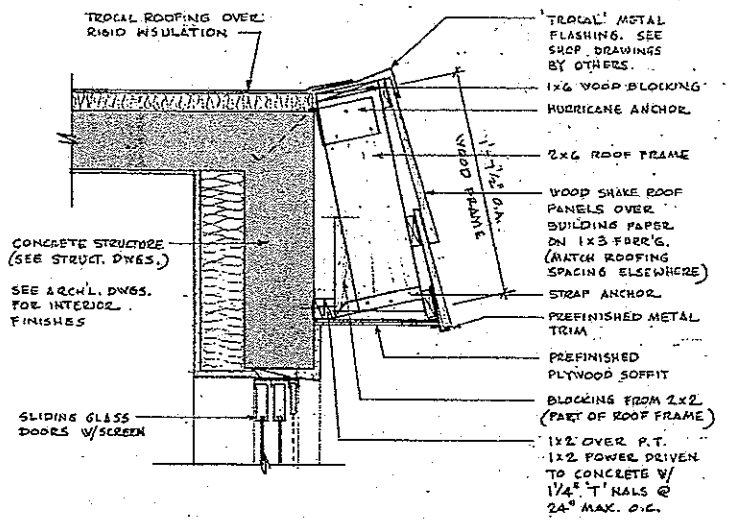
(PATIO WALLS) **(SIDE WALLS)**

WALL SECTIONS – TYPICAL



BALCONY RAILING ELEVATIONS 3/4" = 1'-0"



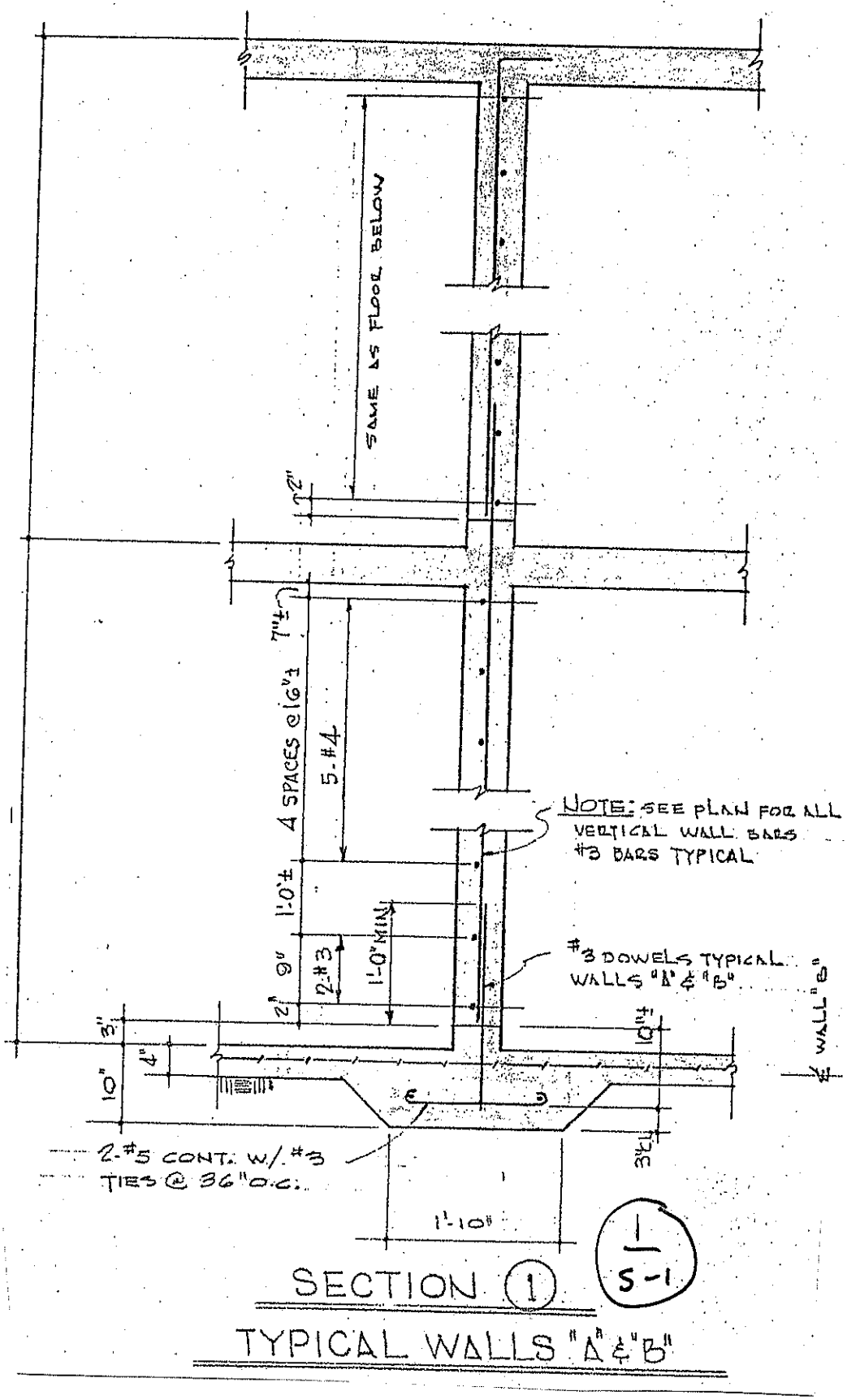


▲DETAIL: ROOFING AT 2ND FLOOR SLIDING DOORS

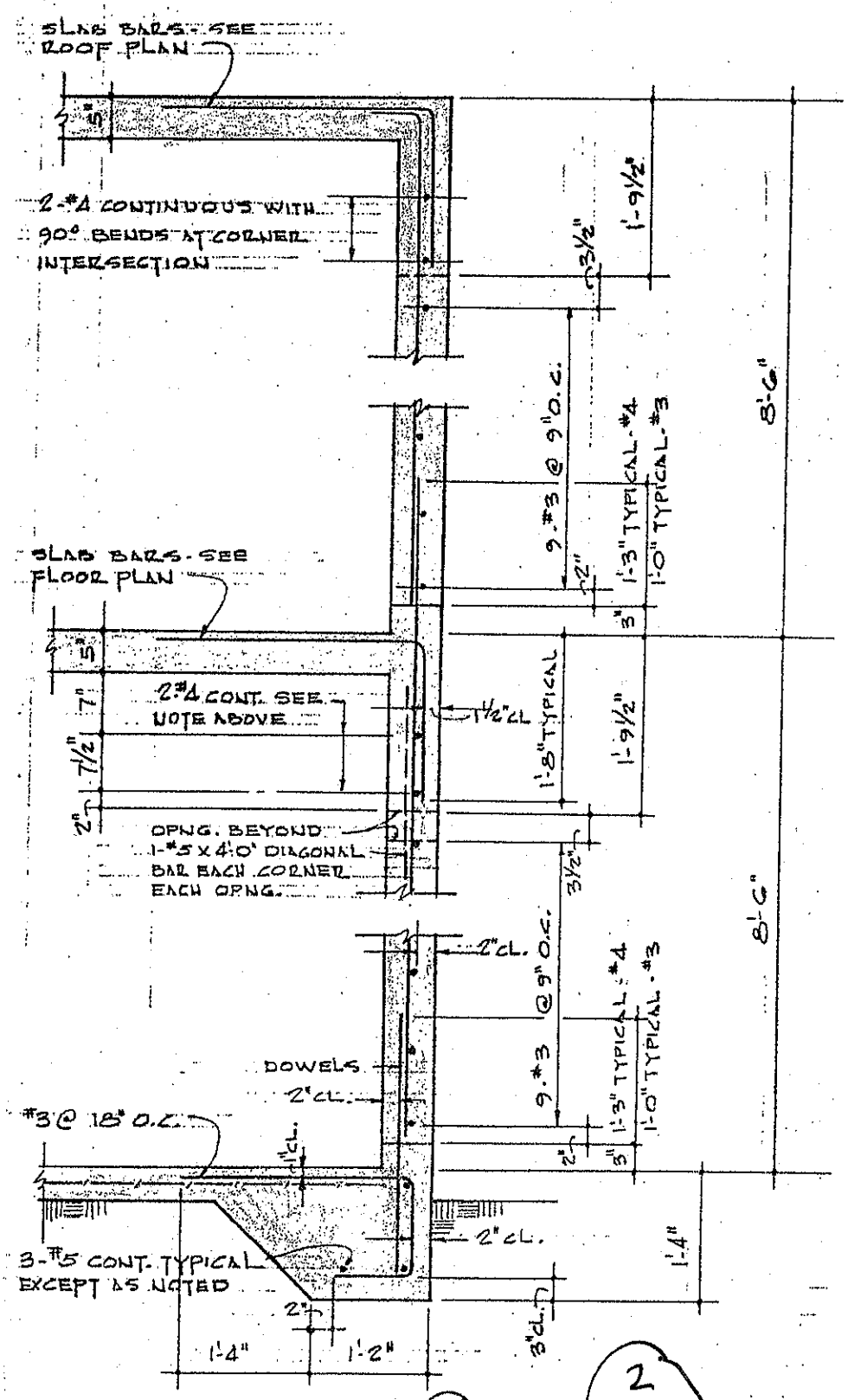
SCALE: 1½" = 1'-0" CF.G.

RAILING

RAILING DETAILS



WALL SECTION – 1

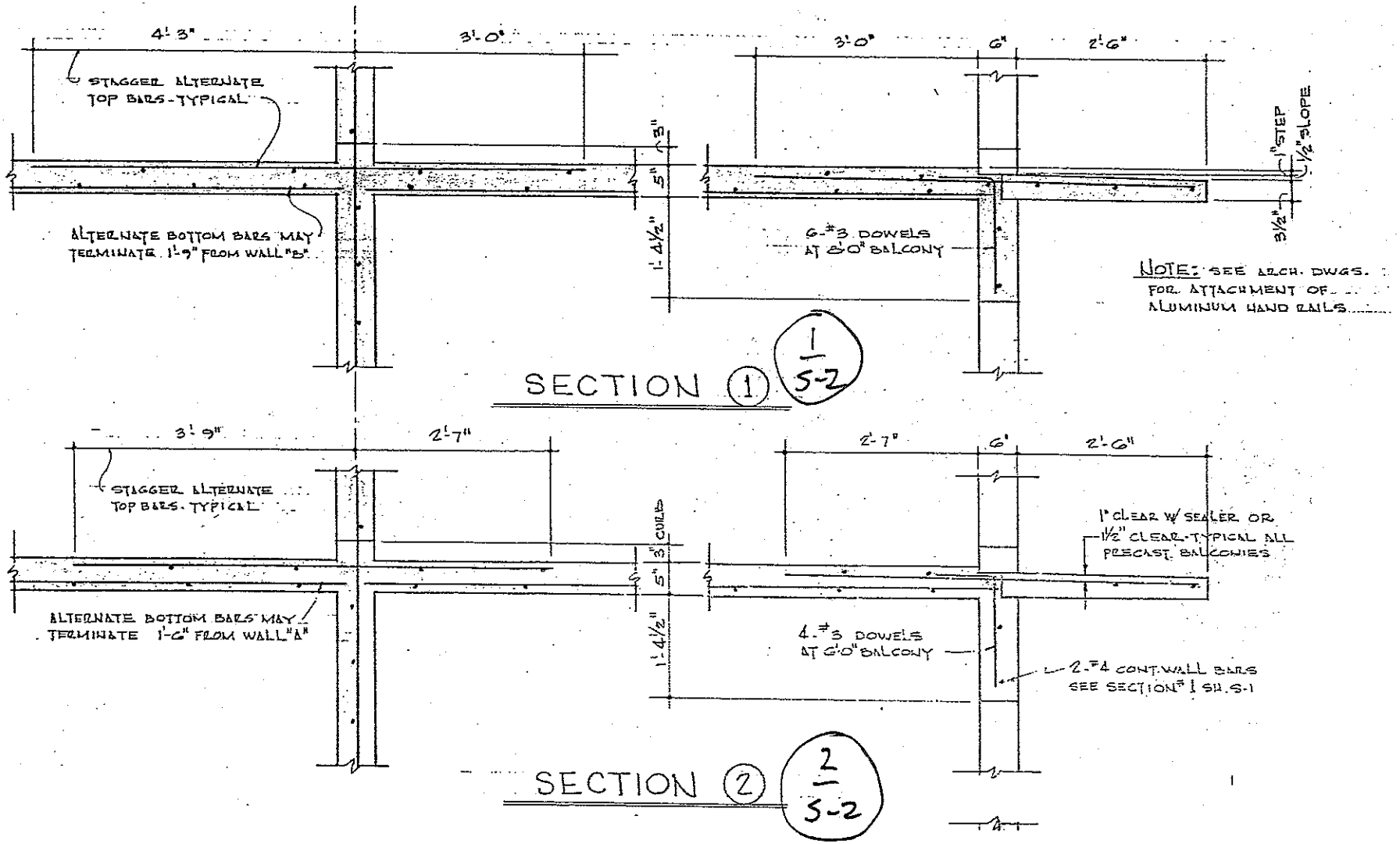


SECTION (2)

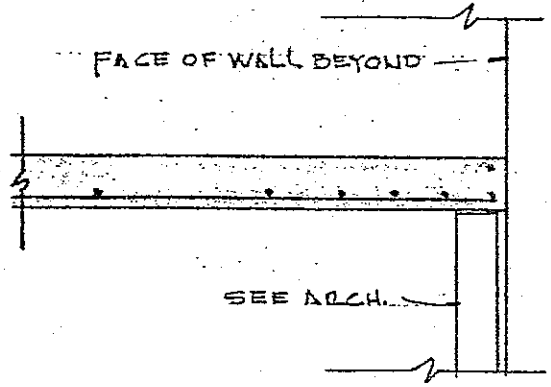
TYPICAL WALLS "C" & "D"

S-1

WALL SECTION – 2


4'-3"
3'-0"
3'-0"
6"
2'-6"
STAGGER ALTERNATE TOP BARS - TYPICAL
ALTERNATE BOTTOM BARS MAY TERMINATE 1'-9" FROM WALL "B"
3"
5"
1'-4½"
6-#3 DOWELS AT 6'-0" BALCONY
1" STEP
½" SLOPE
3½"
NOTE: SEE ARCH. DWGS. FOR ATTACHMENT OF ALUMINUM HAND RAILS
SECTION (1) 1/S-2
3'-9"
2'-7"
2'-7"
6"
2'-6"
STAGGER ALTERNATE TOP BARS - TYPICAL
ALTERNATE BOTTOM BARS MAY TERMINATE 1'-6" FROM WALL "A"
3" CURB
5"
1'-4½"
4-#3 DOWELS AT 6'-0" BALCONY
1" CLEAR W/ SEALER OR 1½" CLEAR - TYPICAL ALL PRECAST BALCONIES
2-#4 CONT. WALL BARS SEE SECTION #1 SH. S-1
SECTION (2) 2/S-2

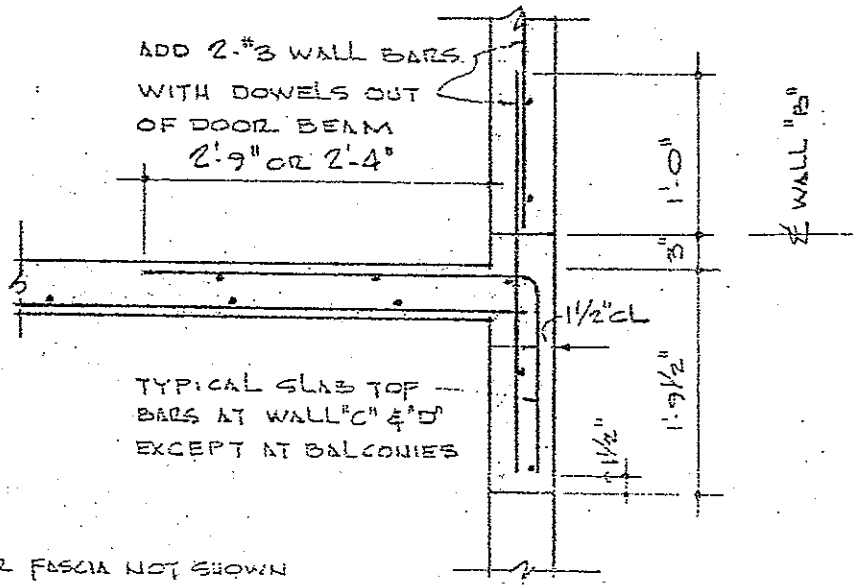
SECTIONS



NOTE: SECTION ALONG WALL "A" IS SHOWN. WALL "B" IS SIMILAR.

4/5-2

SECTION (4)

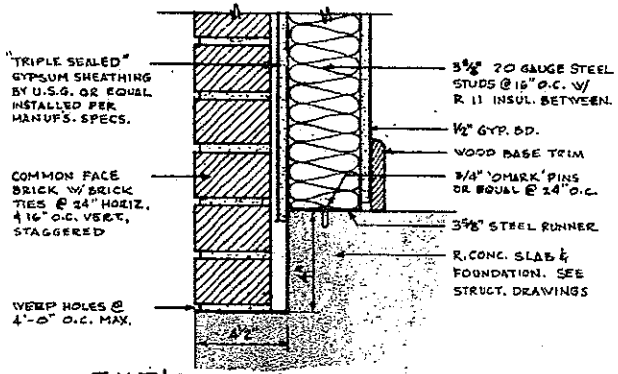


NOTE: 2ND FLOOR FASCIA NOT SHOWN SECTIONS #3 & #4 SEE SH. S-3

SECTION (3)

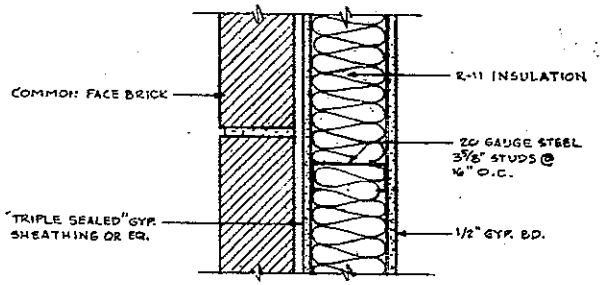
3/5-2

SCALE: 3/4" = 1'-0"



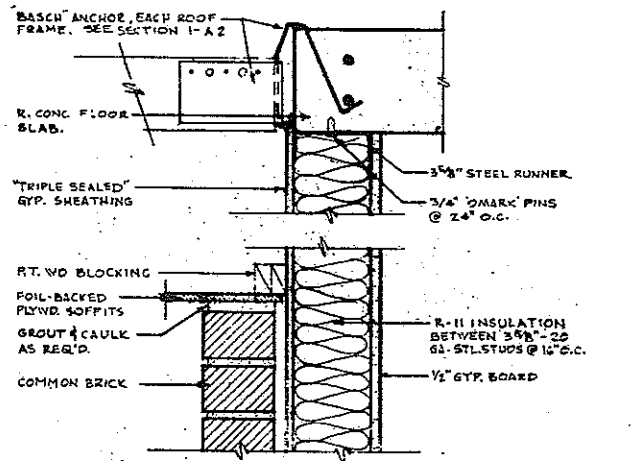
EXT'R. STUD WALL - SILL

SCALE: 3" = 1'-0"



EXT'R STUD WALL - DETAIL

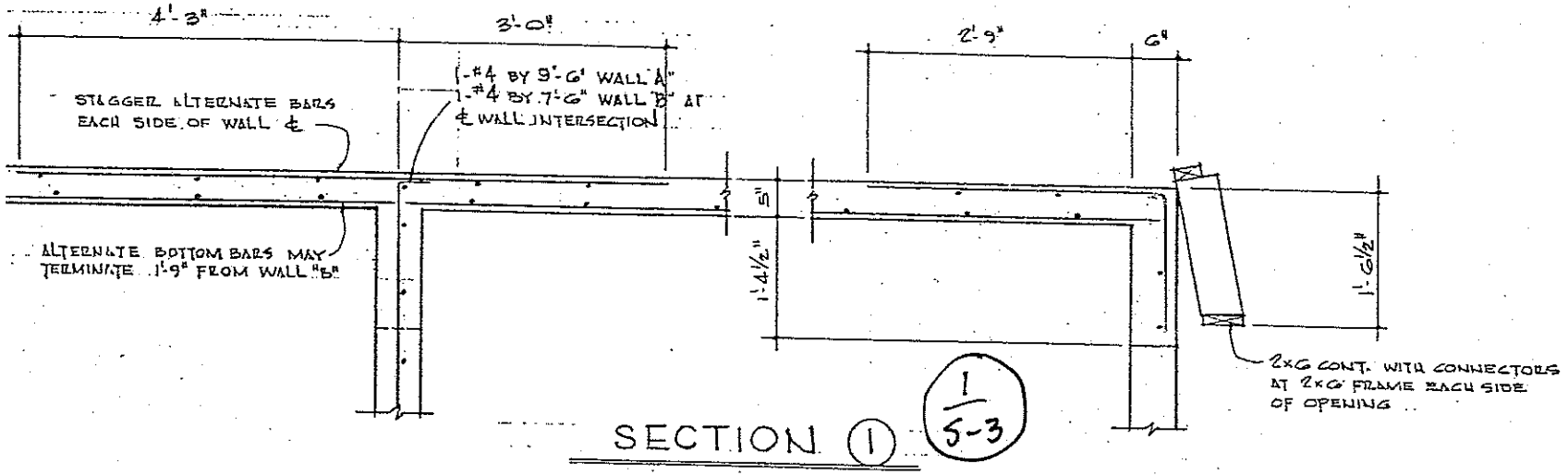
SCALE: 3" = 1'-0"



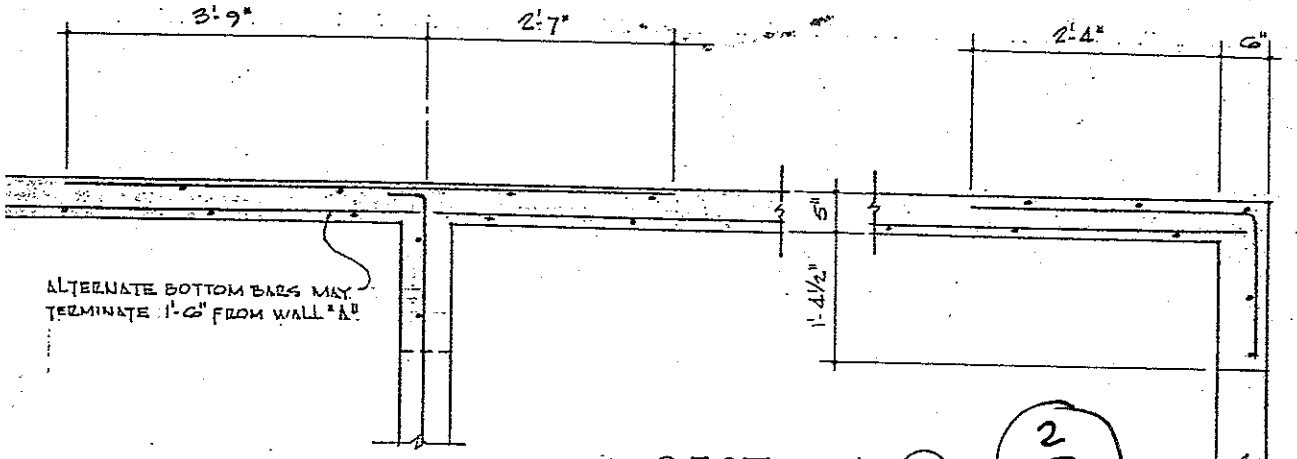
EXT'R STUD WALL - SOFFIT & HEAD

SCALE: 3" = 1'-0"

SECTIONS & DETAILS



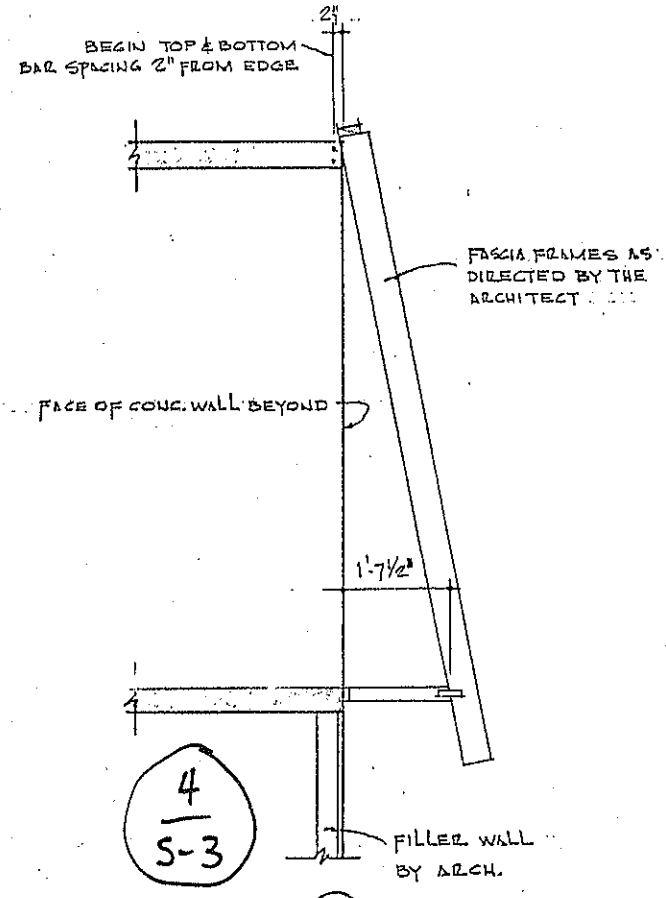
SECTION (1) 1/5-3



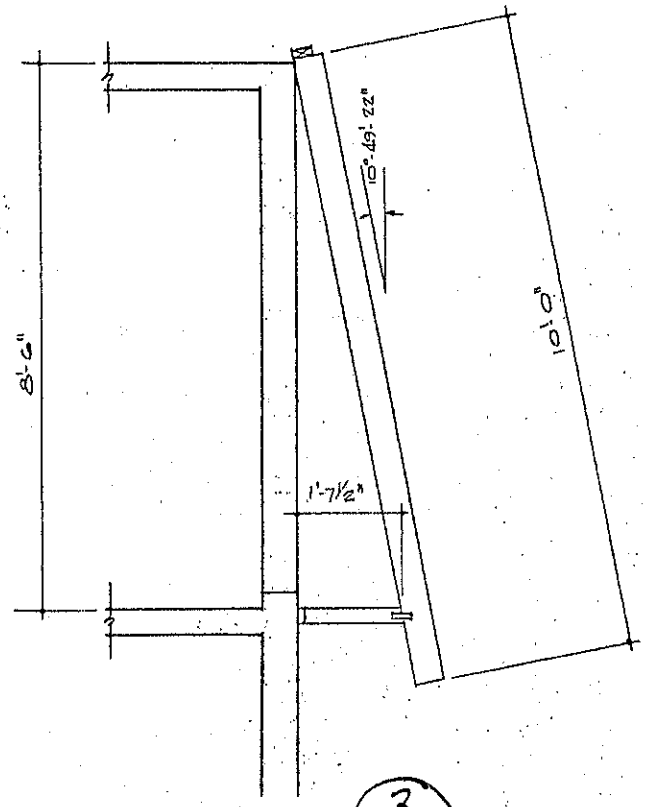
SECTION (2) 2/5-3

SCALE: 3/4"=1'-0"

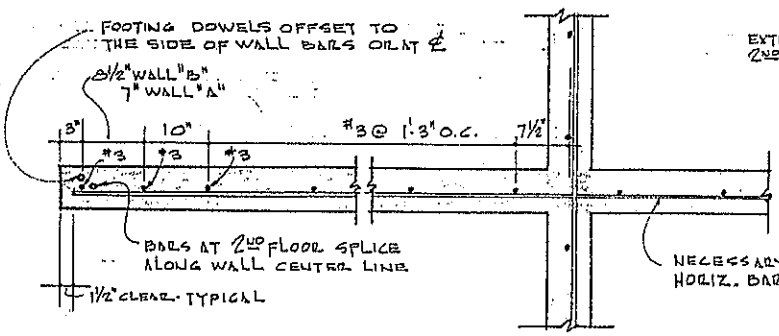
SECTIONS



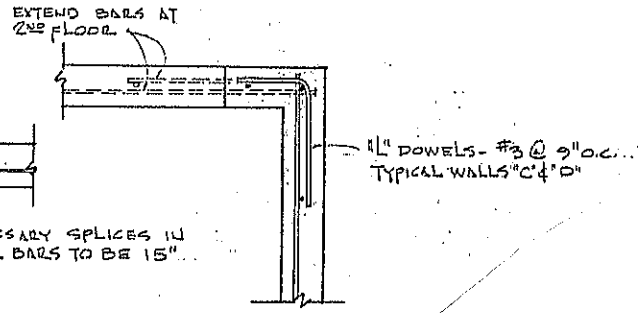
SECTION (4)



SECTION (3)

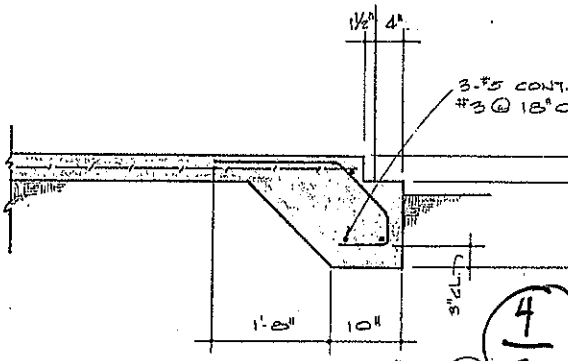


DETAIL (A)-S-1



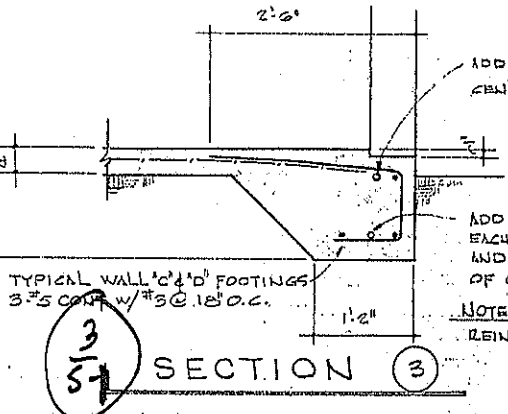
DETAIL (B)-S-1

DETAIL (C)-S-1



SECTION (4)

TYPICAL FILLER WALL FOOTING

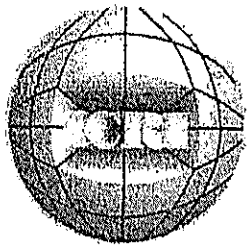


SECTION (3)

SCALE: ¾" = 1'-0"

SECTIONS & DETAILS

REPAIR DRAWINGS



TECHNICAL GUIDELINES

Prepared by the International Concrete Repair Institute December 2008

Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion

Guideline No. 310.1R–2008 (formerly No. 03730)

International Concrete Repair Institute
3166 S. River Road, Suite 132, Des Plaines, IL 60018
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Web site: www.icri.org
E-mail: info@icri.org

Contents

1.0 Introduction

This guideline provides owners, design professionals, contractors, and other interested parties with a recommended practice for the removal of deteriorated concrete caused by the corrosion of reinforcing steel, including the preparation of the removal cavity to provide a clean sound surface to bond a repair material.

This guideline outlines removal geometry, configuration, removal process, edge preparation, reinforcement repair, surface preparation, and inspection prior to placing a repair material. An engineer should evaluate the impact of concrete removal on structural capacity prior to performing concrete removal and repair. The repair methods involve saw cutting and concrete removal using impact tools, hydrodemolition, and other removal techniques. Special caution should be taken to locate and avoid cutting or damaging embedded reinforcing bars, prestressing strands, post-tensioning tendons, or electrical conduits. Cutting into these items can be life threatening and may significantly affect structural integrity.

This guideline also contains a discussion of concrete removal and preparation for the repair of columns where the concrete is in compression. Special consideration must be given to the repair of concrete in compression as the load-carrying capacity of the element may be permanently compromised during the concrete removal and preparation process.

While the procedures outlined herein have been used to successfully remove concrete and prepare the removal cavity on many projects, the requirements for each project will vary due to many different factors. Each project should be evaluated individually to ascertain the applicability of the procedures described herein. Refer to ACI 506R-05, "Guide to Shotcrete" for surface preparation prior to shotcrete application.

2.0 Definitions

Anodic ring effect: Corrosion process in which the steel reinforcement in the concrete surrounding a repaired area begins to corrode preferentially to the steel reinforcement in the newly repaired area (sometimes referred to as the halo effect).

Bruised surface (micro-fracturing): A surface layer weakened by interconnected microcracks in concrete substrates caused by the use of high-impact, mechanical methods for concrete removal, and surface preparation; fractured layer typically extends to a depth of 0.13 to 0.38 in. (3 to 10 mm) and, if not removed, frequently results in lower bond strengths as compared with surfaces prepared with nonimpact methods.

Carbonation: The conversion of calcium ions in hardened cementitious materials to calcium carbonate by reaction with atmospheric carbon dioxide. Carbonation reduces the pH of the concrete and its ability to protect reinforcing steel and embedded metal items from corrosion.

Chloride contamination: Contamination of concrete with chloride ions commonly used in deicing salts and accelerating admixtures such as calcium chloride and sodium chloride. Chloride contamination above the threshold for corrosion can result in corrosion of the reinforcing steel.

Chloride threshold: The amount of chloride required to initiate steel corrosion in reinforced concrete under a given set of exposure conditions; commonly expressed in percent of chloride ion by mass of cement.

Corrosion: Degradation of concrete or steel reinforcement caused by electrochemical or chemical attack.

Microcrack: A crack too small to be seen with the unaided eye.

Tensile pulloff test: A test to determine the unit stress, applied in direct tension, required to separate a hardened repair material from the existing concrete substrate. The test may also be used to determine the maximum unit stress that the existing concrete substrate is capable of resisting under axial tensile loading and the near-surface tensile strength of a prepared surface (refer to ICRI Technical Guideline No. 210.3–2004 [formerly No. 03739] and ASTM C1583).

Substrate: The layer immediately under a layer of different material to which it is typically bonded; an existing concrete surface that receives an overlay, partial-depth repair, protective coating, or some other maintenance or repair procedure.

3.0 Exposure of Reinforcing Steel

The practice of completely removing the concrete (undercutting) from around the corroded reinforcement, no matter what degree of corrosion is found, is key to achieving long-term performance of surface repairs. In most cases, complete removal of the concrete from around the reinforcing steel is the best practice, where protection of the reinforcing steel within the

repair cavity is achieved by providing a uniform chemical environment around the reinforcing steel. If noncorroded reinforcing steel is exposed and the concrete is chloride contaminated, removal of the concrete around the reinforcing should occur or other corrosion-reducing means should be considered. Reinforcing steel partially embedded in chloride-contaminated concrete is susceptible to future accelerated corrosion.

If, for structural reasons, the concrete cannot be completely removed from around the corroded reinforcing steel or if a corrosion inhibiting system is not used, the repair may be compromised due to continued corrosion. If there is a potential trade-off between durability and structural capacity, structural capacity should always take priority. When reinforcing steel is not fully exposed through the concrete removal and preparation process, alternative corrosion inhibiting systems should be considered. These systems may include use of corrosion inhibitors, sacrificial anodes, or cathodic protection.

4.0 Anodic Ring (Halo) Effect

The existing concrete surrounding a repair area in chloride-contaminated or low pH reinforced concrete is susceptible to accelerated corrosion. This is due to the electrical potential differential between the chloride contaminated or low pH existing concrete and the chloride-free or high pH repair material. This anodic ring effect can result in accelerated corrosion of the surrounding reinforcing steel leading to future concrete deterioration. To assess existing concrete conditions beyond the repair area, chloride content and pH of the concrete at the level of the reinforcing steel should be determined. Where the chloride content exceeds the threshold level for the initiation of corrosion or where the reinforcing steel is susceptible to corrosion as a result of carbonation, a corrosion inhibiting system should be considered to minimize future corrosion. Other measures may also be considered, such as the application of sealers and coatings, to slow the corrosion process. In severely chloride-contaminated or carbonated concrete, the complete removal and replacement of the contaminated concrete at and beyond the repair area may be necessary to provide a successful long-term repair.

5.0 Removal Geometry

Examples of the removal geometry for several different types of reinforced concrete elements are shown in Fig. 5.1 through 5.6. Repairs may be located on horizontal, vertical, and/or overhead surfaces. The removal in Fig. 5.5 and 5.6 is for columns where the removal will not affect the structural capacity of the column. Removal of concrete within the reinforcing or to expose the reinforcing (concrete in compression) is a special condition and is discussed in Section 10.

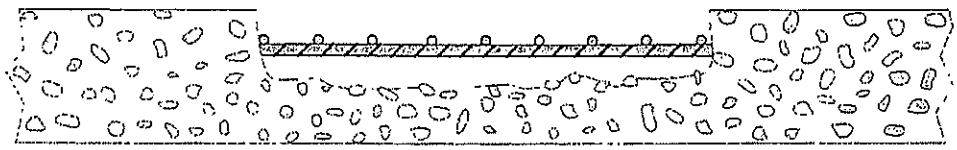

Fig. 5.1 Partial depth repair, slab or wall, section

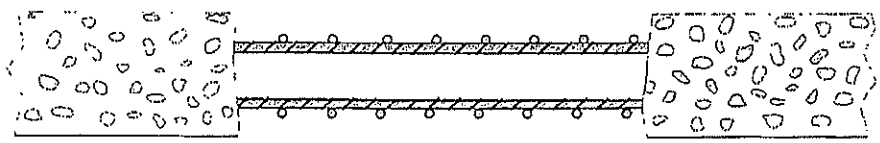

Fig. 5.2 Full depth repair, slab or wall, section

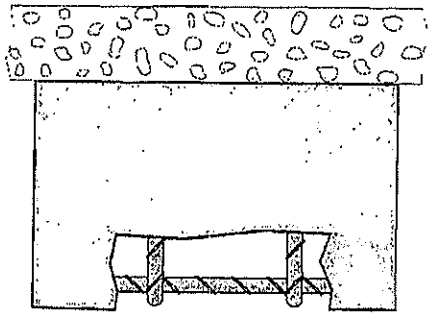

Fig 5 3 Beam or rib repair, elevation

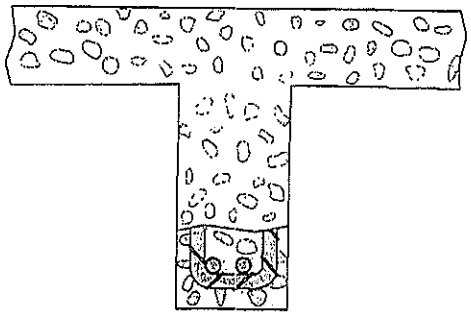

Fig. 5 4 Beam or rib repair, section

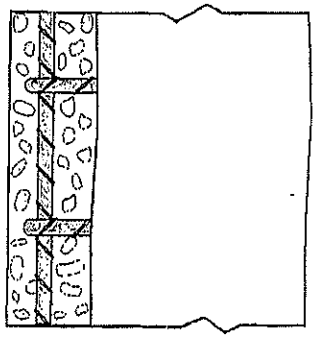

Fig 5 5 Column repair, elevation

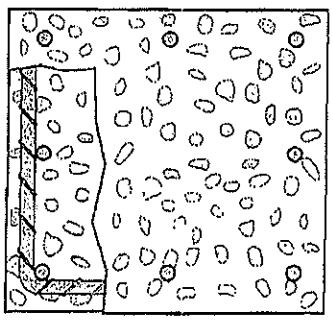

Fig 5 6 Column repair, section

6.0 Configuration of Repair Area

Deteriorated and delaminated concrete should be located and marked prior to starting the removal process. Delaminated concrete can be located using sounding or other suitable techniques. The repair area should extend a minimum of 6 in. (152 mm) beyond the actual delaminated concrete. Note that during concrete removal, repair areas can grow in size beyond the areas identified due to incipient delaminations that are not readily identifiable by sounding. Repair configurations should be kept as simple as possible, preferably square or rectangular with square corners (Fig. 6.1). This may result in the removal of sound concrete. Reentrant corners should be minimized or avoided, as they are susceptible to cracking.

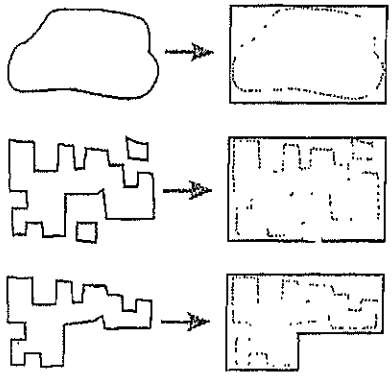

Fig 6 1 Areas of deterioration and recommended removal configurations

7.0 Concrete Removal/Surface Preparation

7.1 Exposing and Undercutting of Reinforcing Steel

Remove concrete from the marked areas and undercut exposed reinforcing steel (Fig. 7.1) using impact breakers, hydrodemolition, or another suitable method. Undercutting will provide clearance under the reinforcing steel for cleaning and full bar circumference bonding to the repair material and the surrounding concrete. Bonding

the repair material to the full circumference of the reinforcing steel will secure the repair structurally. Provide a minimum of 0.75 in. (19 mm) clearance between exposed reinforcing steel and surrounding concrete or 0.25 in. (6 mm) larger than the coarse aggregate in the repair material, whichever is greater. Sound concrete may have to be removed to provide proper clearance around the reinforcing steel. If impact breakers are used for partial depth concrete removal, the breaker should not exceed 30 lb (12 kg). A 15 lb (7 kg) breaker is preferred to minimize damage to the substrate, reinforcing steel, and surrounding concrete.

Concrete removal should extend along the reinforcing steel until there is no further delamination, cracking, or significant corrosion and the reinforcing steel is well bonded to the surrounding concrete. Care should be taken to avoid significant and sudden changes in the depth of concrete removal, as the repair material is more susceptible to cracking at these locations.

If noncorroded reinforcing steel is exposed during the removal process, care should be taken to not damage the bond to the surrounding concrete. If the bond between the reinforcing steel and concrete is broken, undercutting of the reinforcing steel is required.

Remove all deteriorated concrete and additional concrete as required to provide the proper configuration and/or the minimum required thickness of repair material as required by the manufacturer of the repair material and/or the project specifications.

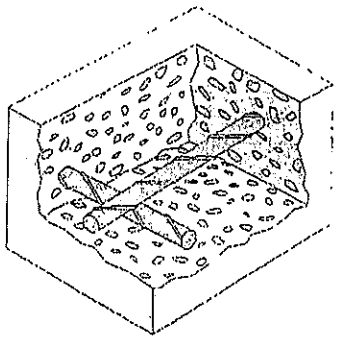

Fig. 7.1. Remove concrete to undercut and expose reinforcing steel and provide uniform repair depth

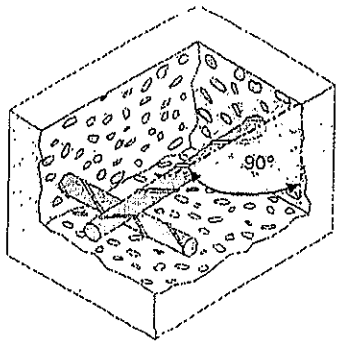

Fig. 7.2 Saw cut perimeter to provide vertical edge

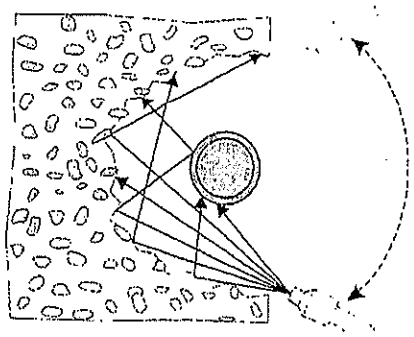

Fig. 7.3 Abrasive blasting to clean substrate and reinforcing

7.2 Preparation of the Repair Perimeter

The perimeter of the repair area should be saw cut 0.75 in. (19 mm) deep to provide a vertical edge (Fig. 7.2) for the repair material. This will avoid featheredging of the repair material. Depending on the repair material selected, the depth of the existing reinforcing and the manufacturer's recommendations, a saw cut depth less than 0.75 in. (19 mm) deep may be sufficient. Care should be taken to avoid cutting the existing reinforcing steel.

7.3 Cleaning of the Concrete Surface and Reinforcing Steel

The use of high-impact, mechanical methods to remove deteriorated concrete will result in a surface layer weakened by interconnected microcracks in the concrete substrate. The fractured (bruised) layer can extend to a depth of 0.125 to 0.375 in. (3 to 10 mm) into the resultant concrete substrate and may result in reduced bond strength. Remove the bruised layer and bond-inhibiting materials such as dirt, concrete slurry, and loosely bonded concrete by oil-free abrasive blasting (Fig. 7.3) or high-pressure water blasting. The

saw-cut edge of the repair area should also be blasted to roughen the polished vertical surface caused by the saw-cutting.

All concrete, corrosion products, and scale should be removed from the reinforcing steel by oil-free abrasive blasting or high-pressure water blasting. Verify that the reinforcing steel and concrete surface are free from dirt, oil, cement fines (slurry), or any material that may interfere with the bond of the repair material. Inspect the repair cavity to verify that all delaminations and deterioration have been removed. If hydrodemolition is used, cement fines (slurry) must be completely removed from the repair surface. A tightly-bonded light rust build-up on the reinforcing surface is usually not detrimental to bond. If a protective coating is applied to the reinforcing steel, follow the coating manufacturer's recommendations for steel surface preparation.

8.0 Inspection and Repair of Reinforcing Steel

Loose reinforcement should be secured in its original position by tying to secure bars or by other appropriate methods to prevent movement during placement of repair material.

If reinforcing steel has lost cross-sectional area, a structural engineer should be consulted. Repair reinforcing steel by either replacing the damaged/deteriorated steel or placing supplemental reinforcing steel in the affected section (Fig. 8.1). Supplemental reinforcing steel may be lap-spliced or mechanically spliced to existing reinforcing steel. The supplemental reinforcing steel should extend (lap length) beyond the damaged/deteriorated area in accordance with ACI 318, "Building Code Requirements for Structural Concrete."

9.0 Final Surface Inspection

Immediately prior to placing the repair material, inspect the repair cavity to verify that all bond-inhibiting materials (dirt, concrete slurry, loosely bonded aggregates, or any material that may interfere with the bond of the repair material to the existing concrete) have been removed. If bond-inhibiting materials are present, the repair cavity should be recleaned as previously described.

To verify the adequacy of the prepared concrete surface and completeness of bond-inhibiting material removal, a tensile pulloff test (ICRI Technical Guideline No. 210.3–2004 or ASTM C1583) should be considered to evaluate the bond strength capacity and tensile strength of the existing concrete substrate. This test may also be performed after the repair is complete. The pulloff strength requirement should be established by the engineer and included as a performance specification for the repair.

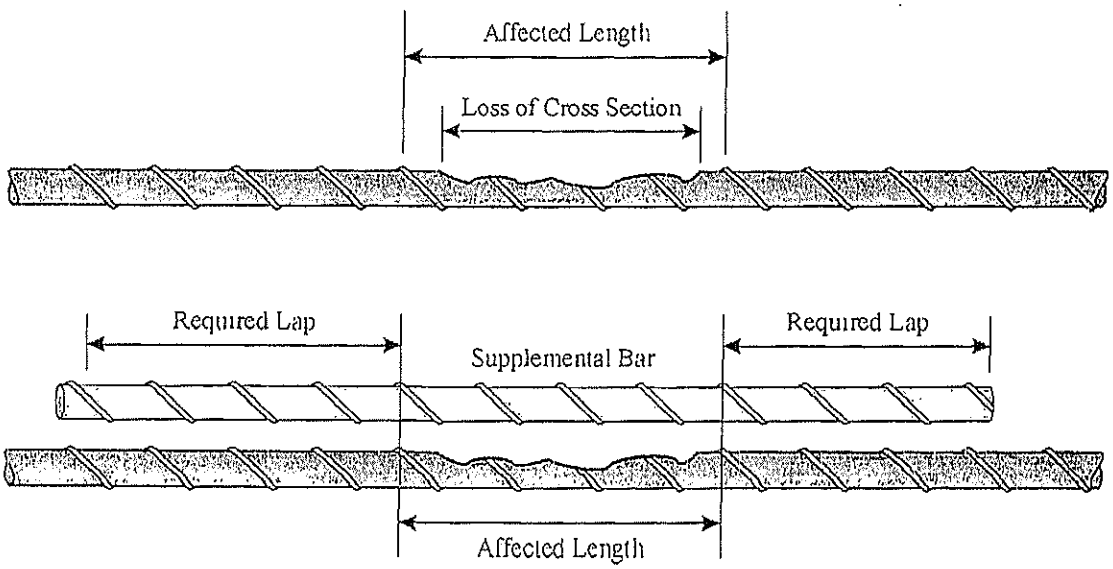

Fig. 8.1 Repair of damaged/deteriorated reinforcing

10.0 Special Condition at Columns

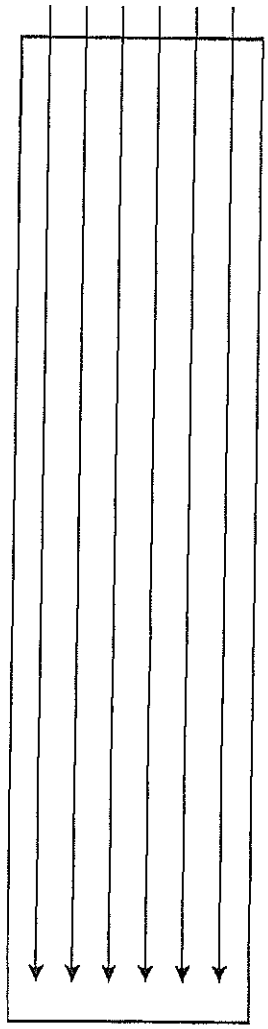

Fig. 10 1: Column load path

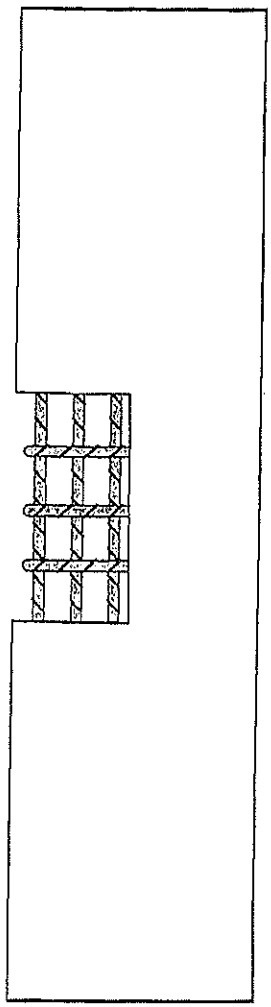

Fig. 10.2a: Column repair

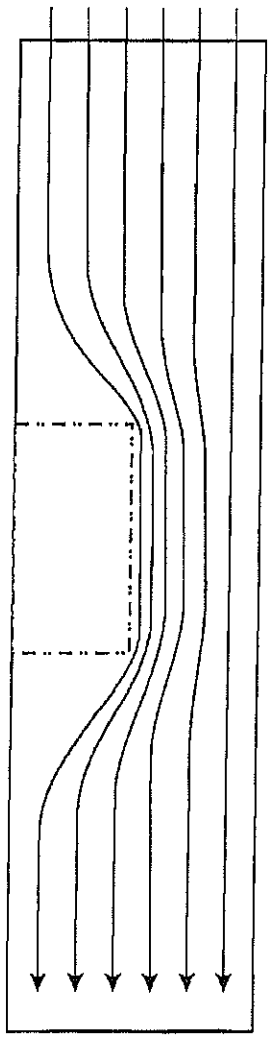

Fig 10.3: Column load path following repair

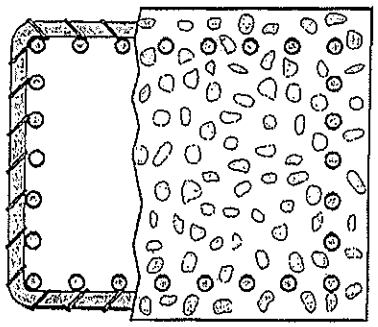

Fig. 10.2b Column section

Undercutting of reinforcement is a best practice in tensile zones of concrete. In columns, the primary loading condition is compression. From a design perspective, the concrete section contained within the reinforcing cage is considered to carry the compressive loads (Fig. 10.1). The concrete outside of the reinforcement is considered as protective concrete cover for fire and corrosion protection of the reinforcement. Removing the concrete within the column reinforcing steel (Fig. 10.2) can greatly increase the compressive stress in the reinforcing steel and the remaining concrete. Upon concrete removal, compressive load paths redistribute around the repair (deteriorated) sections (Fig. 10.3). Depending on the size of the concrete removal area behind the column steel, buckling of the column vertical reinforcing bars can occur. In the majority of cases, shoring systems will not unload the compressive stress in the column section.

When new repair material is placed in the prepared area, the new material cures and most materials undergo drying shrinkage, which results in the new material being put into a tensile stress state. The new material will not carry compressive loads until the original concrete compresses further, forcing the repair material into compression. If further compression is beyond the capacity of the existing concrete, failure of the column may occur. This key concept affects the concrete preparation process In normal concrete repair (other than columns), removal of the concrete surrounding the corroding reinforcement (also known as undercutting) is a normal and necessary process to provide for a long-term durable repair. To remove concrete around vertical reinforcing steel in a column (removing concrete inside the reinforcing bar cage) can cause the remaining concrete and/or reinforcement in the column to become overstressed. From a structural point of view, this condition may not be desirable. If concrete is to be removed inside the reinforcement cage, a qualified structural engineer should determine the impact of the repair on potential reinforcement buckling and overall structural capacity of the column. Note that the discussion in this section is also applicable in concept to compression zone portions of other structural members such as beams, slabs, and walls (with or without compression reinforcement) where on-going compressive stress exists and where adequate shoring cannot be installed prior to repairs to prevent displacements and corresponding stress redistributions during repairs.

11.0 Summary

The repair of deteriorated concrete resulting from reinforcing steel corrosion is necessary to extend the service life of the structure. Performing concrete repairs using industry-best practices will ensure the success and longevity of the repair. Understanding the existing conditions and cause of corrosion will assist the engineer in specifying the type and extent of the repair required, and the type of corrosion mitigation systems and/or preventative measures that should be considered to protect the structure from future deterioration.

12.0 References

12.1 Referenced Standards and Reports

The following standards and reports were the latest editions at the time this document was prepared. Because these documents are revised frequently, the reader is advised to contact the proper sponsoring group if it is desired to refer to the latest version.

American Concrete Institute (ACI)

ACI 506R, "Guide to Shotcrete"

ACI E706 (RAP 8), "Installation of Embedded Galvanic Anodes"

American Society for Testing and Materials (ASTM International)

ASTM C1583, "Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)"

International Concrete Repair Institute (ICRI)

ICRI Concrete Repair Terminology

ICRI Technical Guideline No. 130.1R–2008 (formerly No. 03735), "Guide for Methods of Measurement and Contract Types for Concrete Repair Work"

ICRI Technical Guideline No. 210.3-2004 (formerly No. 03739), "Guide for Using In-Situ Tensile Pull-Off Tests to Evaluate Bond of Concrete Surface Materials"

ICRI Technical Guideline No. 310.3–2004 (formerly No. 03737), "Guide for the Preparation of Concrete Surfaces for Repair Using Hydrodemolition Methods"

ICRI Technical Guideline No. 320.2R–2008 (formerly No. 03733), "Guide for Selecting and Specifying Materials for Repair of Concrete Surfaces"

These publications may be obtained from these organizations:

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331
www.concrete.org

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428
www.astm.org

International Concrete Repair Institute
3166 S. River Road, Suite 132
Des Plaines, IL 60018
www.icri.org

About ICRI Guidelines

The International Concrete Repair Institute (ICRI) was founded to improve the durability of concrete repair and enhance its value for structure owners. The identification, development, and promotion of the most promising methods and materials are primary vehicles for accelerating advances in repair technology. Working through a variety of forums, ICRI members have the opportunity to address these issues and to directly contribute to improving the practice of concrete repair.

A principal component of this effort is to make carefully selected information on important repair subjects readily accessible to decision makers. During the past several decades, much has been reported in the literature on concrete repair methods and materials as they have been developed and refined. Nevertheless, it has been difficult to find critically reviewed information on the state of the art condensed into easy-to-use formats.

To that end, ICRI guidelines are prepared by sanctioned task groups and approved by the ICRI Technical Activities Committee. Each guideline is designed to address a specific area of practice recognized as essential to the achievement of durable repairs. All ICRI guideline documents are subject to continual review by the membership and may be revised as approved by the Technical Activities Committee.

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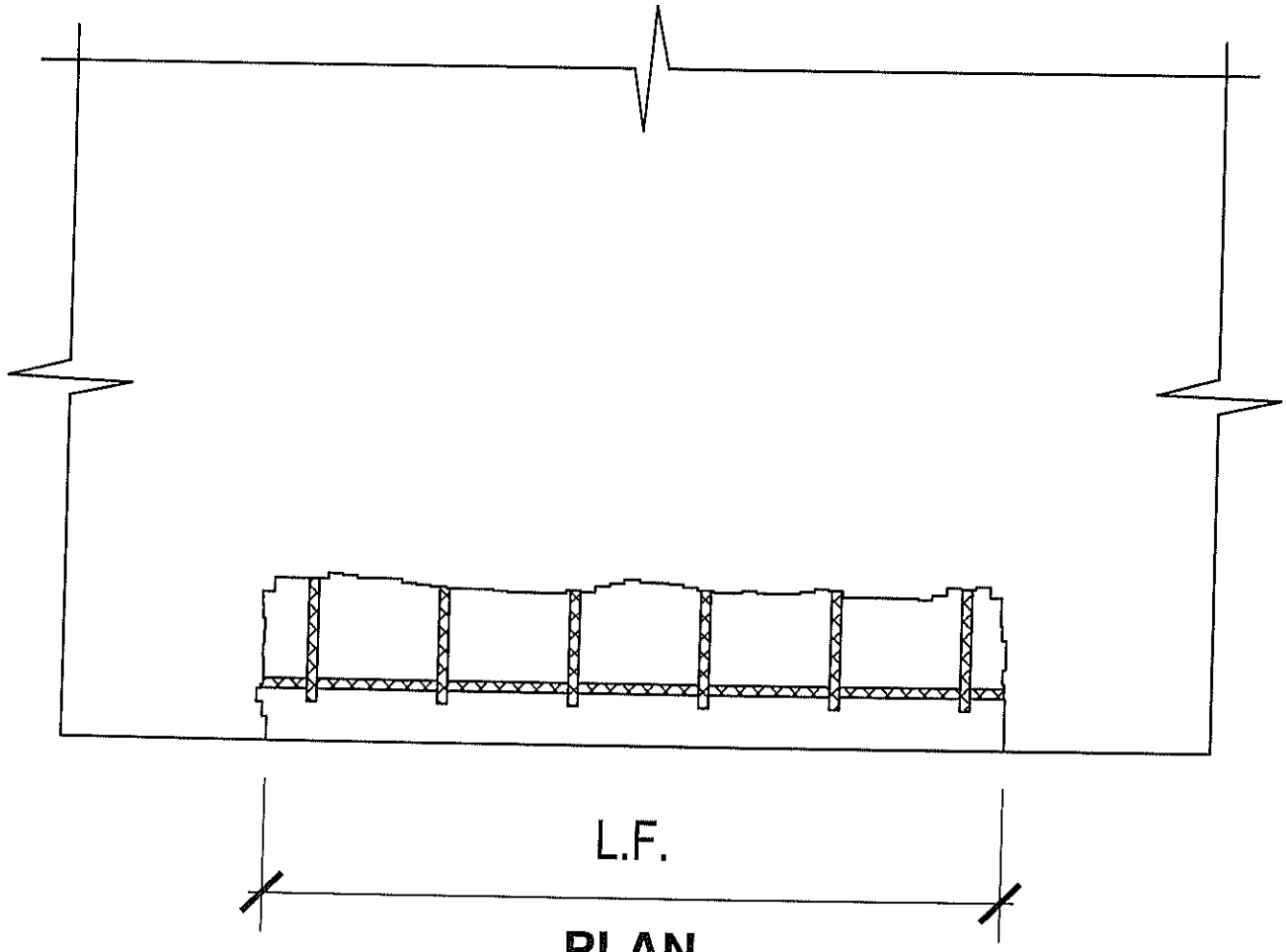
Synopsis

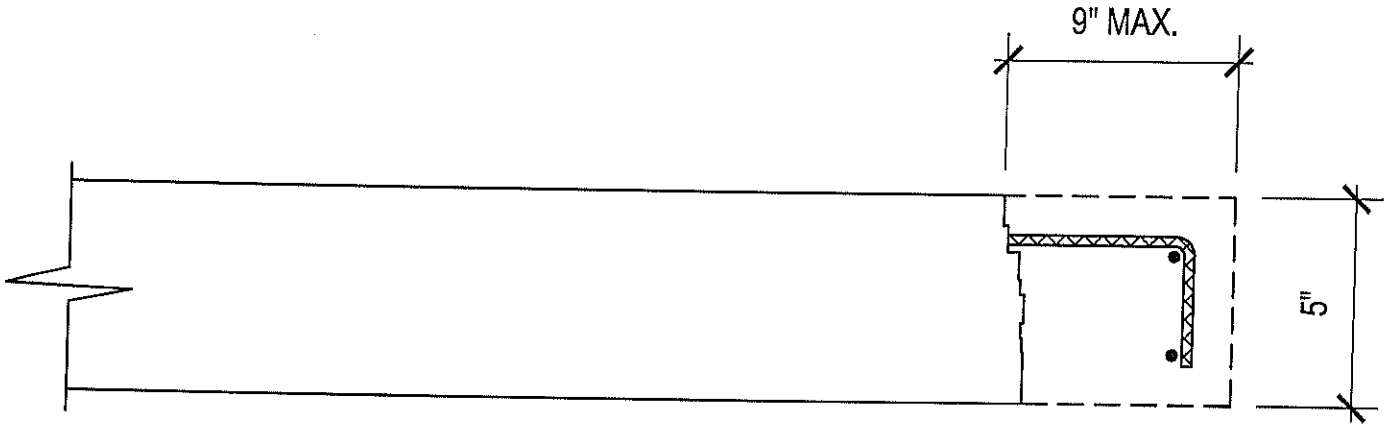
This guideline provides guidance on concrete removal and surface preparation procedures for the repair of deteriorated concrete caused by reinforcing steel corrosion. Removal geometry, configuration of the repair area, removal process, edge preparation, reinforcement repair, surface preparation and inspection necessary for durable repairs are discussed. Special considerations for concrete removal associated with column repair are included.

Keywords

anodic ring effect, bonding, bruising, corrosion, delamination, deterioration, reinforcing steel, structural repair, surface preparation.



PLAN



SECTION

SLAB EDGE
CONCRETE REMOVAL

CHALAIRE AND ASSOCIATES, INC.
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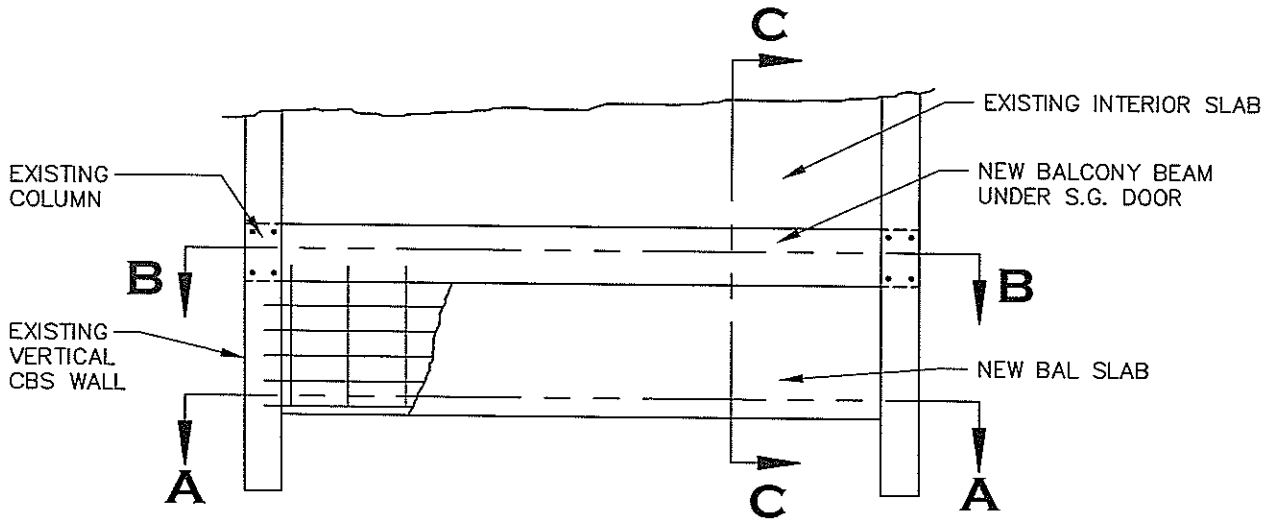
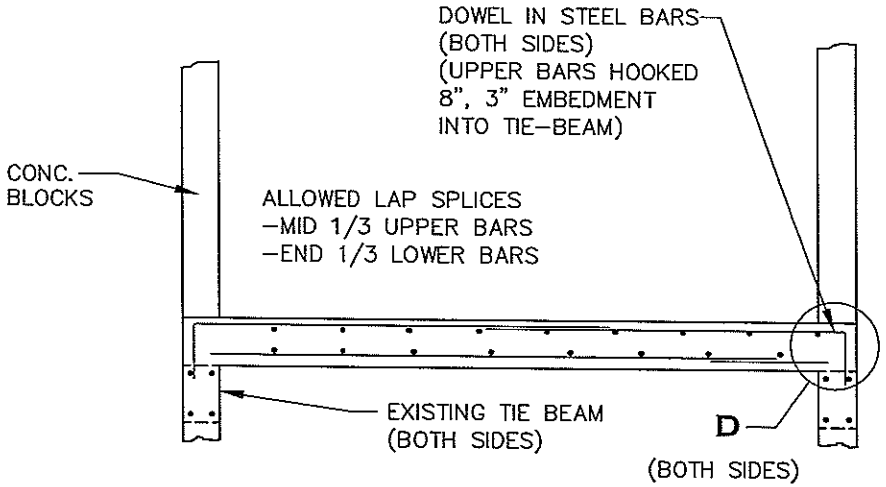
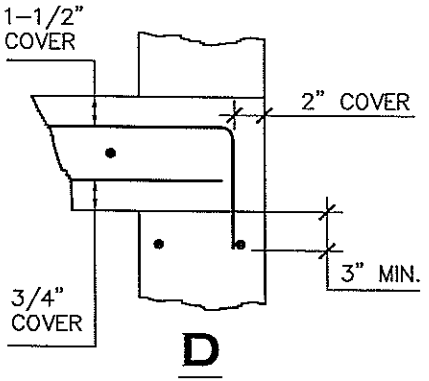


FLOOR PLAN

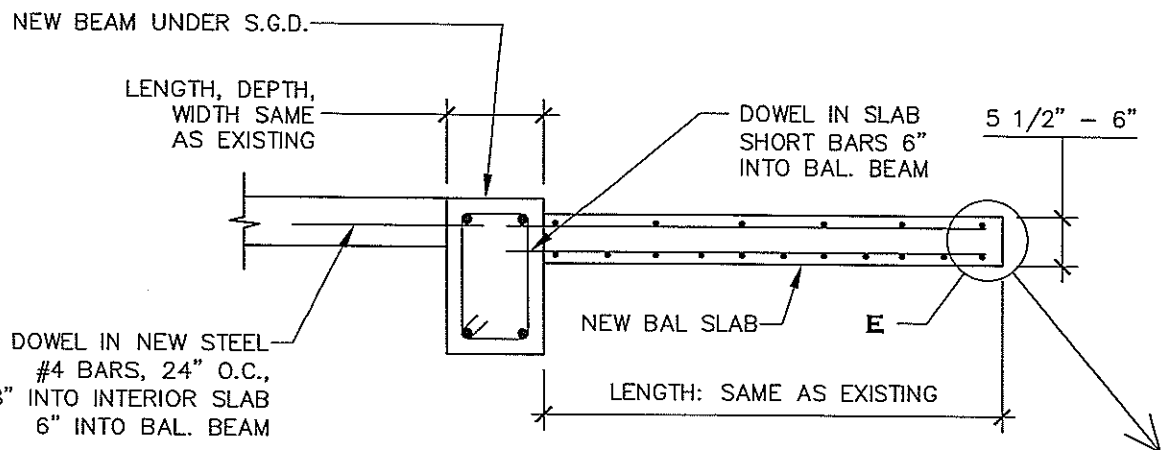




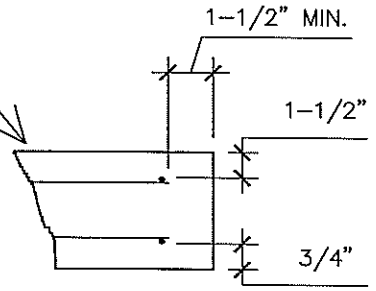
SECT. A-A - SLAB

	SLAB REPAIR	CHALAIRE AND ASSOCIATES, INC. ENGINEERING CONSULTANTS EB# 6834 DON CHALAIRE, PE #53089 TERRI CHALAIRE, PE #65587 721 US HIGHWAY #1, SUITE 212 NORTH PALM BEACH, FL 33408 PHONE (561) 848-7055 FAX (561) 848-7057	REVISIONS / DATE	DRAWN CW DATE 10/06/17 SCALE NTS SHEET 1 OF 2

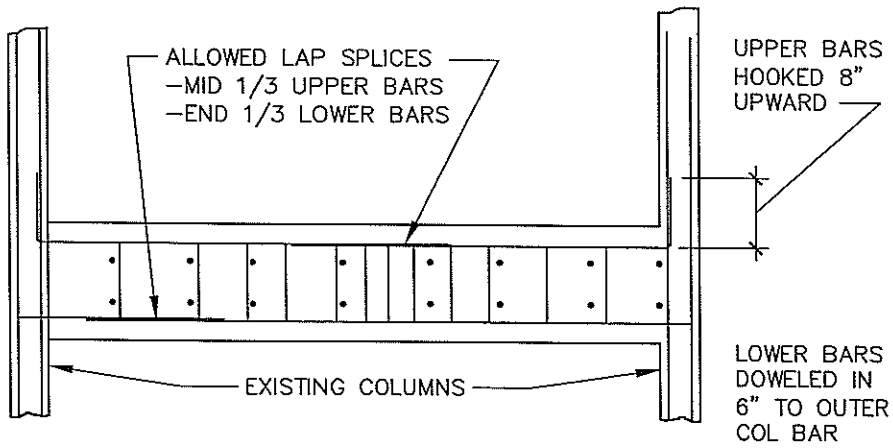
NOTES:
1. MIN COVER REINF. STEEL OF SLAB IS 3/4" BOTTOM 1-1/2" TOP
2. COVER OF REINF. STEEL OF BEAM IS 1-1/2"
3. SLOPE BALCONY AWAY FROM BLDG. 1" IN 6'
4. BAL SLAB STEEL BAR PLACEMENT
   LONG DIM, #5 BARS, 6" O.C. LOWER MAT
   LONG DIM, #5 BARS, 12" O.C. UPPER MAT
   SHORT DIM, #4 BARS, 12" O.C. EA. MAT



SECT. C-C



E



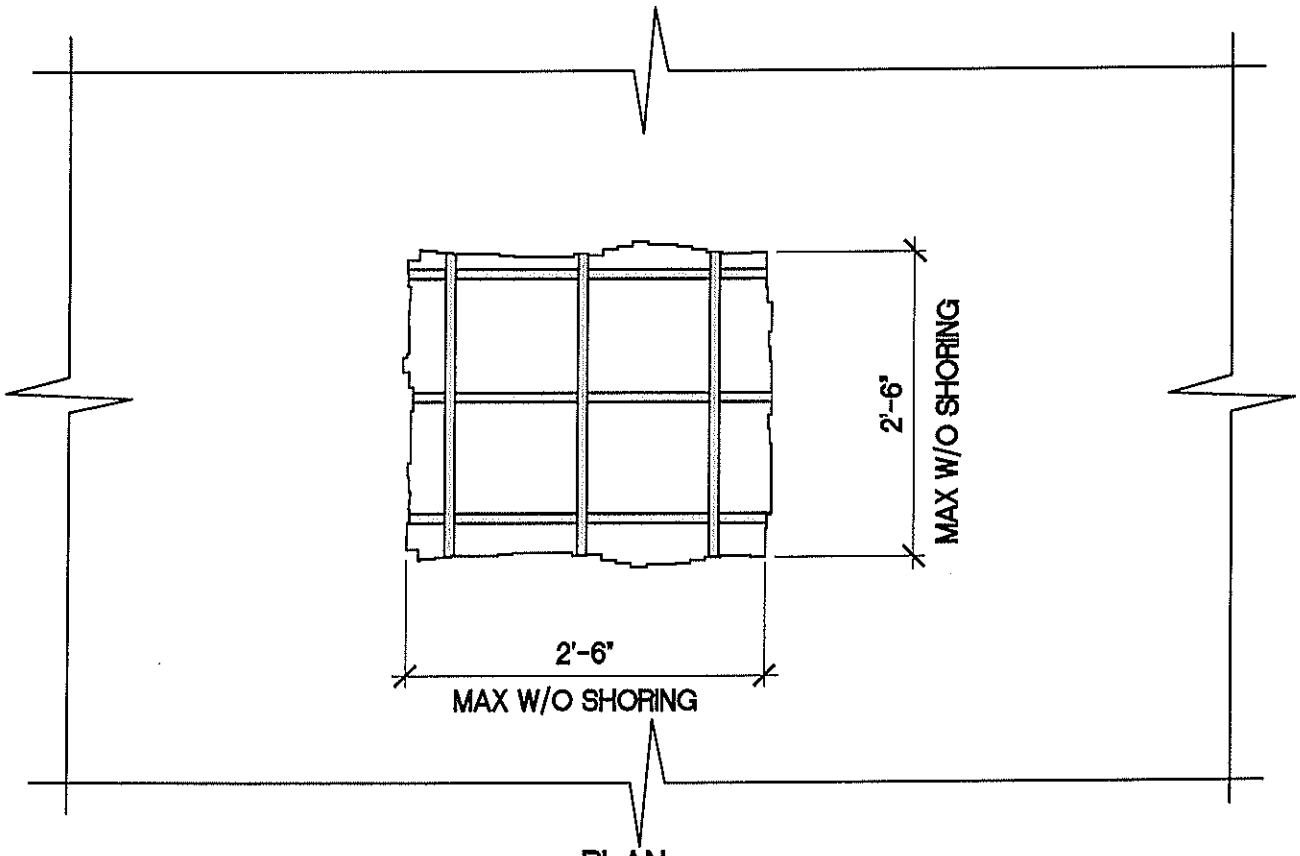
SECT. B-B - BAL BEAM

SLAB REPAIR

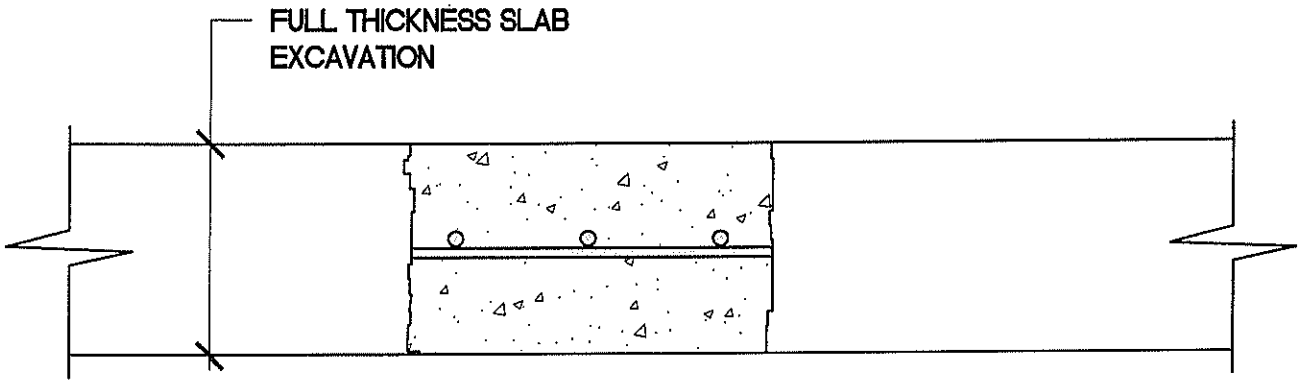
CHALAIRE AND ASSOCIATES, INC.
ENGINEERING CONSULTANTS
EB# 6834
DON CHALAIRE, PE #33089
TERRI CHALAIRE, PE #65587
721 US HIGHWAY #1, SUITE 212
NORTH PALM BEACH, FL 33408
PHONE (561) 848-7055 FAX (561) 848-7057

REVISIONS	DATE

DRAWN CW
DATE 10/06/17
SCALE NTS
SHEET 2 OF 2



PLAN



SECTION

NOTES:

1. FOR SLAB AREAS, NOT AT EDGES WITH ONLY ONE MAT OF REBAR
2. MUST BE FULL THICKNESS SLAB EXCAVATION
3. PROVIDE CONTINOUS SHORING UNDER ENTIRE REPAIR AREA IF REPAIR AREA IS GREATER THAN 2'-6" x 2'-6"

SLAB CONCRETE REMOVAL AWAY FROM SLAB EDGE WITH ONLY ONE MAT OF STEEL BARS

CHALAIRE AND ASSOCIATES, INC.
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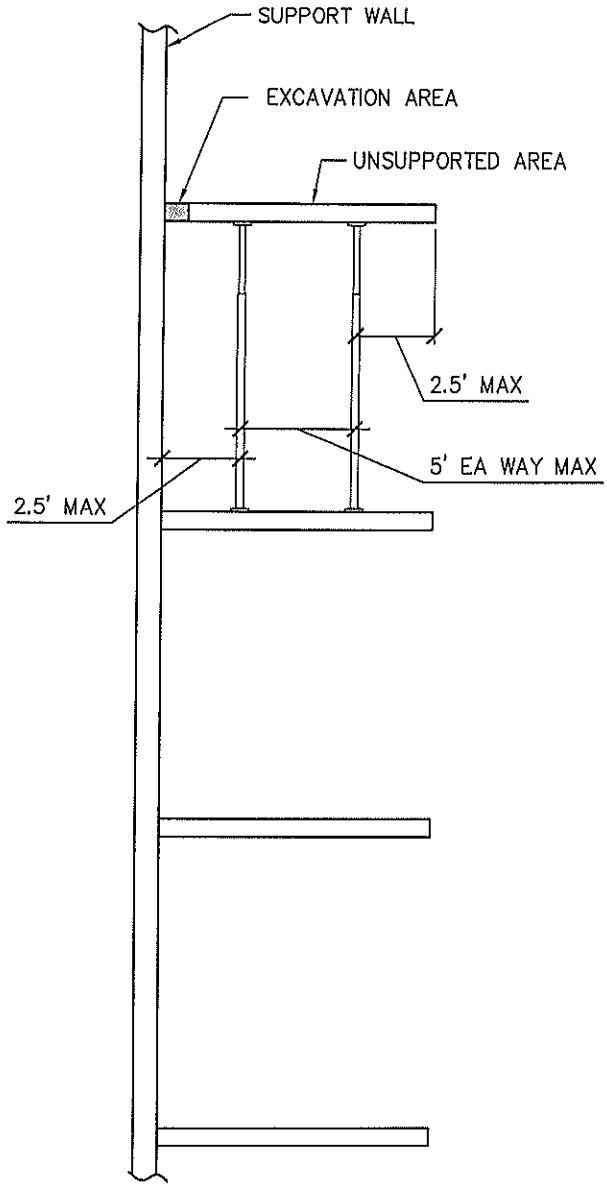
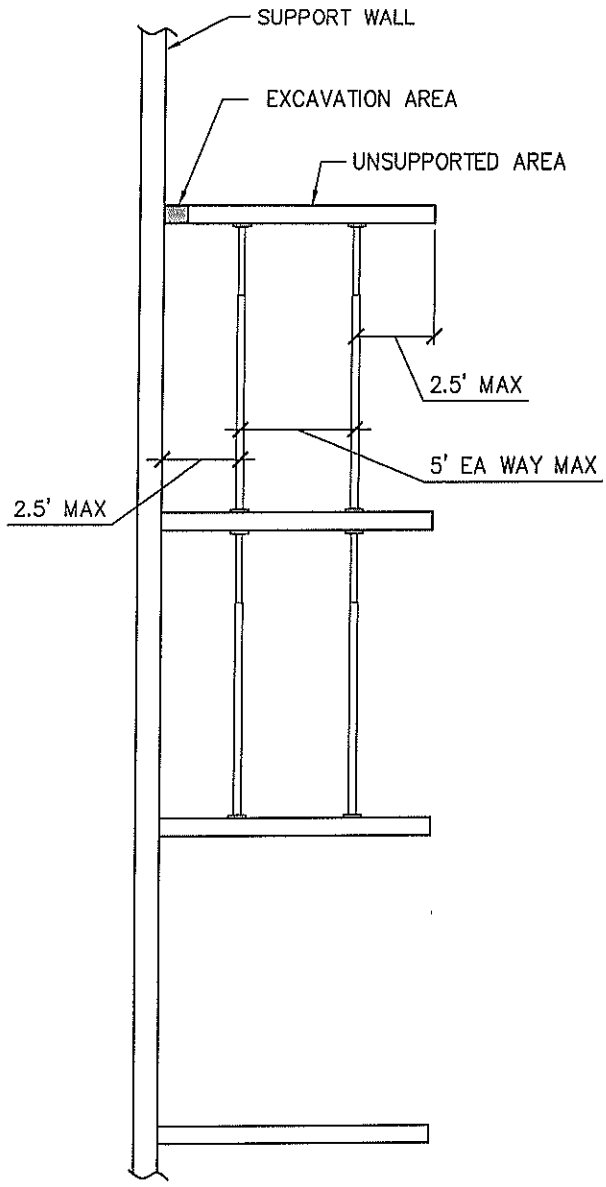
PHONE (561) 848-7055 FAX (561) 848-7057

REVISIONS	DATE

DRAWN: GW
DATE: 08/17/17
SCALE: NTS
SHEET



OPEN WALKWAY - SIDE VIEW

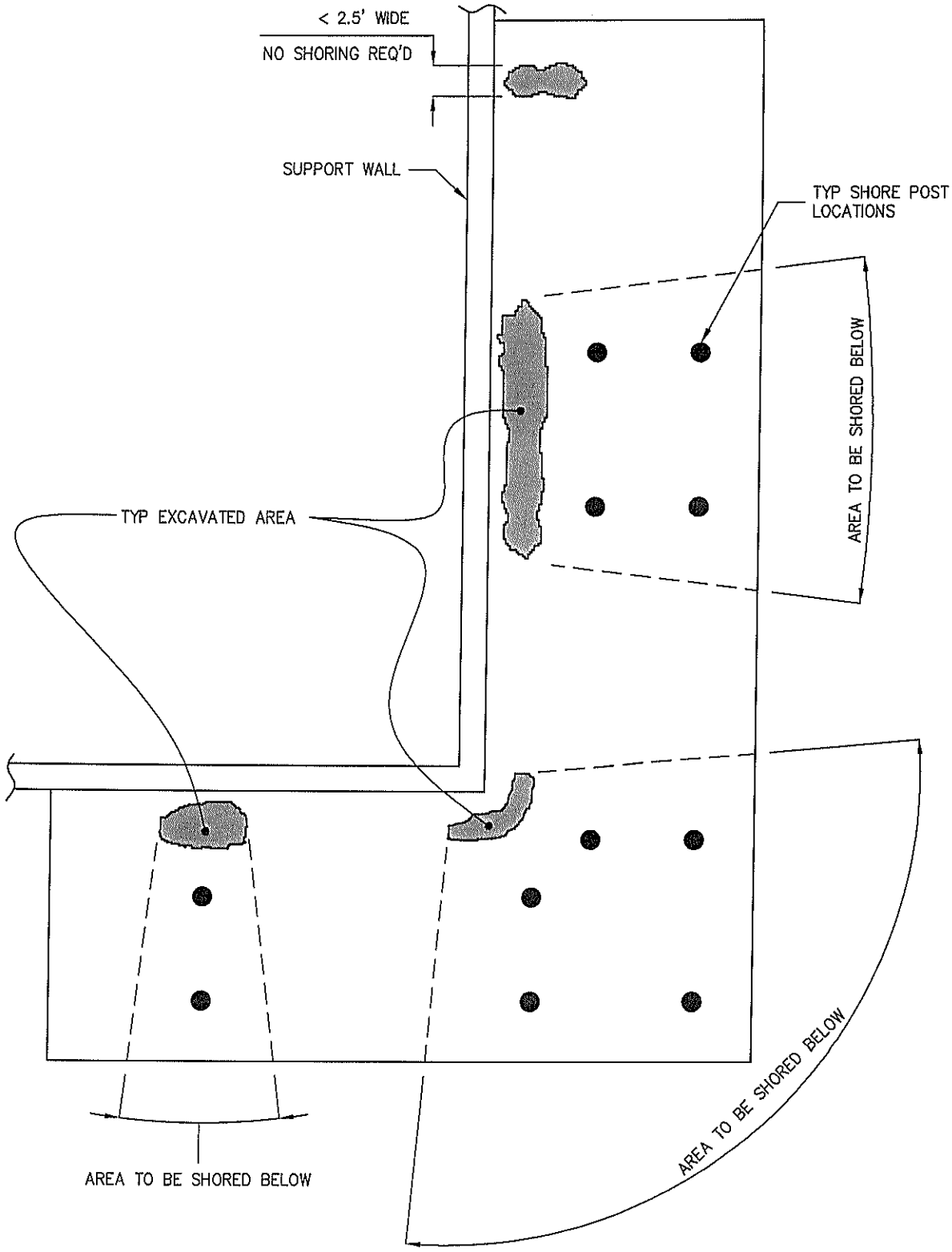


PRIVATE BALCONIES - SIDE VIEW

NOTES:

1. MAX SLAB THICKNESS: 6"
2. MAX SPACING PER POST: 5' EA WAY
3. MAX SLAB AREA PER POST IS 25 SQ FT
4. POST CENTERED IN 25 SQ FT AREA
5. ONE UNSUPPORTED AREA REQUIRES ONE SUPPORTING SLAB FOR OPEN WALKWAYS WITH A DESIGN LIVE LOAD OF 100 PSF
6. ONE UNSUPPORTED AREA REQUIRES TWO SUPPORTING SLABS FOR PRIVATE BALCONIES WITH A DESIGN LIVE LOAD OF 40 PSF
7. SUPPORTING CONCRETE SLAB HAS STRENGTH GREATER THAN 28 DAYS

SIDE VIEWS	TYPICAL SHORING FOR CANTILEVERED SLABS	CHALAIRE AND ASSOCIATES, INC. ENGINEERING CONSULTANTS EB# 6834 DON CHALAIRE, PE #33089 TERRI CHALAIRE, PE #65587 721 US HIGHWAY #1, SUITE 212 NORTH PALM BEACH, FL 33408 PHONE (561) 848-7055 FAX (561) 848-7057	REVISIONS	DATE	DRAWN CW DATE 08/17/17 SCALE NTS SHEET SHR-1	

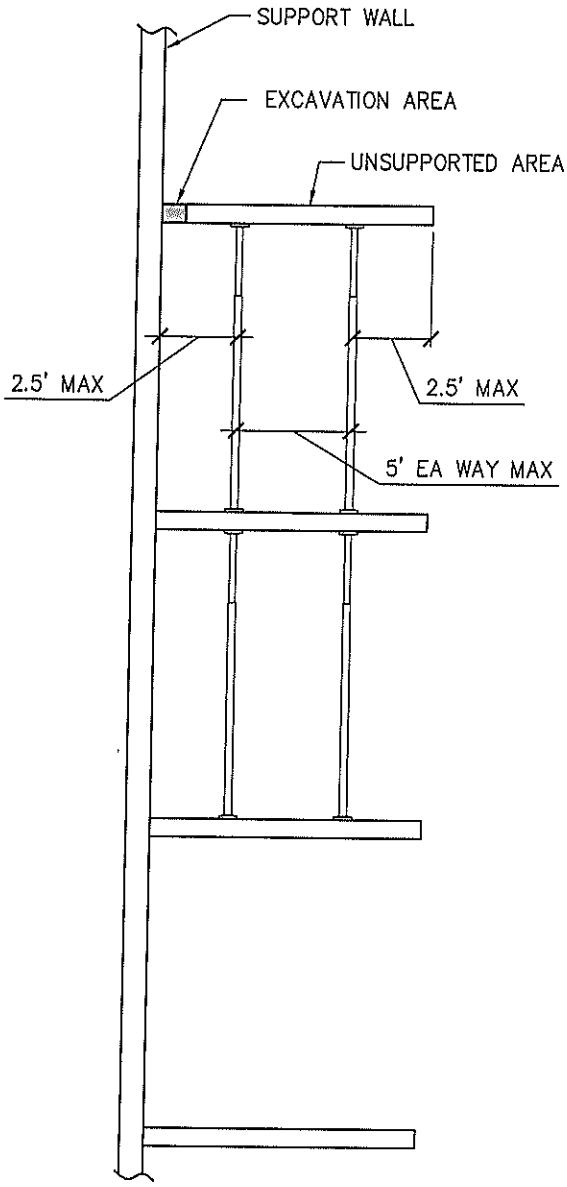


PLAN VIEW

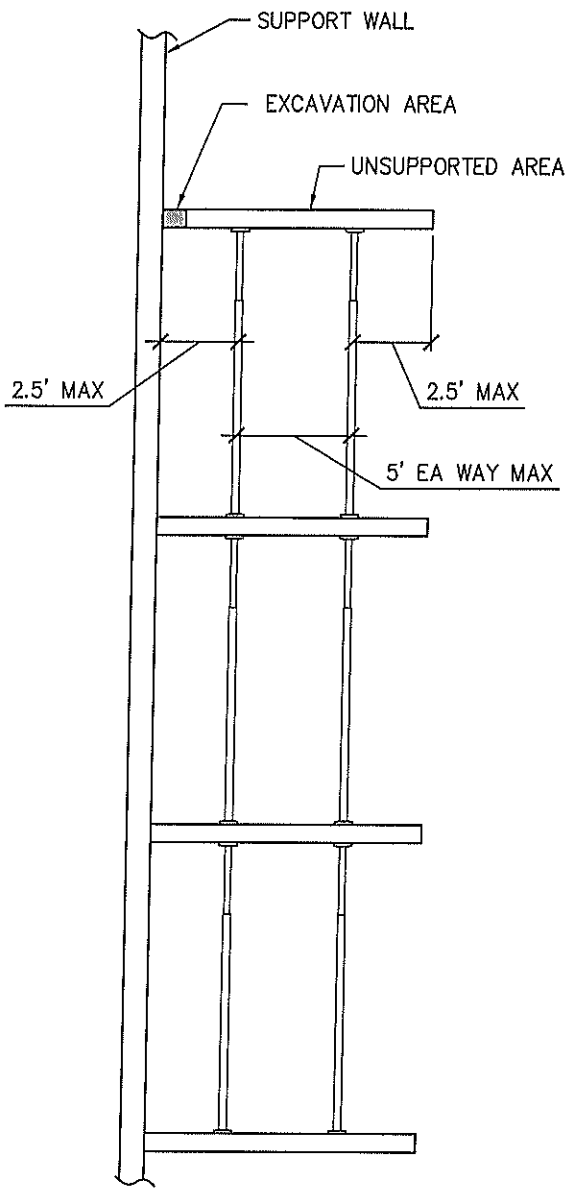
NOTES:

1. MAX SPACING PER POST: 5' EA WAY, 2.5' FROM SUPPORTING WALL & 2.5' FROM EDGE
2. MAX SLAB ARE PER POST IS 25 SQ FT
3. POST CENTERED IN 25'SQ FT AREA
4. FOR USE WHER SUPPORTING CONCRETE SLAB HAS STRENGTH GREATER THAN 28 DAYS

PLAN VIEW	TYPICAL SHORING FOR CANTILEVERED SLABS	CHALAIRE AND ASSOCIATES, INC. ENGINEERING CONSULTANTS EB# 6834 DON CHALAIRE, PE #33089 TERRI CHALAIRE, PE #65567 721 US HIGHWAY #1, SUITE 212 NORTH PALM BEACH, FL 33408 PHONE (561) 848-7055 FAX (561) 848-7057	REVISIONS / DATE		DRAWN CW DATE 08/17/17 SCALE NTS SHEET SHR-4



OPEN WALKWAY - SIDE VIEW

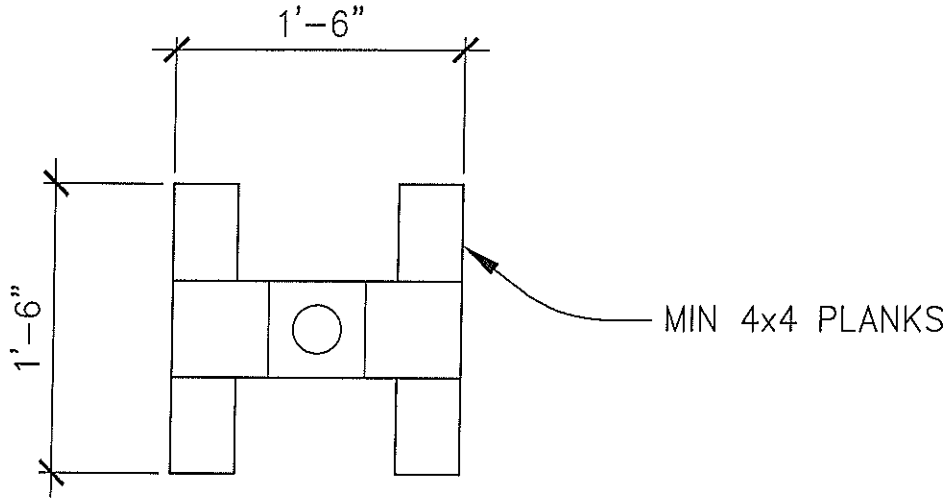


PRIVATE BALCONIES - SIDE VIEW

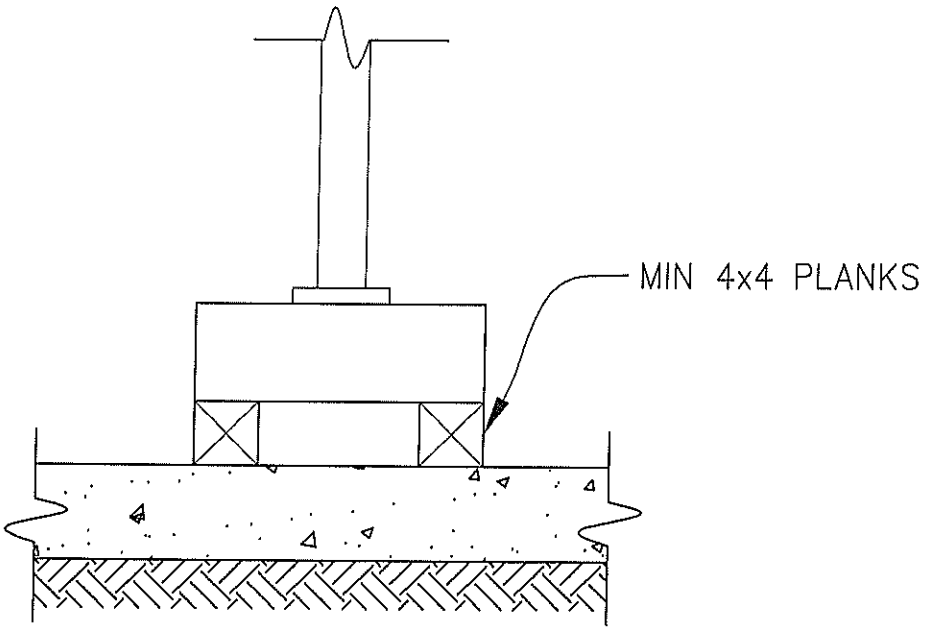
NOTES:

1. MAX SLAB THICKNESS: 6"
2. MAX SPACING PER POST: 5' EA WAY
3. MAX SLAB AREA PER POST IS 25 SQ FT
4. POST CENTERED IN 25 SQ FT AREA
5. ONE UNSUPPORTED AREA REQUIRES ONE SUPPORTING SLAB FOR OPEN WALKWAYS WITH A DESIGN LIVE LOAD OF 100 PSF
6. ONE UNSUPPORTED AREA REQUIRES TWO SUPPORTING SLABS FOR PRIVATE BALCONIES WITH A DESIGN LIVE LOAD OF 40 PSF
7. SUPPORTING CONCRETE SLAB HAS STRENGTH LESS THAN 28 DAYS

SIDE VIEWS SUPPORTING CONCRETE SLAB STRENGTH LESS THAN 28 DAYS	TYPICAL SHORING FOR CANTILEVERED SLABS	CHALAIRE AND ASSOCIATES, INC. ENGINEERING CONSULTANTS EB# 6834 DON CHALAIRE, PE #33089 TERRI CHALAIRE, PE #65687 721 US HIGHWAY #1, SUITE 212 NORTH PALM BEACH, FL 33408 PHONE (561) 848-7055 FAX (561) 848-7057	REVISIONS / DATE	DRAWN CW DATE 08/17/17 SCALE NTS SHEET SHR-8	

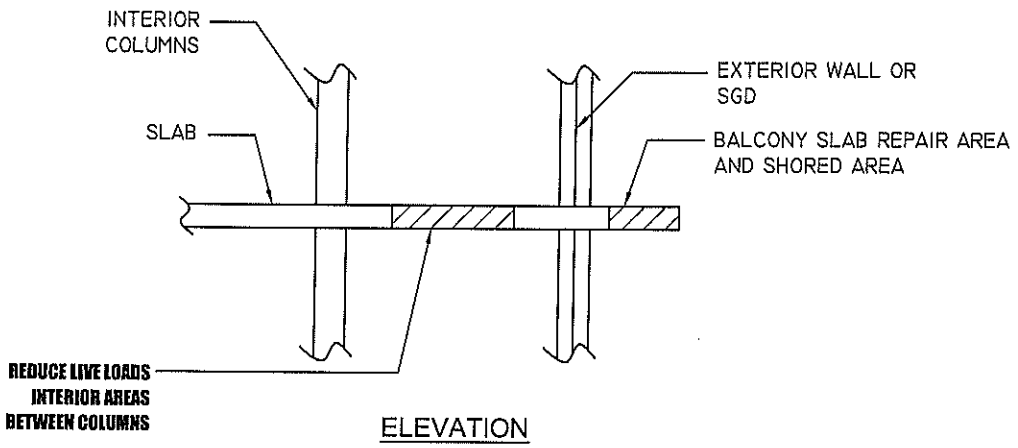


PLAN

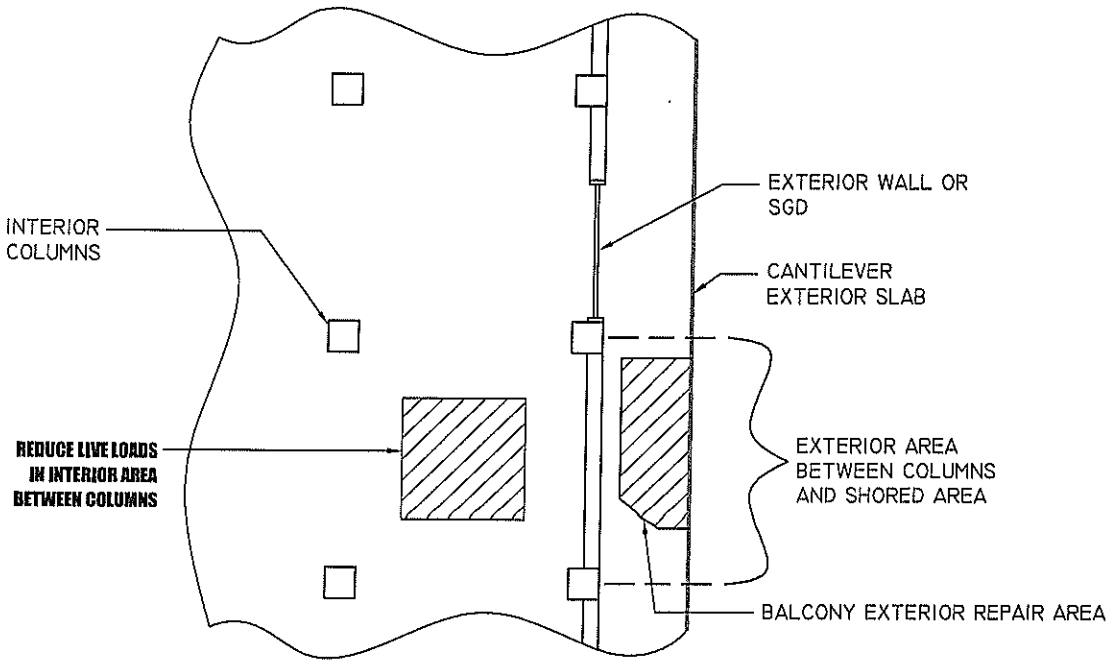


VIEW

	TYPICAL SHORING SUPPORT ON ASPHALT, SOIL OR SLAB ON GRADE	CHALAIRE AND ASSOCIATES, INC. ENGINEERING CONSULTANTS EB# 6834 DON CHALAIRE, PE #33089 TERRI CHALAIRE, PE #65587 721 US HIGHWAY #1, SUITE 212 NORTH PALM BEACH, FL 33408 PHONE (561) 848-7055 FAX (561) 848-7057	REVISIONS / DATE	DRAWN: CW DATE: 08/17/17 SCALE: NTS SHEET: SHR-11



ELEVATION



PLAN

REDUCE INTERIOR LIVE LOADS IF CANTILEVER EXTERIOR SLAB EXTERIOR REPAIR AREA IS > 50% OF EXTERIOR AREA BETWEEN COLUMNS

CHALAIRE AND ASSOCIATES, INC.
ENGINEERING CONSULTANTS
EB# 6834
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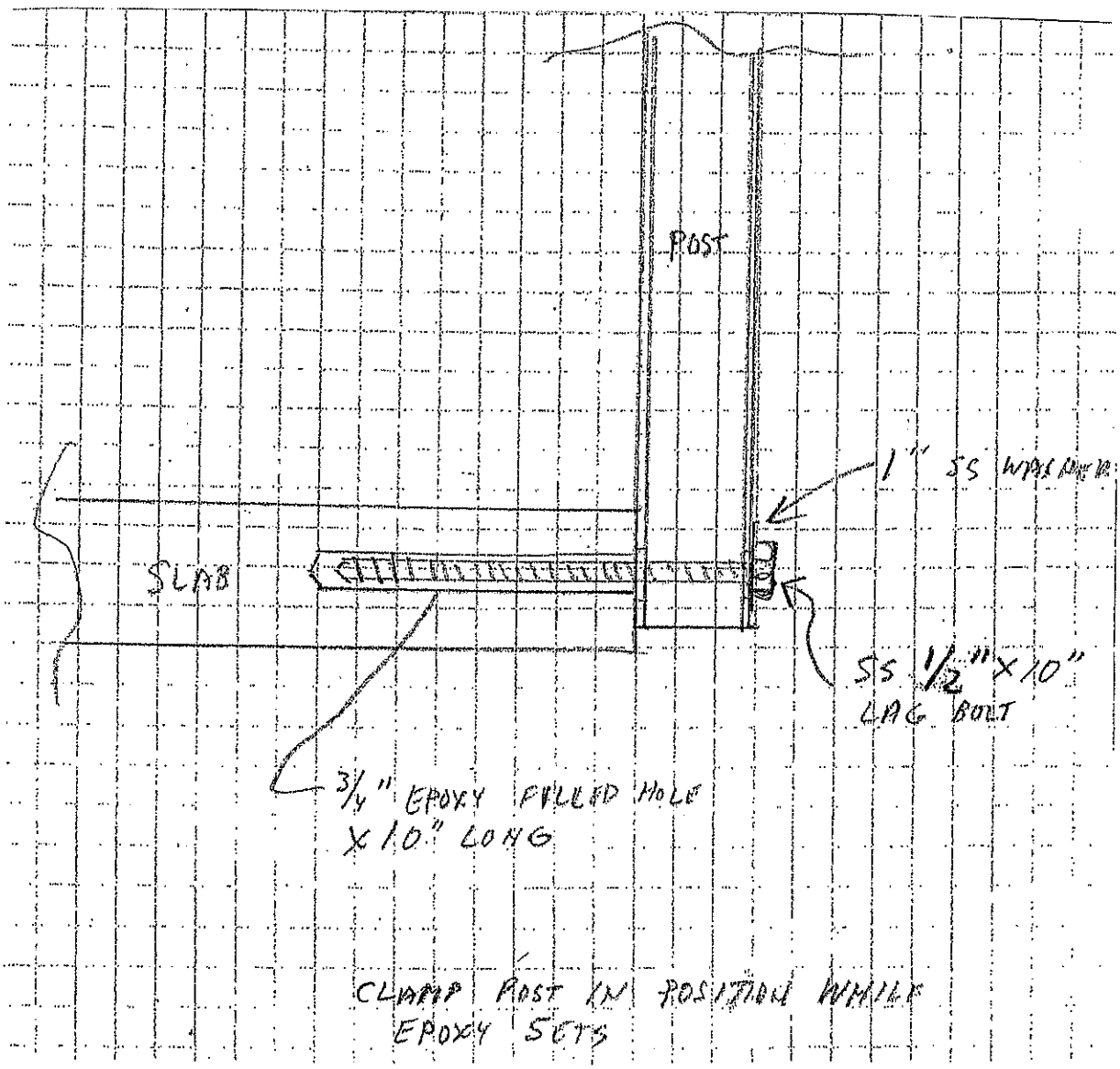
REVISIONS	DATE

DRAWN CW
DATE 08/17/17
SCALE NTS
SHEET SHR-13



RAILING BOLT AT NEW CONC.

CHALAIRE AND ASSOCIATES, INC.
ENGINEERING CONSULTANTS
EB# 6834
DON CHALAIRE, PE #53089
TERRI CHALAIRE, PE #65587
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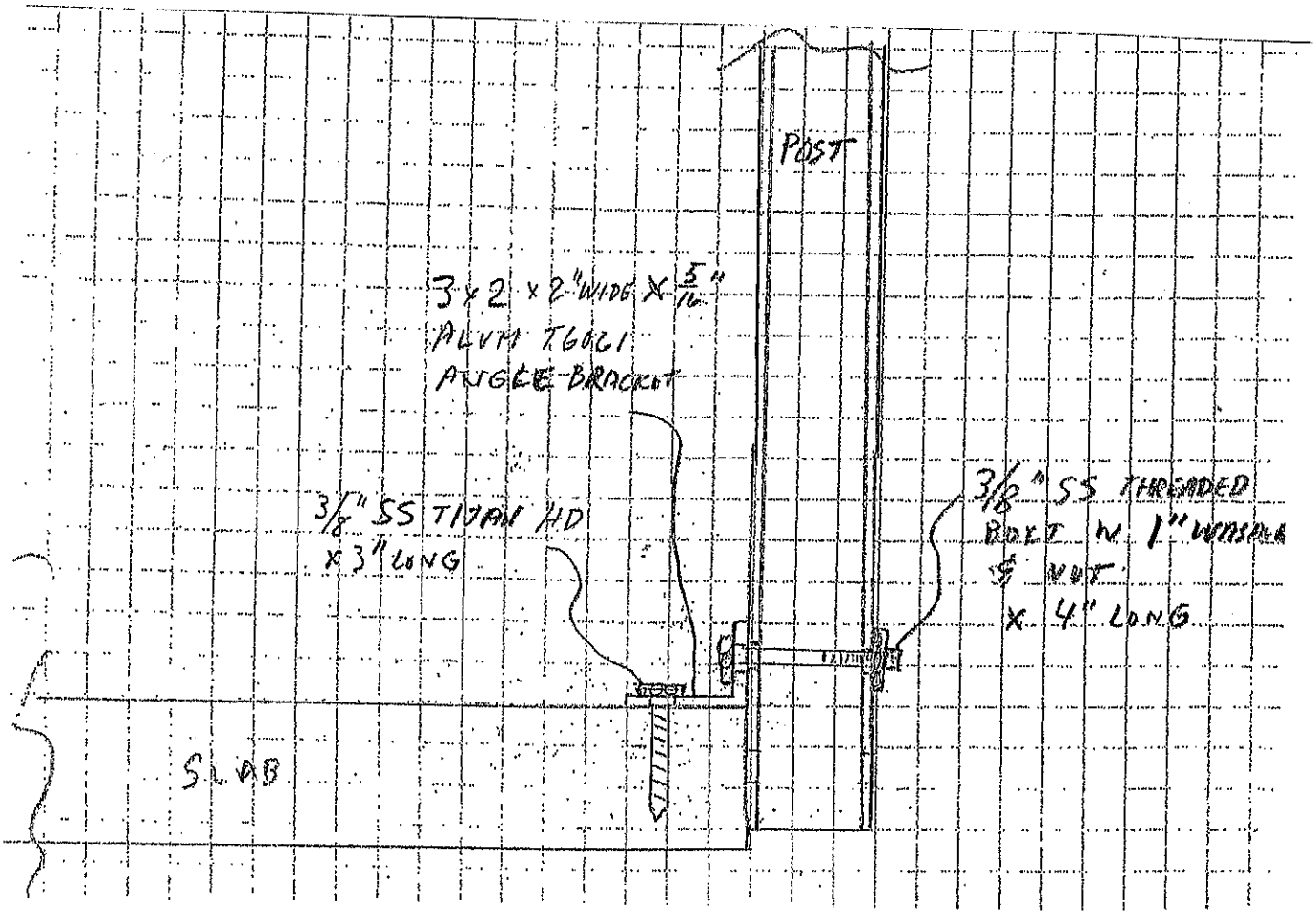
NORTH PALM BEACH, FL 33408
PHONE (561) 848-7055 FAX (561) 848-7057

REVISIONS	DATE	DRAWN CW
		DATE 08/17/17
		SCALE NTS
		SHEET



ANGLE BRACKETS

CHALAIRE AND ASSOCIATES, INC.
ENGINEERING CONSULTANTS
EB# 6836
DON CHALAIRE, PE #33089
TERRI CHALAIRE, PE #65587
721 US HIGHWAY #1, SUITE 212
NORTH PALM BEACH, FL 33408
PHONE (561) 848-7055 FAX (561) 848-7057

REVISIONS	DATE

DRAWN: CW
DATE: 08/17/17
SCALE: NTS
SHEET:

REPAIR LOCATIONS

AND

ESTIMATED QUANTITIES

(FROM SURVEY REPORT DATED 11/21/23)

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
1	6901		x			x	4				4		
	6902		x		x	x	8	2				1	bolt missing
	6903		x			x					2		
	6904		x	x			4	1		x			visible rebar
2	6905		x				6		x		2		
	6906	x				x	4						
	6907		x				8				2		
	6908		x			x	4						
3	6909		x					3	x				
	6910		x			x							
	6911		x			x	4					3	bolt missing
	6912		x			x		3					
4	6913		x					2					
	6914		x			x	10						
	6915		x					1			6		
	6916		x					1					
5	6917		x			x	1	9	x		6		visible rebar, prev patch
	6918				x		8	2		x	4		bolt missing
	6919		x			x					8		
	6920		x				7	3					
6	6921		x				4	3		x	6	1	visible rebar, visible chair
	6922		x				8				10		beam spall
	6923		x					2		x	4		
	7004		x				2	1			4		bolt missing
7	6925		x								2		
	6926		x			x	8	4		x	2		
	6927		x		x	x		4					
	6928		x				8	7	x	x	2		
7	69th Court Sub	1	26	1	3	13	98	48	4	6	64	5	

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
8	7001		x	x			4	4	x				
	7002		x								4		
	7003		x				8						
	6924		x				8				2		
9	7005		x				4	4	x		2	1	
	7006		x					4	x	x	4		
	7007		x	x				2			2	1	
	7008		x					8			2		
10	7009		x								2		prev patch
	7010		x				11						
	7011		x			x							
	7012		x		x	x	3	1					
3	70th Court Sub	0	12	2	1	2	38	23	3	1	18	2	
11	7101		x				8	24		x	2		
	7102		x			x							
	7103		x	x		x					2		
	7104		x								4		
12	7105		x				8	4			2		
	7106	x			x	x							
	7107	x	x					6	x		4		
	7108		x					10	x	x	8		
18	7109		x			x	4	4		x			
	7110		x					14	x	x	4		visible chair
	7111		x										
	7112		x			x		4		x	2	2	prev patches, hook in small balc
19	7113		x			x		4		x			
	7114		x		x	x		6	x		4		
	7223		x			x		7	x		2		
	7224		x			x					6		

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
16	7115		x					2			6		
	7116		x			x	8						
	7221	x					10				2		
	7222		x			x		3			4	1	ACC frame only, visible rebar
15	7117		x					5		x	2		
	7118		x		x			5	x			2	
	7119		x					4		x	2		
	7120		x					7	x	x	2		
14	7121		x	x				9	x	x	4		
	7122		x			x	2						
	7123		x		x						2		
	7124		x			x	4	4			4		
13	7125		x					3	x	x	2		
	7126		x				4	6			2	1	
	7127		x		x						2		
	7128		x										
8	71st Court Sub	3	30	2	5	13	48	131	9	11	74	6	
21	7201		x					1				1	holes in bottom of balc, visible chairs
	7202		x					3			2		
	7203		x		x	x		23	x	x			
	7204		x		x			3			4	3	
22	7205		x				8	2			2		
	7206		x				4	12	x	x	2		
	7207		x				8	3		x	6		
	7208		x				8	5		x	4		
24	7209		x					14	x	x	2		
	7210		x					11	x	x	2		
	7211		x					27	x	x		1	
	7212		x				8	7	x				

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
23	7213		x					3		x		1	
	7214		x					24	x	x	2		
	7215		x				3	1					visible rebar, unused fastener holdes
	7216		x				8	2			4		
17	7217		x					6					
	7218		x			x		13	x	x		1	visible chairs
	7219	x					4				2		
	7220		x								2		
20	7225		x		x			15	x	x	2		visible chairs, stuccod damage to wall
	7226		x		x	x							
	7227	x						4			2		
	7228		x					1			6		
6	72nd Court Sub	2	22	0	4	3	51	180	9	11	44	7	
29	7301		x				8	18	x	x	6		visible chairs
	7302		x					14	x	x	8		
	7303		x				6	17	x	x	2		visible chairs
	7304		x			x		18	x		2	2	
30	7305		x					26	x	x	6		visible rebar
	7306		x				6	4	x		2		beam spall
	7419		x			x		32	x	x	4		visible chair
	7420		x				8	27	x	x	2		
33	7307		x					13	x	x	4		
	7308		x			x		3					visible rebar and chairs, ACC frames only
	7417		x					2			4	1	
	7418		x	x			8	42	x	x	2		
32	7309	x					8	2	x		6		divots slab ceiling, vegetation by SGD
	7310		x					10		x		3	
	7311		x		x		8			x	4		
	7312		x				3	15	x	x	4		

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
28	7313		x			x		1					
	7314		x		x			28	x	x	2	1	
	7315		x					42	x	x	4		visible chairs
	7316		x		x		8	42	x	x			
27	7317		x		x	x							pev patch
	7318	x									2	1	cracked tile on large balc
	7319	x				x		1			4		
	7320		x		x			1			2		
25	7321		x					4		x	2		
	7322		x					7	x	x	2		
	7323		x					4		x	2	1	
	7324		x					16	x	x			
26	7325		x										missing bolt, hole in beam
	7326		x					13	x	x	6		
	7327		x			x					2		
	7328		x				4	8	x	x	2		
8	73rd Court Sub	3	29	1	5	7	67	410	19	20	86	9	
38	7401	x				x	10				2	3	
	7402		x			x	7	2			6		
	7403		x				4	16		x			
	7404		x				6	12	x	x	2		
39	7405		x			x	3	8			6		visible chair
	7406		x				6	3	x		2		
	7522		x			x		6		x	4	1	
	7523		x		x			20	x	x		2	visible rebar
36	7407		x				3	4	x		4		2 missing bolts
	7408		x					12		x	4	1	
	7520		x				4				4	1	
	7521		x				4	2			4		

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
35	7409		x					35	x	x	4		
	7410		x					13	x	x	2		unused fastener holes
	7411		x					30	x	x	2		stucco damage
	7412		x					42	x	x	2		
34	7413		x					12	x	x	2		
	7414		x					14	x	x	4	2	visible rebar
	7415		x					18	x	x	2	1	
	7416		x	x				26	x	x	2		vegetation
31	7421		x			x	4	6	x				
	7422		x				4	2	x		2		missing bolt, visible chair
	7423		x			x		6			4		vegetation
	7424		x			x	4	2					stucco damage
6	74th Court Sub	1	23	1	1	7	59	291	14	13	64	11	
41	7501		x					10	x	x	4		
	7502		x			x		3					
	7503	x				x	3				8		
	7504		x				3	24	x	x	2	1	
44	7505		x			x	8	11	x	x	2	2	prev patches, visible chair
	7506		x				8	4			2	1	
	7507		x		x	x		7	x	x		1	visible chairs
	7730	x				x	4				6		tile heaved at large balc
43	7508	x	x					1					turf on small balc
	7509		x			x	4				2	1	
	7510		x		x			42	x	x	2		visible chairs
	7511		x	x							2		carpet on large balc
42	7512		x	x				11	x	x	6		vegetation, ripped screen
	7513	x				x	4				2		vegetation
	7514		x			x	3	16	x	x	4		visible chair
	7515		x			x	8	15	x	x	8		prev patches, vegetation

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
37	7516		x		x			17	x	x			visible chairs
	7517	x									2		unused fasteners
	7518		x			x							
	7519		x					7	x		2		
40	7524	x				x							
	7525		x					33	x	x	4		
	7526		x			x		16	x	x	4		
	7527	x						1					
6	75th Court Sub	7	18	2	3	12	45	218	12	11	62	6	
75	7601		x			x							
	7602		x		x			3					
	7603		x					7	x	x	4	1	visible rebar, screws under balc
	7604		x		x			8		x	2		visible rebar and chairs
74	7605		x			x		4					prev patches
	7606		x			x		5	x		2		visible chairs
	7607		x		x			1			2	1	missing bolt
	7608		x		x			3			6		conc chunk missing, ripped screens
73	7609		x			x	4	1			8		visible chair, vegetation
	7610		x					7	x	x	2	1	
	7611		x			x		3			2	1	
	7612		x					4			2		
72	7613		x				7	4	x		2		prev patch
	7614	x					4				2		
	7615		x				6	12	x	x	6		prev patches
	7616		x			x	4	23	x	x			visible rebar
71	7617		x			x					2		visible chair
	7618	x									2	1	
	7807		x		x	x	4	5			2		
	7808		x	x		x	7	5	x				

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
68	7619		x		x		8	7	x	x	2		visible chairs
	7620		x					15	x	x	2		visible rebar
	7805		x				3	10		x	2	2	
	7806		x		x			17	x	x	4		visible chair
69	7621		x					12	x	x	2		
	7622		x		x	x		9			4		
	7623	x						1			2		
	7624		x			x		2			2		overgrowth
7	76th Court Sub	3	25	1	8	11	47	168	11	10	66	7	
53	7701		x					34	x	x	4	1	visible rusted rebar
	7702		x		x	x							
	7703		x					42	x	x			visible rusted rebar
	7915		x			x		42	x	x	2		prev patches
51	7704		x				4	15	x	x		2	visible chairs
	7705	x									2		cracked and lifted tile, vegetation
	7913		x			x		3				2	visible rebar, prev patches
	7914		x		x			5	x			1	plant overgrowth
50	7706	x									2		vegetation
	7707		x		x		3	2			4		impact doors, visible chair
	7708		x					6		x			visible chairs
	7709		x					15	x	x	2		visible chairs
49	7710		x					42	x	x	2	1	visible chair and rebar
	7711		x		x	x						2	prev patch
	7712		x			x		13		x	2		visible chair
	7713		x	x				34	x	x	4		vegetation
48	7714		x			x	4	6				2	visible chair
	7715		x					4		x	2		
	7716		x					3			2		visible chairs
	7717		x					8		x	4		

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
							Edge spall w=9"	Deck slab spall	entire balc likely	entire balc likely	Wall/Col Beam spall	Rust Spot	
Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
47	7718		x				7	8	x	x	4		
	7719		x			x	3	15	x		2		
	7720		x					30	x	x			visible chairs
	7721		x		x			27	x	x			ripped screen
46	7722		x	x			8	24	x	x	2		
	7723	x						4					vegetation
	7724		x					10		x	4		prev patches
	7725	x	x					4					vegetation, rug on top of small tile balc
45	7726		x					31	x	x	4		
	7727		x		x			42	x	x			visible chairs
	7728		x			x	10	8			2		prev patches, visible chair
	7729		x		x			42	x	x	2		visible chair, stucco damage
8	77th Court Sub	4	29	2	7	8	39	519	16	19	52	11	
67	7801		x			x	11	12	x	x		1	
	7802		x			x	3	10	x	x	6	2	visible rebar
	7803		x	x				42	x	x			interior water damage by SGD near large balc
	7804		x	x									
70	7809		x		x			42	x	x			visible chairs
	7810	x			x		4						
	7811	x											missing bolt
	7812		x			x		2					visible chair
63	7813		x				11						visible chairs
	7814		x		x	x		4					
	7815	x	x			x	11	7	x	x			visible rebar, rug on small balc
	7816		x				4	20	x	x	4		prev patches, rusted fasteners
62	7817		x			x	4	5	x			2	visible chairs
	7818		x				4	28	x	x		1	visible rebar (severe), prev patches
	8007		x			x	7	2	x		6		visible rebars and chairs, prev patches
	8008		x				7	36	x	x	2		visible rebar and chairs

Heritage Village - OBSERVED ESTIMATED QUANTITIES

Location		Balc Flr Cover		Covered Flat Screen Encl	Screen Encl	Accordion Shutters?	Estimated Quantities						Notes
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Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
65	7819		x			x	10	11		x	2		visible rebar, prev patches, sawcuts
	7820		x				10	42	x	x	4	1	prev patch
	8005		x				8	7	x		4		prev patch, visible chair
	8006		x	x		x		5			2		visible rebar
66	7821		x			x					8		unused fastener holes, divots
	7822		x				4	16		x	2		visible chair, prev patch
	7823	x					7				4		stucco damage, visible chair
	7824		x	x		x	7	16	x	x			visible rebar
6	78th Court Sub	4	21	4	3	11	112	307	13	12	44	7	
56	7901		x				6	12	x	x	2	1	
	7902		x	x		x		2			2		
	7903		x	x				7					
	7904		x			x	4	25	x	x	2		
55	7905		x		x		8	42	x	x	2		hooks in bottom of balc
	7906		x					42	x	x	2		visible rusted rebar
	7907		x					42	x	x		1	visible rusted rebar
	7908		x					32	x	x	4		visible rusted rebar
52	7909		x					8	x		2		
	7910		x			x	4	12		x			visible chair
	7911		x			x		2			2	1	
	7912		x			x		3	x		2		visible chair
54	7916		x		x		4	10	x	x			
	7917		x			x	4	7	x		2	1	visible chair
	7918		x			x		42	x	x	4		visible rusted rebar
	7919		x					11	x	x	2		visible rebar
4	79th Court Sub	0	16	2	2	7	30	299	12	10	28	4	
64	8001		x				11	17	x	x	4	1	visible rebars and chairs
	8002		x			x	3	5	x				
	8003		x				4	1				2	prev patches, visible chairs
	8004		x			x		6	x				visible rebar

Heritage Village - OBSERVED ESTIMATED QUANTITIES

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Bldg #	Unit #	Tile	Other				LF	SF	small	large	CF	#	
61	8009		x			x		4		x			rusted visible rebar
	8010	x		x							2		
	8011		x		x	x	4	6	x	x	4		vegetation, visible chair
	8012		x					24	x	x	4		visible rebars and chairs
60	8013		x	x			3	15	x	x			
	8014		x					8	x		4	3	prev patches, visible chairs
	8015	x					4				4		
	8016		x					15	x	x	2	1	visible chairs
59	8017		x				4	2		x	2		
	8018		x					9	x	x	2		
	8019		x					20	x	x	4		
	8020		x			x		8	x	x	2		rug on small balc, visible rebar
58	8021		x			x		2					prev patches, visible chair
	8022	x					3				2		
	8023		x			x	4	1			4	1	
	8024		x					6		x	4		visible rebar
57	8025		x					2			4		prev patches, visible chairs, bolt not connected
	8026		x					17		x			visible chairs
	8027		x					6	x		2		
	8028		x			x		6	x		2	1	visible chairs
6	80th Court Sub	3	21	2	1	8	40	180	13	12	52	9	
75	Total	31	272	20	43	102	674	2774	135	136	654	84	