PASSIVE HOUSE RETROFITS

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BRENNAN & BRENNAN
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M2 CONTRACTING
PASSIVE HOUSE ACADEMY
PASSIVE HOUSE INSTITUTE
PJIOE CONSTRUCTION
RJD ENGINEERING
SG BUILD
TAFFERA FINE BUILDING & FINISHES
+ ALL CONTRIBUTING SUBCONTRACTORS
LESSONS LEARNED:
HOW TO SELL THE
CONCEPT OF PASSIVE
EXPLAINING AMENITIES TO CLIENTS
Do people care about climate change?

U.N. REPORT FROM THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

THE PLANET COULD REACH THE TEMPERATURE THRESHOLD THAT WILL SEE THE WORST EFFECTS OF CLIMATE CHANGE AS EARLY AS 2030. (TIME)

“"I just keep asking myself, ‘Why don’t I care about this?’ Don’t get me wrong, I 100% believe in climate change. yet, I’m willing to do absolutely nothing about it.”

MICHAEL CHE, WEEKEND UPDATE, SATURDAY NIGHT LIVE.
NBC 10/13/2018

Climate Change’s Effect on Beer Production

Scientists report that climate change may impact the world’s beer supply, and the U.S. faces a potential $1 trillion deficit by 2019.

THE DAILY SHOW WITH TREVOR NOAH, COMEDY CENTRAL. 10/16/2018
WHY CLIENTS CHOOSE PASSIVE: SEALED WALLS

Passive buildings have sealed walls that *prevent dust, bugs, mice, and unwanted air* infiltration.

Unknowingly, many of our existing homes get their “fresh air” through hidden crevasses and holes, where bugs and vermin can roam freely.

LEFT: TYPICAL TOWNHOUSE FLOOR JOISTS POCKETED INTO THE PARTY WALL.

ABOVE: PASSIVE FLOOR JOISTS ARE WRAPPED BEFORE POCKETED INTO THE SEALED PARTY WALL.
WHY CLIENTS CHOOSE PASSIVE: FRESH AIR

What if you could have filtered fresh air 24/7?

Passive house owners can tell the difference in fresh air quality, one of their most appreciated passive elements.

- No need to open windows for fresh air, (but you still can!) as energy recovery ventilators (ERV) regulate moisture.
- ERVs filter air from contaminants and pollution, noticeably alleviating health issues like allergies.
- ERVs stabilize humidity levels, especially during the summer.
- ERVs are constantly running at a low speed without user interaction, but at a low electricity draw.
WHY CLIENTS CHOOSE PASSIVE: QUIET HOMES

What if you could eliminate almost all street noise?

The combination of sealed walls, better insulation, and Passive windows drastically reduce street noise. Quiet spaces no longer need to be at the back of the home.
WHY CLIENTS CHOOSE PASSIVE: WARM HOMES

What if you almost never needed heat?

New York City Passive House occupants barely use their heat. These Brooklyn homeowners had not turned on the heat all season, and this interior temperature was recorded.
WHY CLIENTS CHOOSE PASSIVE: DESIGN FREEDOM

Passive House allows for more *design freedom*.

Without radiators, soffits, or drafts, *we no longer have the spatial constraints* as when designing within a typical townhouse.
WHY CLIENTS CHOOSE PASSIVE: NET ZERO

Passive house is the path to net-zero.

By building a better envelope, a passive house reduces the energy demand and makes net-zero possible with renewable energy sources, like solar panels.
LESSONS LEARNED: A SUCCESSFUL PROCESS WORKING WITH CONSULTANTS AND CONTRACTORS
WORKING WITH CONSULTANTS

1. Start with your passive consultant before Schematic Design.
   - Reduce heating load
   - Reduce cooling load
   - Reduce primary energy load

2. Help your clients understand passive house concepts and to provide clear options with implications of their decisions.

GRAPHICS ARE PART OF A PASSIVE CERTIFICATION PACKAGE, FROM BLDGTYP (PASSIVE CONSULTANTS).
WORKING WITH CONSULTANTS

3. Pay close attention to shading & cooling.

PRELIMINARY ENERGY MODEL FOR WINTER PERIOD WINDOW NET ENERGY BALANCE, FROM BLDGTYP (PASSIVE CONSULTANTS).
WORKING WITH CONSULTANTS

Throughout Construction:
• Hold frequent walk-throughs to ensure correct implementation of details.
• Do blower door tests often, which test the air-tightness of a building, seeking 0.6 air changes per hour @ 50 pascals pressure (0.6ACH50). In a typical townhouse, around 10.0 ACH50 are common, which means that the mech. systems need to make up for that much heat/cool air.
WORKING WITH CONTRACTORS

Myth: “You need a passive house contractor to be successful.”

- None of the contractors we worked with had worked on a passive house, or even heard of the term.
- We required that the site super and G.C. get certified through the passive house tradesperson training at AEA.

You do need a contractor that enjoys building.
WORKING WITH CONTRACTORS

Three essential meetings:
1. Pre-design meeting
2. Pre-construction design meeting
3. Passive house primer meeting on site with subcontractors
IMPORTANCE OF COMMISSIONING & SERVICING

Identify who will:

- Commission
- Service
- Educate client about how the house works, i.e., change typical habits

HRV/ERV UNIT ZEHNDER

ROUTINE SYSTEM BALANCING ALEX WILSON, BUILDINGGREEN, INC.

PERFORMANCE MONITORING WIRELESS SENSOR TAG BY CAO GAGETS LLC, & NETATMO WEATHER-STATION SHOWN.
GAME-CHANGING REALITIES
TYPICAL HEATING SYSTEMS

- CHOPPED-OUT PLASTER CROWN FOR PIPE INSTALLATION
- HOT EXPOSED PIPE
- PLENTY OF SPACE, BUT NOT INSULATED
- WINDOWS INSTALLED IN A WAY THAT ALLOWS AIR LEAKAGE
- RADIATOR IN AN AWKWARD LOCATION WITH A LEAKY VALVE
- ROTTING AROUND PIPE THROUGH FINISHED FLOOR
TYPICAL HEATING SYSTEMS

1. MANY OF OUR HOUSES HAVE DECADES-OLD SYSTEMS THAT WERE OVERSIZED, INEFFICIENT BOILERS WITH NO ZONING.

2. THEN WE RESOLVED THIS BY PROVIDING:
   • HIGH-EFFICIENCY BOILERS
   • THE ABILITY TO ZONE PER FLOOR/ROOM
   • SOME HOMES EVEN HAVE HYDRONIC IN-FLOOR HEATING.

3. THEN WE STARTED TO CONTROL THIS SYSTEM EFFICIENTLY WITH SENSORS & CONTROL SYSTEMS THAT WORKED WITH PHONES & TABLETS.
PASSIVE HEATING SYSTEMS

In a passive home, you don’t need a separate heating system.
PASSIVE HEATING SYSTEMS

COST, TIME, & SPACE SAVINGS:
- NO BOILER
- NO MANIFOLDS
- NO FLUE
- SIGNIFICANTLY FEWER THERMOSTATS
- NO ELABORATE CONTROL SYSTEM
- NO RADIATORS
- NO RADIATOR PIPING
- NO NEED FOR IN-FLOOR HEATING
TYPICAL COOLING SYSTEMS

THROUGH-WALL A/C UNITS

SEVERAL ROOFTOP CONDENSING UNITS
TYPICAL VS. PASSIVE ROOF

PASSIVE HOUSE
ROOFTOP
MECHANICAL
EQUIPMENT

TYPICAL HOUSE
ROOFTOP
MECHANICAL
EQUIPMENT
PASSIVE ROOF

WITH 80-90% LESS MECHANICALS, A ROOF CAN LOOK LIKE THIS.
TYPICAL VS. PASSIVE WINDOWS

PASSIVE HOUSE WINDOWS:
• CAN BE VISUALLY INDISTINGUISHABLE
• CAN BE LANDMARKS APPROVED
• FAR OUT-PERFORM TYPICAL WINDOWS
• CAN BE COST NEUTRAL
PASSIVE WINDOWS

PASSIVE HOUSE WINDOWS INSTALLED IN LANDMARK DISTRICTS.
TYPICAL VS. PASSIVE CELLAR

TYPICAL TOWNHOUSE CELLAR
TYPICAL VS. PASSIVE CELLAR

PASSIVE CELLARS CAN LOOK LIKE THIS AND HAVE FRESH, NON-DAMP AIR.
CLOTHES DRYERS

Heat pump dryers

Whirpool has a full-sized electric heat pump dryer that does not need to be vented, but *should include an ERV exhaust point in the room.*
LARGE WINDOWS

Walls of glass

They are possible if you are mindful of shading and building orientation.
HISTORIC DETAILS

Passive front door in Landmark/Historic Districts

NEW PASSIVE DOOR, LPC APPROVED

EXISTING HISTORIC DOOR

NEW PASSIVE DOOR
HISTORIC DETAILS

Preserving existing details
You can do a passive house without gutting a space. Passive windows are a solution to difficult historic openings.

BEFORE

AFTER

PASSIVE HOUSE CASEMENT WINDOWS WITH RE-APPLIED AND RESTORED STAINED GLASS AT INTERIOR.

ADAM MACCHIA PHOTOGRAPHY
PASSIVE CONCEPTS APPLIED
PASSIVE HOUSE:
TOWNHOUSE RETROFIT
BROOKLYN, NY
EXTERIOR WALL
SECTION DETAIL, EXTERIOR WALL

- MASONRY WALL
- Parge Coat and Liquid Applied Air/Water Membrane
- Maintain a minimum 1” gap between masonry wall and back of stud
- 3 ½” x 1 ½” laminated veneer studs @ 16” O.C.
- 4.5” of dense packed cellulose, blow in insulation between masonry and wood
- Continuous Air Barrier
- 2x2’s laid horizontally @ 16” O.C.
- 1 1/2” unfaced stone wool batt insulation in service cavity
- Finish GWB
- Top of Finish Floor

**Spray-Applied Rockwool, R-4 per inch (American Rockwool)**
**Suggested Sequencing Notes:**

1. Parge Party Wall with Linemesh Prior to Air Barrier Application
2. Apply Liquid Membrane to Party Wall
3. Frame Out Front/Rear Wall as Indicated
4. Install Vapor Membrane to Front/Rear Wall
5. Insulate Front/Rear Wall
6. Install Horizontal Furring and Frame Out Party Walls
7. Install Unfaced Batt Insulation at Front/Rear Wall & Rigid Foam at Party Wall (3.5'-0")
8. Install CBG as Noted

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**Diagram Details:**

- **Passive**
- **Neighbor**

- Verify Sound Batt
- 1/2" Hat Channel @ 24" O.C.
- 3/8" Horizontal Nailer Midway Up Wall to Tie Back Studs.
- 1. Apply (1) Layer of Liquid Air Barrier
- 2. Install Nailer
- 3. Apply 2nd Layer of Liquid Air Barrier Over Nailer and Wall Surface

- Type Insulation - Confirm
- Apply "Sto-Gold" (Or Equal) to Shaped Party Walls, G.C.
- To Review Manufacturer's Installation Instructions
- Parge Existing Masonry with Linemesh Prior to Air Barrier Application

- Existing Brick Party Wall
- Tape Edge of Vapor Membrane to Party Wall with "Pro Clima Vanka" Tape (Or Equal)
- Plywood Strip to Tape Membrane To

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**Plan Detail, Exterior Wall / Party Wall Corner**
SECTION DETAIL, FLOOR JOIST AT EXTERIOR WALL

- Existing front/rear masonry wall
- Finish GWB
- Unfaced stone wool batt
- Insulation in service cavity
- 2x2 horizontal furring
- Approx. 16" o.c.
- Pro Clima "Intello" membrane
  (or equal)
- Note: A/C grade plywood ("A" side
  to int.) can be substituted for
  smart membrane
- Dense packed cellulose
- Insulation blown filling gap
  between masonry and wood
- Varies from 1/2" to 1 1/2" gap
  w/ 1/2" min. required
- 2x4 eng. stud wall
- Finish floor

- Plywood subfloor
- Second wood member to support
- Plywood subfloor installed after
  vapor membrane is passed through
- Note: add framing member to
  support bridging between joists
- Anchors to wall as req’d
- Countersink anchor into joist
- "Proclima, Intello Plus" vapor membrane
  (or equal) wrapped up through to next
  floor prior to decking and wall framing
- New wood joist tied back to existing
  masonry wall with blocking, see note
- Fill cavity between masonry wall and
  first joist (infill between blocking)
- First three joist bays at front &
  rear walls with dense pack insulation

- Note:
  - Solid blocking only required at
    anchor location (full depth x 8" lg)
  - Finish materials & insulation in joist bay
    not shown for drawing clarity
PARTY WALL
PARTY WALL

SECTION DETAIL
PARTY WALL ABOVE GRADE

EXISTING MASONRY PARTY WALL

FLUID APPLIED "STO-GOLD" (OR EQUAL) LIQUID MEMBRANE

1-5/8" METAL STUDS AT 24" O.C. BRACE BACK TO MASONRY WALL

PLYWOOD NAILER TO TIE BACK STUDS TO MASONRY WALL

1. APPLY (1) COAT LIQ. MEMBRANE
2. INSTALL NAILER
3. (1) COAT LIQUID MEMBRANE OVER PLYWOOD

(1 1/2" UNFACED STONE WOOL BATT) INSULATION IN SERVICE CAVITY - CONFIRM.

(1) LAYER 1/4" TYPE X MOISTURE RESISTANT (PURPLE BOARD OR EQUAL) GWB

LIQUID MEMBRANE EXTENDS THROUGH TO NEXT FLOOR

TOP OF FINISH FLOOR

SPRAY STO AND LIME-BASED MORTAR. A PAIR OF SPRayers CAN COVER A FLOOR A DAY.
PARTEL BLOWERPROOF LIQUID

“AIRTIGHT COATING IS SPRAY APPLIED WITH AN AIRLESS PAINTSPRAY MACHINE...IT IS A SMART VAPOR CONTROL MEMBRANE WITH VARIABLE PERMEABILITY.” (PARTEL)

SPRAY APPLICATION BY PARTEL & BRENnan BRENNan
AIR SEALING AT PARTY WALL JOISTS

- **Hand apply "STO Guard Rapid Seal" to Party Wall to Joist Member Connection**
  - AT NEW STRUCTURAL STEEL POCKETS
  - AT NEW DOUBLE C JOISTS

- **Apply "STO Gold" (or equal) Fluid Applied Membrane to Face of Party Wall Brick, refer to manufacturer's instructions**
  - Hold Plywood Subfloor Off Party Wall Temporarily to Allow Application of Air Seal at Party Wall to Be Continuous
  - Hand apply "STO Guard Rapid Seal" to Party Wall to Joist Member Connection
  - "STO Gold" (or equal) All Joist Bays and/or Where Existing Plaster is Not Present

- **Where existing joists are to remain, sister with lvl, sand & prep joists prior**
  - Refer to structural drawings
  - Where already present, existing plaster to remain on Party Walls to act as air barrier

- **Double C-Joists Tape ends before setting in pocket, see image**
  - Fill each in at pocket solid with closed cell spray foam, fill ±18"
PRE-WRAPPED FLOOR JOISTS, TO BE PLACED IN JOIST POCKETS.
CELLAR
CELLAR PARTY WALL, BELOW GRADE

PLAN DETAIL
PARTY WALL / EXTERIOR CORNER, BELOW GRADE

SUGGESTED SEQUENCING NOTES:
1. Install "15 MIL STEGO WRAP" (or equal) at front/rear wall, leave adequate material to return back ±3'-0" on party wall.
2. Parge party walls to ensure acceptable application of liquid applied air barrier.
3. Apply liquid air barrier (confirm spec) to party wall.
4. Complete installation of "15 MIL STEGO WRAP" (or equal) on party wall as indicated.
5. Frame out all walls as indicated.
6. Insulate front/rear wall.
7. Make continuous vapor membrane transition from floor above, tape to 6mil plastic at party walls as indicated.
8. Install GWB as noted.

1 1⁄2" HAT CHANNEL @ 24" O.C.
LIMEWASH PARGING PRIOR TO AIR BARRIER APPLICATION
LIQUID APPLIED AIR BARRIER, STO-GOLD (OR EQUAL)
EXISTING PARTY WALL
TAPE EDGE OF VAPOR MEMBRANE TO STO-GOLD ON WALL WITH "PRO CLIMA VANA" TAPE (OR EQUAL)
AT EXISTING FOUNDATION WALLS, APPLY PLYWOOD NAILER AT TERM. BAR LOCATIONS. APPLY STO OVER PLYWOOD.
TERMINATION BAR RUN VERTICALLY TO MEET HORIZONTAL TERM BAR ABOVE GRADE, SEE FOUNDATION DETAIL.
15 MIL "STEGO WRAP" (OR EQUAL) WRAPPED ±3'-0" BACK ON PARTY WALL W/ TERMINATION BAR RUN VERTICALLY SEE FOUNDATION DETAIL.

EXISTING FRONT/REAR WALL OF HOUSE
UNDER-SLAB INSULATION

LAYOUT OF REBAR

TERMINATION BAR AND STEGO MASTIC
DETAIL AT PARTY WALL

CONCRETE SLAB FILL
RETURN BACK VAPOR BARRIER
WITH TERM BAR 3½”-0” ON PARTY WALLS

'STEGO' (OR EQUAL) TERMINATION BAR LOCATED ABOVE GRADE ON FOUNDATION WALL
AT EXISTING FOUNDATION WALLS, IF NECESSARY, APPLY PLYWOOD NAILED AT TERM. BAR LOCATIONS

1) LAYER 3/16” TYPE X GREENGLASS PAPERLESS CBW OR APPROVED EQUAL
3/4” UNFACED MINERAL FIBER INSULATION

2-1/2” METAL STUDS ON (TIMBERSTRAND BOTTOMPLATE) AT 24” O.C. BRACE BACK TO MASONRY WALL

15 MIL STEGO WRAP (OR EQUAL) TO CLOSE DRAINAGE PLAN

PARGE IF NECESSARY AND APPLY ‘STO GOLD’ (OR EQUAL) TO EXISTING CELLAR WALL

EXISTING FOUNDATION

VERIFY IF UNDERPINNING

ADJACENT BUILDING FOUNDATION

NEW BASE

4” CONCRETE SLAB
15MIL ‘STEGO’ WRAP (OR EQUAL) MOISTURE BARRIER
4” RIGID INSULATION

CELLAR

SECTION DETAIL
EXTERIOR OR PARTY WALL / CELLAR SLAB
SECTION DETAIL
ROOF W/ EXTERIOR WALL

- NEW PRECAST CONCRETE COPING W/ DRIP EDGE
- W.R. GRACE FIREBARRIER W/ S.S. DRIP EDGE

NEW MASONRY PARAPET EXTENSION

RECESS & COUNTER FLASH

BLACK ALUMINUM FLASHING

NEIGHBORS PARAPET

SECTION DETAIL
ROOF W/ PARTY WALL

FINISH GWB

PARGE & STO

EXISTING MASONRY INDEPENDENT WALL

TRANSITION FROM STO TO INTELLO MEMBRANE AT SETBACK - VERIFY CONNECTION DETAIL W/ AIR SEAL SUB.

2X BEARING ON INNER WYTHE

HEIGHT VARIES - VERIFY HEIGHT
NECESSARY TO CREATE POSITIVE WATER PROOFING OR 8" MIN.

RECESS & COUNTER FLASHING

ROOFING MEMBRANE

RIGID INSULATION PITCHED TO EDGE

PLYWOOD DECKING

DENSE PACKED CELLULOSE

A/C GRADE PLYWOOD AS AIR BARRIER AT CEILING OF BULKHEAD

TAPE CONNECTION FROM MEMBRANE TO PLYWOOD

DENSE PACKED CELLULOSE

PRO CLIMA INTELLO MEMBRANE TAPED AT ALL SEAMS W/ PRO CLIMA VANA TAPE

INSTALL A/C GRADE PLYWOOD AS AIR BARRIER ALONG EDGES OF ROOF AND TAPE (A SIDE TO INTERIOR); SEE NOTE BELOW

RAPID SEAL AT TAPE JOINTS

6" STO PEEL & STICK (OR EQUAL)

SECOND APPLICATION OR STO OVER "PEEL & STICK"

LIQUID APPLIED AIR BARRIER STO-GOLD (OR EQUAL)

PARTY WALL

NOTE:
THIS ENSURES INTERIOR PARTITIONS ON PERIMETER CAN BE FRAMED W/O INTERRUPTION FROM INSULATION & PASSIVE ENVELOPE INSTALLATION

SECTION DETAIL
ROOF/PARTY WALL,
NEIGHBOR’S ROOF AT
SAME OR HIGHER LEVEL
SECTION DETAIL

ROOFING MEMBRANE PROTECTION BOARD

4" MIN. RIGID INSULATION

PLYWOOD DECKING
DENSE PACK INSULATION BLOWN IN AFTER PLYWOOD INSTALLATION

ROOF FRAMING, REFER TO STRUCTURAL DRAWINGS FOR SIZING. FRAMING TO SLOPE TO DRAIN/GUTTER.

PLYWOOD SHEATHING INSTALLED AT UNDERSIDE OF ALL ROOF LOCATIONS.
TAPE ALL SEAMS W/ "PROCLIMA VANA" TAPE (OR EQUAL)

SEE DETAIL S/A-514

VERIFY DIM

ROOF PENETRATION

SECTION DIAGRAM

ROOF PENETRATION

VERIFY DIM

SPRINKLER SUPPLY LINE, VERIFY DIA. ERV FLEX TUBES 3 ½" O

LVL ROOF FRAMING

CONDENSATE PIPE
CONFIRM W/ PAPER ON FLASHING AT ROOF MEMBRANE

EXT. RIGID INSULATION
PLYWOOD DECKING

PLYWOOD AIR BARRIER

"PRO CLIMA ROFLEX" (OR EQUAL) ADHESIVE MEMBRANE TO PLYWOOD AIR BARRIER

BOX OUT AS NECESSARY
WINDOWS
Step 1
Prepare Masonry Opening: remove all existing material, clean, re-point inside and out. Exterior masonry layer needs to be water tight to window opening.

Step 2
Install framing components adjacent to window opening.
Install sill framing to accommodate positive slope to exterior.

Step 3
Install side return rigid insulation.
Install sill waterproof flashing on base plywood and 6” up each side.
Install sill sub-base to accommodate positive slope to exterior.

Step 4
Glue-n-screw 3/4” AC-grade plywood strips to top and sides of window frame ensuring a tight fit.
Orient “A-grade” side of plywood facing the window frame and seal/repair all imperfections in A-grade side of plywood for continuous air tightness. (Refer to project plan set for specific section details)

Step 5
Install plywood/window assembly into the masonry opening leaving 1/8” + space at bottom of window sill and sill flashing.
Attach back side of studs to masonry wall using wood blocking or clips in order to secure stud-plywood-window to masonry wall.

Step 6
Screw plywood to side studs making tight connections at close intervals.

Step 7
Install shade pocket rough box.
Waterproof exterior of window to masonry using water tight tape or elastomeric caulk.

Step 8
Install brick mould at sides and top. Caulk to window and masonry.

Step 9
Install interior air tight layer across face of studs. Air seal to window plywood extension jambs.
Install 3/4” thick vertical strips on each stud face.

Step 10
Install 3/4” thick horizontal strips to create a 1-1/2” deep service cavity.
Install electrical boxes and wire runs in service cavity.

Finish
Install blown in insulation behind air tight layer.
Install batt insulation in 1-1/2” service cavity.
Complete shade pocket.
Install drywall and finish trim around window.
WINDOW INSTALLATION WITH SIGA TAPE & M2 CONTRACTING.
MECHANICAL
TYPICAL NON-PASSIVE HOUSE
TOWNHOUSE MECHANICALS

- DROPPED CEILINGS, SOFFITS
- HEAT TO FRONT AND REAR ROOMS

TYPICAL PASSIVE HOUSE
TOWNHOUSE MECHANICALS

- SIMPLER DUCTWORK
- SMALLER MECHANICALS
- CLEARER FRONT/REAR ROOMS

**NOTE:** DUCTWORK NOT ACOUSTICALLY LINED SHALL BE EXTERNALLY WRAPPED
SPECIAL CONDITIONS
NEW MANSARD / DORMERS

SECTION DETAIL
DORMER & MANSARD
**SECTION DETAIL: REAR ADDITION**

**NEW BASEMENT W/ SLAB ON GRADE**

- **Fabric Flashing:** WR Grace Vicor Plus (or equal) embedded in caulking return up sub frame min. 6" refer 'WR Grace Vicor Plus' (or equal).
- **Sill:** Slightly pitched w/ cut in drip edge self leveling caulk.
- **New Slab Pitch to Drain:** Foundation pitch to drain.
- **Min. 4" Foam at Slab Edge:**
- **1" Compac Foam:**
- **Air/Moisture Barrier:** Stego is mill membrane or similar.
- **4" Continuous XPS Insulation Under Concrete Slab:**

**Diagram: New Slab on Grade Connection**

- **Masonry Wall Beyond:**
- **Rigid Insulation or Wood:**
- **1" Rigid Insulation:**
- **Stego 15 Mil Plastic:**
- **New S.O.G.:**
- **Rigid Insulation Below Slab:**
- **Existing Masonry / Rubble Foundation at Rear of House:**
- **New S.O.G. at Basement:**
- **Masonry Wall:**
- **Stego w/ Term Bar:**

**KEY PLAN**

- **Line of Existing Slab:**
- **Confirm Termination:** Stego wrapped up from cellar S.O.G. - See detail 1/A-510.

**SECTION A**

**SECTION B**
SECTION DETAIL
REAR ADDITION -
+ REFER TO CELLAR DETAIL PAGE
SPECIAL CONDITIONS - LARGE MASONRY OPENING

PROVIDING INSULATION WHERE STEEL WAS REQUIRED FOR LARGE MASONRY OPENINGS.
COMPLETED PROJECTS
COMPLETED CERTIFIED PASSIVE PROJECTS

MANHATTAN
UPPER WEST SIDE

BROOKLYN
CARROLL GARDENS

BROOKLYN
BROOKLYN HEIGHTS

BROOKLYN
BROOKLYN HEIGHTS
UPPER WEST SIDE, MANHATTAN

- 1ST PASSIVE HOUSE IN MANHATTAN
- LEED PLATINUM
BROOKLYN HEIGHTS, BROOKLYN

1ST PASSIVE HOUSE IN A LANDMARK DISTRICT

KLEEN CONSTRUCTION

PETER PEIRCE PHOTOGRAPHY
CARROLL GARDENS, BROOKLYN

1ST PASSIVE PLUS IN THE U.S.

PJOE CONSTRUCTION

JOHN MUGGENBOURG PHOTOGRAPHY
BROOKLYN HEIGHTS, BROOKLYN

- ROOF DECK
- LPC APPROVED BAY

TAFFERA FINE BUILDINGS AND FINISHES INC.

JOHN MUGGENBORG PHOTOGRAPHY
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