



BASIC OUTLINE FOR DESIGN

FOUNDATION: 4000 PSI concrete for all footings, walls, and fiber mesh slab: Two rows of # 4 rebar in the footing with # 4 vertical uprights 2' on Center. Wherever possible the footings/frost wall will be drilled and Pinned to existing Ledge. The walls will have # 4 verticals 2' O.C. and 8 rows of # 4 horizontal. Appropriate utility penetrations in the 8" thick concrete walls to be determined by contractor onsite for water, sewer, and electrical. Drainage consists of PVC drainage pipes placed atop the footings, then crushed stone, drainage fabric, more crushed stone. Preferably sand, or gravel will be placed at least half way up the concrete walls to assist drainage. Drainage precautions will be oversized. Basement walls will be treated with two coats Thoroseal (Grey color) once the concrete formwork ties are knocked off to increase moisture protection. Appropriate plumbing pipes will be applied under in the crushed stone as under-slab-prep. The crushed stone will be tamped and leveled, then 3" thick blue board will go on top and be leveled and sealed– PEX tubing will then be placed on top of the blue board, then the fiber mesh slab will be poured. The slab will get a polished trowel finish, and once under roof, a clear coat sealant (leaving concrete its natural color) as this slab will act as the completed and finished floor in the basement with radiant heat underneath.

WALLS: 2 sets of above ground 2" X 6" P.T. lumber stacked and sistered running horizontal (or 1 set of 4" X 6" P.T.) creating stud wall sill plates for the basement walkout. On the inside of the concrete walls, 2" X 3" studs will be used to maximize interior space

and will be filled @ 2" of polyurethane closed cell spray foam before receiving strapping and the 1/2" sheetrock. No. 2 (or better) SP @ 2" X 6" X 8' stud construction will occur for both the basement walkout and the entire perimeter of the 8' high main floor walls. For minimal cost for maximum lateral load efficiency, a set of diagonal braces (either hurricane ties, eccentric braces, chevron braces, or "X" braces will be chosen) for each wall extending from the P.T. sill plates to the top of the wall (to the header) at an angle between 30° and 60° (45° is ideal) while omitting the 250° West facing wall of glass— however some additional bracing can be implemented in Both Gables if possible. This will account for a few hundred dollars in price but up to a 20 to 30% increase in lateral (wind and seismic load capacity) and reduce the chance of any racking. Walls will be finished on the exterior with an insulated zip system sheathing with 1" of insulation on the inside and rigid plywood @ 3/4" on the outside followed by vertical Northeastern White pine premium shiplap @ 1" X 10" with no finish (untreated), with the rough side out. This will be fastened with stainless steel screws. The clear span tie beam on the main floor (centered on the wall between the wall posts and loft posts) is glulam engineered timber @ 4" X 10" X 28' held up by galvanized steel L brackets that are hex bolted (also galvanized) into the wall (sistered vertical studs). This inside of the walls on the main floor will be insulated with closed cell polyurethane @ 3" thick. Then wood strapping, and then 1/2" sheetrock will be hung on the interior walls (both the basement and main floor ceilings will be finished in sheetrock as well) with corner bead so the sheetrock will fall 90° to the glass without any wood exposed on the interior window casing, creating a Square Columnar effect.

FLOORS: The main floor (basement ceiling) will be comprised of joists @ 2" X 10" extending from, either the perimeter walls to the bathroom walls, the bathroom walls to the center timber column, or the opposite exterior walls to the center column. Girders will be built onsite using sistered 2" X 10" LVL's to carry loads to the walls and the 8' X 8' wood column while making appropriate space for the stairs. The loft floor joists are 2" X 8" X 8' studs @ 16" O.C. The basement floor will be a polished concrete (discussed in Foundation section above). The main floor and the loft floor will get white pine boards tongue and groove @ 1" X 8" X 8' (or cut to fit on length) and will receive a polyurethane matte finish— all pine boards nailed into plywood with galvanized square head nails.

WINDOWS: There are 4 separate sets of identical sizes (if these sizes aren't stock, then we'll have to rearrange to have an near identical layout as presented within). 8 windows with an R.O. of 3' X 6' 6" all fixed (picture windows) and double paned. 5 Windows will have an R.O. of 2' X 4' and will be awning windows (including the one in the East Facing gable end). 2 windows will have an R.O. of 2' X 6' and will also be awning windows. The last window will have an R.O. of 1.5' X 8' will be fixed and double paned and is located in the West South West Facing gable. Specific to each floor, the windows will RIDE THE EXACT TOP HORIZONTAL LINE around the structure (and also both glass doors as close as possible). The 2 doors will be primarily glass with an aluminum-clad exterior; and both doors will be in swinging to provide for venting screens in the future. Whatever manufacturer is decided upon (Geld win, Anderson, etc.) for the windows— then the doors will be of the same brand and include Identical cladding— creating the most

uniform effect possible. All windows and doors will be clad in aluminum in either a grey, light grey or silver and the hardware will be consistent, choosing only 1, in either a chrome, nickel plated, or aluminum finish; and only 1 color and style of hardware will be consistent throughout all windows and doors.

ROOF: 6/12 pitch (50% grade or 26.6°) with 2" X 12" 18' rafters @ 16" O.C. This will also leave the desired 16" for the overhangs on the non-gable walls. The rafters will have a 2" X 12" X 24' ridge board (or the like) that will leave the desired 2' overhangs along the gable ends. Channel braces between each rafter will be staggered (for nailing) and will connect each rafter to the other; once @ 1/3 the distance from the ridge; and again @ 1/3 the distance from the eaves to prevent any racking. As for roof loads, satisfied under ASD specifications: Dead Load 25 PSF + Live Load 85 PSF = Total Load of 100 PSF (T.W. @ 16") = 130 LB/FT. Fv (Max. Shear) 125 PSI, Fb (Max. Bending moment) 2800 PSI, E 2,200,000 PSI; N.A., Δ; N.A. $V = WL / 2$ and $FV = 3V / 2A$ therefore 104 PSI < 125 PSI, FV is Satisfied. $M = WL^2 / 8$ with when $M = 49920$ LBS", when $C = 5$ ", while FB then is $(M)(C) / I$ if $I = b(h^3) / 12$ therefore 1995 PSI < 2800 PSI, FB is Satisfied. Unbalanced snow loads have been considered for this design. Calculating wind and seismic loads; wind load controls at; $V = 115$ MPH (3 second gust), $I = 1.15$, $KZ = .7$, $KZT = 1.5$, $KD = .90$, $G = .85$, $CP = .8$ (windward) or $-.5$ (leeward) < all exterior column corner wall loads with rafters and roofing on top at given the tributary weight) with a .6 coefficient F.O.S. Atop the rafters will be Advantech, then Triflex, then metal roofing. Optimally, a standing seam roof will be at 26 gauge Galvanized or Galvalume (silver color) and if this is not within budget, then a 26 gauge galvanized or Galvalume (silver color) American Building Component corrugated metal channel roofing (Ameri-drain style) fastened into the roof sheathing with galvanized screws to size. The roof will be insulated with closed cell polyurethane blow-in foam @ 4" thick. Inside finish for the roof will be 1/2" sheetrock painted bone white, same as the walls. The soffits, fascia, and bargeboard will all be premium white pine untreated shiplap, absent of trim, moldings, and any shadow boards. Soffit vents will be custom made— rectangular holes in the underside wood spaced equally and centered along the soffits.