ETHOS BUILDERS

Project Handbook

Field Reference & SOP Guide

Project R.271 — Kapicka Residence

2735 N Vista Road, Arlington Heights, IL 60004
Phius Core 2021 Certification
Target Start: Mid-July 2026

PROJECT HUB

Scan to access all project documents, SOPs, plans, and videos at:
https://projects.ethos-builders.com/p/2735/

Version 1.0 | May 2026 | Prepared by Ethos Builders Preconstruction

Quick Reference Card

This page is the most-used reference on this project. Photograph it. Keep it accessible. Update if any contact changes.

Site Information

Field	Detail
Site Address	2735 N Vista Road, Arlington Heights, IL 60004
GPS Coordinates	TBD — capture at first site visit
Site Hours	Monday–Friday 7:00 AM – 5:00 PM | Saturday 8:00 AM – 1:00 PM | No Sunday work
Site Access	TBD — gate code or key location
Material Staging	TBD — designate area on site map
Sanitary / First Aid	TBD — site trailer or designated location

Key Contacts

Role	Name	Contact
Owner	Alex Kapicka	TBD
Architect (TBDA)	Denny Burke	TBD
Structural (Quad Chicago)	Gene Mojekwu	TBD
Civil (Haeger)	Karl Novak	TBD
Phius Rater	TBD	TBD
Ethos — Project Lead	Jeremiah Butler	jeremiah@ethos-builders.com
Ethos — Site Super	TBD	TBD
Ethos — Lead Carpenter	TBD	TBD

Emergency Contacts

Situation	Contact
Medical / Fire / Police Emergency	911
Nearest Hospital	Northwest Community Hospital, 800 W Central Rd, Arlington Heights (~3 miles)

After-Hours Site Issue	Ethos Super (see Key Contacts)
OSHA Reporting	1-800-321-OSHA
IL Locate (before digging)	811 or call.iccdiglerts.com (call 48 hours before)
Utility Damage — Gas/Electric/Water	Call utility immediately, then notify Super

Project Hub & Photo Upload

Project Hub — all documents: https://projects.ethos-builders.com/p/2735/

Photo Upload — daily QA photos: https://projects.ethos-builders.com/p/2735/photos/upload

About This Handbook

Purpose

This handbook is the primary on-site reference for project R.271. It provides the information needed to execute the project to Phius Core 2021 certification standards, with QR codes throughout linking to detailed procedures, plans, and how-to videos.

How to Use

- Keep this binder accessible in the site office at all times.
- Every section has QR codes — scan for current SOPs, videos, and detailed plans.
- The Quick Reference Card (page 1) covers daily essentials — photograph it for offline access.
- Stage-by-Stage Workflow (Section 5) is the working reference — read the relevant section before each construction phase begins.
- Inspection Checklists (Section 9) are the gates — work cannot proceed past each gate without sign-off.
- If anything is missing, outdated, or unclear — RFI to architect, escalate to Phius rater if performance-related.

Document Control

Field	Detail
Version	1.0
Issue Date	May 2026
Owner	Ethos Builders Preconstruction
Update Cadence	Living document — updates pushed to project hub URL
Source of Truth	https://projects.ethos-builders.com/p/2735/handbook

> **Important:** The printed handbook is a snapshot. The digital version at the project hub URL is the source of truth and is updated as the project evolves. Check the date in the footer of each page; if older than 30 days, re-print or check digital.

Companion Documents

- Phius Core 2021 Construction Curriculum (deep training — read before starting)
- R.271 Materials Takeoff (MTO) — quantities, vendors, specifications
- R.271 Risk Register — open project risks and owners
- Construction drawings (TBDA): A-series plans, S-series structural, PH.1 air sealing
- Specifications (TBDA): material specifications and BOD products

1. Project Overview

1.1 Project Description

R.271 Kapicka Residence is a new-build single-family home with detached accessory structures (garage and studio) in Arlington Heights, Illinois. The main house is targeting Phius Core 2021 certification — Ethos Builders' first project to this standard.

Item	Detail
Buildings	Main house (5,514 SF) + detached garage (668 SF) + detached studio (325 SF)
Stories	Two stories + full conditioned basement
Foundation	Poured concrete walls, conditioned slab, R-20 sub-slab insulation
Structure	Wood-framed, double-stud exterior wall, raised-heel scissor truss roof
Mechanical	All-electric: geothermal heat pump, CERV2 ERV, heat pump water heater
Certification Target	Phius Core 2021 (main house). Garage and studio scope TBD.
Site Climate	IECC Zone 5A — cold, humid. Winter design −4°F, 25 psf snow, 115 mph wind.

1.2 Certification Targets

Metric	Target
Airtightness	≤ 0.05 CFM50/ft² envelope or ≤ 0.69 ACH50 (whichever stricter)
Wall R-value	R-43.7 (double-stud, dense-pack cellulose)
Roof R-value	R-84 (loose-fill cellulose, raised-heel scissor truss)
Sub-slab R-value	R-20 (4" rigid foam continuous)
Windows	Triple-pane uPVC (Zola Thermo), U ≈ 0.14
Ventilation	Build Equinox CERV2 ERV — sole source

1.3 Schedule Milestones

Milestone	Target
Pre-construction meeting	Week before framing
Site mobilization	Mid-July 2026
Foundation complete	TBD
Framing complete	TBD

Envelope dry-in (windows installed, ZIP taped)	TBD
MEP rough complete	TBD
Air sealing complete	TBD
Mid-construction blower door test	Pre-drywall — TBD
Drywall complete	TBD
Mechanical commissioning	TBD
Final blower door + certification	TBD
Substantial completion	TBD

Full schedule maintained in BuilderTrend. Scan QR for current schedule:

Project Schedule: https://projects.ethos-builders.com/p/2735/schedule

2. Team Directory

2.1 Project Team

Role	Firm / Name	Contact
Owner	Alex Kapicka	TBD
Architect — Lead	Tom Bassett-Dilley Architects (TBDA)	TBD
Architect — Project Manager	Denny Burke	TBD
Structural Engineer	Quad Chicago — Gene Mojekwu	TBD
Civil Engineer	Haeger Engineering — Karl Novak	TBD
Phius Rater	TBD	TBD
Ethos — Project Lead	Jeremiah Butler	jeremiah@ethos-builders.com
Ethos — Site Superintendent	TBD	TBD
Ethos — Lead Carpenter / QC	TBD	TBD

2.2 Subcontractor Directory

Updated as subs are awarded. Full list at the project hub team page.

Trade	Firm	Contact
Excavation	TBD	TBD
Concrete / Foundation	TBD	TBD
Framing	TBD	TBD
Roofing	TBD	TBD
Siding	TBD	TBD
Insulation & Air Sealing	TBD	TBD
Mechanical (HVAC + Geothermal)	TBD	TBD
Plumbing	TBD	TBD
Electrical	TBD	TBD
Drywall	TBD	TBD

Painting	TBD	TBD
Cabinetry / Finish Carpentry	TBD	TBD
Flooring	TBD	TBD
Landscape / Final Grade	TBD	TBD

2.3 Key Suppliers

Material / Product	Supplier	Lead Time / Notes
Windows — Zola Thermo uPVC	Zola	12–16 weeks — CRITICAL
CERV2 ventilation	Build Equinox (sole source)	8–12 weeks
ZIP System sheathing + tape	Huber via local lumber yard	1–2 weeks
Pro Clima Intello / tapes / grommets	475 High Performance Building Supply	2–3 weeks
Stego sub-slab vapor barrier	Stego Industries	2 weeks
Huntsman Heatlok HFO spray foam	via insulation sub	Verify HFO blowing agent at delivery
Cellulose (dense-pack and loose-fill)	via insulation sub	1–2 weeks
Concrete (CarbonCure mix)	Ozinga	Standard with mix design notification
Geothermal equipment + drilling	TBD geothermal contractor	6–8 weeks for equipment

Current team directory and contact information:

Full Team Directory & Org Chart: https://projects.ethos-builders.com/p/2735/team

3. Site Information & Rules

3.1 Site Access & Hours

- Site hours: Monday–Friday 7:00 AM – 5:00 PM, Saturday 8:00 AM – 1:00 PM. No Sunday work without prior approval.
- Site access via TBD entry. Combination/key obtained from Ethos super.
- Lock site at end of every work day. Last person out is responsible.
- After-hours access requires super approval and notification.

3.2 Parking

- Worker parking: TBD — confirm with super at first visit.
- Owner/architect visits: TBD designated area.
- Deliveries: stage on driveway; pull off when complete.
- No street parking that blocks neighbor access.

3.3 Site Conduct

- Speak respectfully — neighbors, visitors, fellow workers. We are guests in the neighborhood.
- No music audible beyond the immediate work area.
- Smoking only in designated area; no smoking inside any structure.
- No alcohol, drugs, or impairing substances on site.
- Profanity restraint — owner and family may visit unannounced.
- PPE per OSHA — hard hats, eye protection, hearing protection where applicable, safety footwear.

3.4 Material Staging & Storage

- Lumber and bulk materials: TBD staging area.
- Phius-critical materials (Intello, ZIP tape, Roflex grommets, etc.): inside site trailer or weatherproof storage. NOT exposed to UV, rain, or freezing.
- Windows: store flat and supported, in original packaging until install. Indoor when possible.
- Cellulose insulation: in dry storage; rejects moisture exposure.
- Spray foam (Heatlok HFO): verify HFO blowing agent at delivery. Reject HFC product. Store per SDS.

3.5 Site Cleanliness

- End-of-day cleanup is every trade's responsibility. Sweep up your debris.
- Construction Debris Mgmt (dumpster) location TBD. Sort cardboard separately if site has recycling.
- No food waste in construction dumpster — attracts pests.
- Phius work areas (around Intello, in air-sealed zones): elevated cleanliness — dust and debris compromise tape bond.

3.6 Tree Protection

Arlington Heights has tree preservation requirements. Per Haeger Engineering civil plans, certain mature trees on site are designated for preservation. Tree protection fencing must be in place before mobilization and respected throughout construction. No staging, parking, or storage within protected drip lines.

3.7 Stormwater & Erosion Control

- Per civil plans — silt fence, inlet protection, and stabilized construction entrance per Haeger drawings.
- Monitor after every storm event; repair damage within 24 hours.
- Sweep mud tracking from streets — village inspectors notice.

3.8 Visitors & Photography

- All visitors check in with the super. Sign-in sheet maintained in site office.
- Owner and architect have unrestricted access during site hours.
- Photography for Phius QA: by Ethos super/lead. Sub photography of own work is encouraged.
- Social media — no posting of site, address, or owner identifiable info without owner consent.

4. Phius Quick Reference

4.1 Why R.271 Is Different

This project is being built to Phius Core 2021 certification — a performance-based standard requiring measurably better envelope airtightness, insulation, and mechanical performance than code-minimum construction. Certification depends on the as-built building passing measured tests — there is no "close enough" on a Phius project.

If you have not yet read the Phius Construction Curriculum, do so before starting any work that affects the envelope. Scan to access:

Phius Core 2021 Construction Curriculum: https://projects.ethos-builders.com/p/2735/curriculum

4.2 Critical Performance Targets

Target	Value
Airtightness	≤ 0.05 CFM50/ft² envelope OR ≤ 0.69 ACH50
Wall R-value	R-43.7 (double-stud cellulose)
Roof R-value	R-84 (loose-fill cellulose)
Sub-slab R-value	R-20 (4" rigid foam continuous)
Window U-value	≈ 0.14 (Zola Thermo triple-pane)
Mid-construction blower door	Pre-drywall — required gate before insulation cover-up
Final blower door	Post-finishes — certification test

4.3 Substitution Policy

> **No Substitution Without Rater Approval:** Every Phius-critical product on this project (ZIP System, Intello Plus, Stego, Heatlok HFO, Tescon tapes, Roflex grommets, CERV2, Zola windows) was selected to perform in a specific assembly with specific climate inputs. Substitutions without written Phius rater approval can void certification. If a sub proposes a substitution, route through RFI to architect, then to rater. Do not order a substitute product without that approval in hand.

4.4 The Six Phius-Critical Tasks

These are the field tasks that most determine whether the project passes certification. Each has a dedicated SOP — scan for full procedure:

QR	Task	Stage
	Sub-slab vapor barrier install (Stego)	Foundation
	ZIP System tape application	Sheathing
	Window buck install (1/2" SHTH-4 plywood)	Pre-window
	Window install + air sealing	Envelope dry-in
	Intello Plus interior membrane install	Post-MEP rough
	Penetration sealing (Roflex, Tescon)	Throughout

4.5 Photo Documentation is Required

Phius certification requires a photo log demonstrating that critical details were executed correctly. This is not optional. The photo log cannot be reconstructed after the fact — every key install moment must be captured as it happens. The Photo Documentation Workflow (Section 7) details what to capture, naming convention, and upload destination.

5. Stage-by-Stage Workflow

Each stage section below covers scope, Phius-critical items, sequence, inspection gates, and required photo documentation. Read the stage section before mobilizing each phase. Stage hub QR codes link to current sub assignments and any RFIs/changes specific to that stage.

5.1 Foundation & Slab

Foundation & Slab

Scope summary

- Excavation per civil plans
- Footings + foundation walls per S1
- Exterior foundation insulation + dimple membrane
- Sub-slab insulation (R-20)
- Sub-slab vapor barrier (Stego 10-mil)
- Basement slab pour (CarbonCure mix)
- Slab edge insulation (thermal break)

Phius-critical items

- Sub-slab vapor barrier — install, tape, and Stego Crete Claw at slab edge
- Sub-slab insulation continuous edge-to-edge (R-20)
- CarbonCure concrete (verify mix design with Ozinga dispatch)
- Stego termination up foundation wall per PH.1 detail

Sequence and dependencies

1. Excavation per civil
2. Footings pour
3. Foundation wall forming and pour
4. Exterior foundation rigid insulation + dimple membrane
5. Drain tile install
6. Backfill
7. Sub-slab rigid insulation install
8. Sub-slab vapor barrier install
9. Ethos super pre-pour inspection (vapor barrier walk)
10. Slab pour

Inspection gates

- Code inspection: footings, foundation, slab
- Ethos pre-pour walk: vapor barrier integrity, no tears, all seams taped, Stego Crete Claw set
- Phius rater notification: photos sent for record

Photos required

- Vapor barrier laid (before slab pour) — every seam, every penetration
- Stego Crete Claw at slab edge
- Sub-slab insulation joints
- Foundation insulation install
- Any patches/tears found and repaired

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Foundation & Slab: https://projects.ethos-builders.com/p/2735/stage/foundation

5.2 Framing & Sheathing

Framing & Sheathing

Scope summary

- Floor framing per S1
- Wall framing — double-stud exterior (2x6 outer + 2x4 inner per A4)
- Roof framing — raised-heel scissor trusses + 4 custom drag trusses
- Window/door bucks — 1/2" SHTH-4 plywood
- ZIP System wall sheathing
- ZIP System roof sheathing
- Subfloor and decking

Phius-critical items

- Double-stud wall — outer 2x6 structural, inner 2x4 with air gap per A4
- Raised-heel scissor truss at full insulation depth at eaves
- ZIP System sheathing — clean, dry, all penetrations sealed
- Window bucks installed BEFORE windows arrive on site
- Drag trusses with Simpson HDU hold-downs per S1

Sequence and dependencies

11. Floor framing
12. Wall framing — outer wythe (2x6)
13. Wall framing — inner wythe (2x4)
14. Roof framing and truss install
15. Window/door buck install in rough openings
16. Wall sheathing install (ZIP)

17. Roof sheathing install (ZIP)
18. Subfloor install
19. Pre-tape inspection by Ethos super

Inspection gates

- Code inspection: framing
- Structural engineer: drag truss install and hold-down verification
- Ethos super: pre-tape sheathing walk — over-driven nails identified for repair before tape application

Photos required

- Wall framing complete
- Drag truss hold-downs (Simpson HDU)
- Window/door bucks installed
- ZIP sheathing before tape (smooth, no over-driven nails)
- ZIP tape rolled out — close-up of tape edges
- Buck-to-sheathing tape detail

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Framing & Sheathing: https://projects.ethos-builders.com/p/2735/stage/framing

5.3 MEP Rough

MEP Rough

Scope summary

- Plumbing rough — supply, drain, vents
- Mechanical rough — geothermal piping, distribution
- Electrical rough — service, branch circuits, low-voltage
- Service cavity routing where possible
- PV-ready conduit (1" EMT to attic)

Phius-critical items

- Service cavity (interior 2x4 wall) used for routing wherever possible — keeps Intello continuous
- Penetrations through exterior wall — coordinated for grommet sealing at Intello stage
- CERV2 duct design submitted (Manual D, 0.00" static pressure)
- PV-ready conduit installed and capped at both ends

Sequence and dependencies

20. Plumbing rough
21. Mechanical rough — geothermal piping
22. Mechanical rough — duct rough-in
23. Electrical rough
24. Pre-Intello inspection — Ethos super verifies all penetrations identified and sub-coordinated

Inspection gates

- Code inspection: rough mechanical, rough plumbing, rough electrical
- Ethos super: penetration walk before Intello install (every exterior wall and ceiling penetration noted and coordinated for grommet)

Photos required

- Service cavity wiring runs
- Each exterior wall penetration before sealing
- Each ceiling/attic penetration
- PV-ready conduit (both ends capped, labeled)
- Airtight electrical boxes installed at exterior walls

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — MEP Rough: https://projects.ethos-builders.com/p/2735/stage/mep-rough

5.4 Air Sealing & Insulation

Air Sealing & Insulation

Scope summary

- Interior smart vapor membrane (Pro Clima Intello Plus)
- Penetration sealing (Roflex grommets, Tescon Profil, fluid-applied)
- Top plate and band joist sealing
- Dense-pack cellulose in double-stud wall cavity
- Closed-cell HFO spray foam at rim joist, slab edge thermal break
- Loose-fill cellulose in attic to R-84
- Attic baffles at eaves

Phius-critical items

- Intello Plus continuous around interior envelope (walls + ceiling)

- Tescon Vana tape at all Intello seams, rolled out fully
- Roflex grommets at every round penetration
- Mineral wool fill at window/door rough openings
- HFO blowing agent in spray foam — REJECT HFC product at delivery
- Dense-pack cellulose at 3.5 lb/ft³ verified by net opening method

Sequence and dependencies

25. Air sealing — exterior side complete (during framing/sheathing)
26. Air sealing — interior side: Intello install
27. Penetration sealing — all Roflex grommets, Tescon Profil
28. Pre-blower-door walk (Ethos super + insulation sub)
29. Mid-construction blower door test
30. Repair any failures
31. Re-test if needed
32. Dense-pack cellulose blow
33. Closed-cell HFO spray foam
34. Attic loose-fill cellulose blow
35. Attic baffles install
36. Post-insulation walk

Inspection gates

- Ethos super pre-blower-door walk: every penetration confirmed sealed, smoke pen check
- Phius rater mid-construction blower door
- Ethos QC: cellulose density verification on first wall of each type

Photos required

- Intello install (each wall, each ceiling area)
- Each Tescon-taped seam
- Each Roflex grommet (close-up)
- Top plate sealing
- Spray foam at rim joist
- Spray foam product label (verify HFO)
- Cellulose dense-pack density test
- Attic loose-fill depth marker
- Blower door test result reading

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Air Sealing & Insulation: https://projects.ethos-builders.com/p/2735/stage/air-sealing

5.5 Pre-Drywall Blower Door Test

Pre-Drywall Blower Door

Scope summary

- Phius rater conducts mid-construction blower door test
- Pre-test walk with smoke pen by Ethos super
- Document leaks found and repaired
- Re-test until target met or accepted close-of-construction value

Phius-critical items

- Target: 0.05 CFM50/ft² envelope or 0.69 ACH50 (whichever stricter) — Phius Core 2021
- All air sealing scope complete before scheduling test
- First-attempt pass rate ~50% industry-wide — plan for 1–2 iterations

Sequence and dependencies

37. Envelope substantially complete (Intello, ZIP, all penetrations sealed)
38. Pre-test walk with smoke pen
39. Schedule blower door with rater (give 1 week minimum)
40. Conduct test
41. Document results
42. Identify and repair leaks
43. Re-test if failed
44. Final test result documented in certification package

Inspection gates

- Phius rater: mandatory for certification
- Ethos: pre-test walk required
- No insulation install until blower door passed (insulation hides leaks)

Photos required

- Pre-test envelope state
- Any leaks identified during smoke pen walk (before repair)
- Repair work
- Blower door equipment and reading
- Final result on rater report

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Pre-Drywall Blower Door: https://projects.ethos-builders.com/p/2735/inspection/pre-drywall-blower-door

5.6 Drywall & Interior Finishes

Drywall & Interior Finishes

Scope summary

- Drywall hang and finish
- Interior trim and millwork
- Painting
- Tile, flooring, cabinetry
- Plumbing finish
- Electrical finish
- HVAC commissioning

Phius-critical items

- No envelope penetrations after this point — air barrier is buried
- Any unforeseen penetration MUST be addressed before drywall closes wall
- Mechanical commissioning includes verifying CERV2 airflow against design

Sequence and dependencies

45. Drywall hang
46. Tape and mud
47. Prime/paint
48. Tile work
49. Flooring
50. Cabinetry
51. Plumbing finish
52. Electrical finish
53. Mechanical commissioning

Inspection gates

- Code inspection: drywall, final mechanical, final plumbing, final electrical
- Phius rater: mechanical commissioning verification
- Final blower door

Photos required

- Mechanical commissioning data
- Airflow measurements at each register
- Final equipment installations

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Drywall & Interior Finishes: https://projects.ethos-builders.com/p/2735/stage/framing

5.7 Final Blower Door & Certification

Final Blower Door & Certification

Scope summary

- Final blower door test — certification gate
- Phius certification submission package
- Final inspections by AHJ
- Substantial completion walkthrough

Phius-critical items

- Final test must meet or exceed targets
- Certification package compiled by rater: energy model, photo log, blower door, commissioning, product confirmations
- Phius reviews and issues certificate (4-8 weeks post-submission)

Sequence and dependencies

54. Final blower door
55. Mechanical commissioning report finalized
56. Photo log finalized
57. Documentation compiled by rater
58. Submission to Phius
59. Certificate issued

Inspection gates

- Phius rater: final certification
- Owner: substantial completion walkthrough

Photos required

- Final blower door test
- Completed building exterior

- Mechanical room equipment commissioning
- Photo log packaged and archived

Stage reference (current SOPs, RFIs, sub assignments):

Stage Hub — Final Blower Door & Certification: https://projects.ethos-builders.com/p/2735/inspection/final-blower-door

6. Critical Detail Cheat Sheets

Field-reference cheat sheets for the most-failure-prone Phius details. Each cheat sheet is a summary; the full SOP (with video) is at the QR code. Print individual sheets and laminate for trade-station use if helpful.

6.1 Sub-Slab Vapor Barrier Install

Sub-Slab Vapor Barrier (Stego)

Why it matters: Sub-slab vapor barrier prevents ground moisture from migrating into the slab and indoor space. The termination at the slab edge is the most-failed Phius detail — handle deliberately.

Steps

60. Sub-slab rigid insulation laid edge-to-edge first (R-20).
61. Stego 10-mil rolled over insulation. Overlap seams 6" minimum.
62. Tape all seams with Stego Wrap Tape, full-width contact.
63. Stego Crete Claw at slab edge — interlocks with slab to maintain seal.
64. Vapor barrier extends 6" up foundation wall; tape to foundation.
65. Patch any tears with Stego tape — never leave a tear exposed.
66. Ethos super pre-pour walk with photo documentation BEFORE concrete arrives.

Common failures to watch for

- Tears during slab prep or pour (rebar chair feet, foot traffic) — must be patched.
- Seam overlap less than 6" — air will flow under tape.
- No Stego Crete Claw — slab-to-foundation joint will leak.
- Tape applied to dirty or wet surface — bond fails.

Full SOP (with video):

Full SOP — Sub-Slab Vapor Barrier (Stego): https://projects.ethos-builders.com/p/2735/sop/sub-slab-vapor-barrier

6.2 ZIP System Tape Application

ZIP System Tape Application

Why it matters: ZIP tape is the primary exterior air barrier and water control. Improperly applied tape will fail at blower door test — and the failure mode is invisible until the test reveals it.

Steps

67. Conditions check: ZIP face clean (no dust, no moisture), above 0°F (Huber spec), no rain.
68. Tape applied centered over the seam, full contact.
69. ROLL THE TAPE with a hand roller (J-roller). Untrained subs skip this — failure rate is high.
70. Lap tape ends 3" minimum at horizontal-to-vertical transitions.
71. Fluid-applied (Huber Liquid Flash or equivalent) at window/door RO corners, complex transitions.
72. Photograph rolled tape immediately for QA record.

Common failures to watch for

- Tape not rolled — bond is half what it should be, fails at blower door.
- Tape applied below 0°F — adhesive does not flow into substrate.
- Tape over dirty surface (dust, sawdust) — bond compromised.
- Over-driven nails not addressed before tape — pinpoint leaks at every nail head.
- Vertical tape ends not lapped — joint leaks at corner.

Full SOP (with video):

Full SOP — ZIP System Tape Application: https://projects.ethos-builders.com/p/2735/sop/zip-tape-application

6.3 Window Buck Install

Window Buck Install (1/2" SHTH-4 Plywood)

Why it matters: Window bucks create the structural box that the window installs into. They MUST be installed before the windows arrive. Phius-spec windows have integrated flanges that require the buck to be present.

Steps

73. Confirm rough opening dimensions against window schedule (A5). Verify with framing sub.
74. Cut bucks from 1/2" SHTH-4 plywood — square corners, dimensions match RO.
75. Install bucks plumb and square to interior face. Verify with level and square.
76. Tape buck-to-ZIP-sheathing on exterior with ZIP tape, rolled fully.
77. Apply fluid-applied sealant at buck corners (Huber Liquid Flash or equivalent).
78. Buck-to-Intello taping happens during interior air sealing stage (Tescon Vana).

Common failures to watch for

- Window installed direct to RO without buck — requires removal and reinstall.

- Buck not plumb to sheathing face — window install misaligned.
- Tape applied without rolling — fails at blower door.
- Liquid Flash skipped at corners — leak path at RO corner.

Full SOP (with video):

Full SOP — Window Buck Install (1/2" SHTH-4 Plywood): https://projects.ethos-builders.com/p/2735/sop/window-buck

6.4 Pro Clima Intello Plus Install

Intello Plus Smart Vapor Membrane

Why it matters: Intello is the interior air barrier AND the smart vapor membrane. Variable permeability lets the wall dry in winter (outward) and resist inward vapor drive in summer. Must be continuous around the entire interior envelope.

Steps

79. Install on interior face of inner 2x4 wall — before drywall, after MEP rough complete.
80. Continuous around walls and ceiling — no breaks.
81. Tape all seams with Pro Clima Tescon Vana, rolled fully. Min 4" overlap if seaming pieces.
82. Tape transitions: wall-to-floor, wall-to-ceiling, wall-to-window-buck.
83. Penetrations: Roflex grommets for round, Tescon Profil for irregular.
84. Maximum 3 months UV exposure — drywall must follow.
85. Photograph every seam, every penetration before insulation/drywall covers.

Common failures to watch for

- Substituting regular poly — traps moisture in summer, mold/rot risk.
- Stretching/over-tensioning Intello — causes wrinkles, incomplete coverage.
- Tape not rolled — same failure as ZIP tape.
- Penetration sealed with mastic only (no grommet/profile) — fails over time.
- UV exposure exceeded 3 months — material degrades.

Full SOP (with video):

Full SOP — Intello Plus Smart Vapor Membrane: https://projects.ethos-builders.com/p/2735/sop/intello-membrane

6.5 Penetration Sealing

Penetration Sealing (Roflex / Tescon Profil)

Why it matters: Every wire, pipe, and duct crossing the air barrier is a potential leak. The strategy is the service cavity (interior 2x4 wall) — but where unavoidable, every penetration is sealed deliberately.

Steps

86. Service cavity first — route in interior 2x4 wall wherever possible.
87. Round penetrations through Intello: Roflex grommet sized to pipe/conduit OD. Adhesive flange to membrane.
88. Irregular penetrations: Tescon Profil tape with appropriate dimension flap (4" or 6").
89. Mechanical duct penetrations: manufacturer-spec'd boots or fluid-applied sealant.
90. Top plate penetrations: fluid-applied sealant top and bottom.
91. Photograph every penetration after sealing — required for QA record.

Common failures to watch for

- Electrical box installed through Intello without grommet — major leak source.
- Plumber drilled through top plate without sealing — leak path to attic.
- Wrong size Roflex grommet — gap around pipe.
- Tape only without grommet — fails over time as pipe moves with temperature.

Full SOP (with video):

Full SOP — Penetration Sealing (Roflex / Tescon Profil):
https://projects.ethos-builders.com/p/2735/sop/penetration-sealing

6.6 Pre-Blower-Door Checklist

Pre-Blower-Door Preparation

Why it matters: Before scheduling the mid-construction blower door test, the envelope must be substantially complete. A premature test wastes the rater's time and your money. A thorough pre-test walk identifies easy fixes before the formal test.

Steps

92. All Intello seams taped and rolled. Walk every seam, look for gaps or wrinkles.
93. All Roflex grommets installed at round penetrations. Confirm flange seal to membrane.
94. All Tescon Profil at irregular penetrations.
95. Top plate sealing complete.

96. Window perimeters sealed (Contega).
97. ZIP tape inspection — any voids found and patched.
98. Walk envelope with smoke pen on a windy day — visible leaks identified.
99. Repair list compiled and addressed BEFORE rater arrives.
100. Schedule rater with at least 1 week notice.

Common failures to watch for

- Test scheduled before envelope substantially complete — wastes a test cycle.
- Major obvious leaks not identified pre-test — embarrassing and expensive.
- Insulation already installed — leaks now hidden, harder to find and fix.

Full SOP (with video):

Full SOP — Pre-Blower-Door Preparation: https://projects.ethos-builders.com/p/2735/sop/blower-door-prep

7. Photo Documentation Workflow

7.1 Why Photo Documentation

Phius certification requires evidence that critical details were executed correctly. The photo log is the primary evidence — it cannot be reconstructed after the fact. Every key install moment must be captured as it happens. The certification package handoff to Phius depends on a complete photo log.

7.2 What to Photograph

See Section 5 (Stage-by-Stage Workflow) for stage-specific photo requirements. General principle: photograph any Phius-critical detail before it is covered by the next layer. If you would not be able to verify the work was done correctly by looking at the finished building, photograph it.

7.3 How to Photograph

- Use a smartphone with good camera — daily camera, not specialized equipment.
- Well-lit — shoot during daylight or with site lighting on.
- Steady — brace against framing or rest on a surface.
- Include scale where helpful — tape measure, hand, or known object in frame.
- Take 2–3 shots of each detail — wide context + close detail.
- If the detail is on a complex surface, shoot from 2–3 angles.

7.4 Naming Convention

File names matter for certification package compilation. Use this pattern:

> **Format:** R271_[STAGE]_[LOCATION]_[DETAIL]_[DATE]_[INITIALS].jpg

Examples:

- R271_FOUNDATION_BSMT_VaporBarrier_2026-07-22_JB.jpg
- R271_FRAMING_FrontElevation_ZIPTape_2026-08-15_RB.jpg
- R271_AIRSEAL_LivingRm_IntelloPenetration_2026-09-30_AS.jpg

7.5 Upload Workflow

- Photos upload daily — do not let them pile up on phones.
- Primary destination: Project hub photo upload (current — BuilderTrend; transition to Ethos system over time).
- Folder structure: Stage → Date → individual files.

- Weekly review by Ethos super — flag any gaps and re-shoot if access still allows.

Photo upload destination:

Photo Upload Destination: https://projects.ethos-builders.com/p/2735/photos/upload

7.6 Certification Handoff

At project completion, Ethos super compiles the photo log into a structured archive organized by Phius QA categories. The rater receives this archive as part of the certification submission package. Plan for ~4–8 hours of compilation work at handoff.

Photo documentation SOP:

Photo Documentation SOP: https://projects.ethos-builders.com/p/2735/sop/photo-documentation

8. Communication Protocol

8.1 Daily Huddle

Start of every day, 10 minutes maximum. Lead by Ethos super or lead carpenter. Everyone on site participates.

- Yesterday's progress — what got done, any issues.
- Today's work — what's planned, who's doing what, dependencies.
- Phius-critical task today? — pre-task review of the SOP.
- Safety reminders — site-specific or weather-driven.
- Blocking issues — RFIs, missing materials, sub coordination.

8.2 RFI Process

Any field condition that does not match the plans, or any question that affects performance, goes through RFI. Verbal answers from any party become RFI-documented within 24 hours.

101. Field condition identified — sub or super raises.
102. Document: project, location, plan reference, question.
103. Submit via the RFI form.
104. Architect responds — typically 2–5 business days.
105. If performance-affecting: rater notified, may need to weigh in.
106. Answer documented in project file.
107. Work resumes per the answer.

RFI submission:

Submit an RFI: https://projects.ethos-builders.com/p/2735/rfi

8.3 Escalation Path

Situation	First → Then → If Needed
Sub coordination	Sub lead → Ethos super → Ethos PM
Field condition unclear	Super → Ethos PM → Architect (RFI)
Phius performance question	Super → Ethos PM → Architect → Phius Rater
Owner change request	Super → Ethos PM → Owner → Architect → all parties for impact

Safety issue	Anyone → Super (immediate) → PM, OSHA if reportable
Material substitution requested	Sub → Super → PM → Architect → Rater (if Phius-critical)

8.4 Documentation

- Daily logs in BuilderTrend (current) — weather, crews on site, work completed, RFIs raised.
- Photo log per Section 7.
- RFI log centralized.
- Sub sign-ins maintained in site office.

8.5 Site Meetings

Meeting	Cadence / Attendees
Daily huddle	Daily, 10 min — all on-site staff
Weekly sub coordination	Weekly, 30 min — Ethos super, active subs, PM as needed
Owner walkthrough	Bi-weekly during active phases — owner, architect, Ethos PM
Architect site visit	Per architect contract — coordinate observation reports
Phius rater visits	Per rater contract — preconstruction, mid-construction blower door, final

9. Inspection Checklists

Stage-gate checklists for Ethos super and lead carpenter. Each gate must be cleared before work proceeds. Sign and date when complete; archive in project file.

9.1 Pre-Pour (Sub-Slab Vapor Barrier)

Pre-Pour Checklist

- ☐ Sub-slab rigid insulation laid edge-to-edge (R-20)
- ☐ Stego 10-mil vapor barrier laid over insulation
- ☐ All seams overlapped 6" minimum
- ☐ All seams taped with Stego Wrap Tape (full contact, no gaps)
- ☐ Stego Crete Claw installed at slab edge perimeter
- ☐ Vapor barrier extends up foundation wall and taped
- ☐ All penetrations sealed (plumbing stubs, post bases)
- ☐ Photo documentation complete — every seam, every penetration
- ☐ No tears visible — any tears patched with Stego tape
- ☐ Phius rater notified with photos (if rater requires pre-pour notification)
- ☐ Walk completed by Ethos super: _____ Date: _____

Submit pre-pour inspection:

Pre-Pour Inspection Form: https://projects.ethos-builders.com/p/2735/inspection/pre-pour

9.2 Pre-Tape (Sheathing Complete, Before ZIP Tape)

Pre-Tape Checklist

- ☐ All wall sheathing (ZIP System) installed
- ☐ All sheathing nails properly seated (no over-driven nails — verify first row of every wall)
- ☐ Sheathing surface clean (no dust, no sawdust, no moisture)
- ☐ Outdoor temperature ≥ 0°F (Huber spec for tape application)
- ☐ No precipitation in forecast for 24 hours after tape application
- ☐ Window/door bucks installed
- ☐ All penetrations through sheathing identified for sealing

- ☐ Walk completed by Ethos super: _____ Date: _____

Submit pre-tape inspection:

Pre-Sheathing-Tape Inspection Form: https://projects.ethos-builders.com/p/2735/inspection/pre-sheathing-tape

9.3 Pre-Intello (MEP Rough Complete)

Pre-Intello Checklist

- ☐ All plumbing rough complete and inspected
- ☐ All mechanical rough complete and inspected
- ☐ All electrical rough complete and inspected
- ☐ Service cavity routing maximized — exterior penetrations minimized
- ☐ All exterior wall penetrations identified and located
- ☐ All ceiling/attic penetrations identified
- ☐ PV-ready conduit installed and capped
- ☐ Airtight electrical boxes installed at exterior wall penetrations
- ☐ Sub coordination confirmed — insulation sub aware of all penetrations
- ☐ Walk completed by Ethos super: _____ Date: _____

Submit pre-Intello inspection:

Pre-Intello Inspection Form: https://projects.ethos-builders.com/p/2735/inspection/pre-intello

9.4 Pre-Blower-Door (Air Sealing Complete)

Pre-Blower-Door Checklist

- ☐ Intello Plus installed continuously around walls and ceiling
- ☐ All Intello seams taped with Tescon Vana and rolled out
- ☐ All round penetrations sealed with Roflex grommets
- ☐ All irregular penetrations sealed with Tescon Profil

- ☐ Top plates sealed (Intello-to-top-plate transition)
- ☐ Window/door perimeters sealed (Contega)
- ☐ Mechanical duct penetrations sealed
- ☐ All photo documentation complete
- ☐ Pre-test walk with smoke pen by Ethos super — no visible leaks
- ☐ Rater scheduled with minimum 1 week notice
- ☐ Walk completed by Ethos super: _____ Date: _____

Submit pre-blower-door inspection:

Pre-Drywall Blower Door Inspection Form: https://projects.ethos-builders.com/p/2735/inspection/pre-drywall-blower-door

9.5 Final Blower Door & Mechanical Commissioning

Final Inspection Checklist

- ☐ All drywall and finishes complete
- ☐ All mechanical systems commissioned (CERV2, geothermal, HPWH)
- ☐ Airflow measurements at each register documented
- ☐ Final blower door test conducted
- ☐ Test result meets or exceeds target (0.05 CFM50/ft² or 0.69 ACH50)
- ☐ Photo log compiled and archived
- ☐ Mechanical commissioning report finalized
- ☐ Phius certification package compiled by rater
- ☐ Submission to Phius
- ☐ Walk completed by Ethos super: _____ Date: _____

Submit final inspection:

Final Blower Door Inspection Form: https://projects.ethos-builders.com/p/2735/inspection/final-blower-door

10. Emergency Procedures

10.1 Medical Emergency

108. Call 911 immediately.
109. Stay with the injured person if safe — do not move unless danger requires.
110. Send someone to direct EMS to the site entrance and to the injured person.
111. Notify Ethos super immediately.
112. Super notifies PM, owner if appropriate.
113. Document the incident — time, location, witnesses, injury.
114. OSHA reportable injuries (hospitalization, amputation, eye loss): report to OSHA within 24 hours (1-800-321-OSHA).

10.2 Fire

115. Call 911.
116. Evacuate the immediate area.
117. Do not attempt to fight a fire larger than a small contained one with an extinguisher.
118. Account for all workers at the designated muster point (TBD on site).
119. Notify Ethos super and PM.

- Fire extinguishers located: TBD — confirm at first site visit. Add to site map.

10.3 Severe Weather

- Tornado warning: take shelter in basement (foundation) of house if structure permits, or in vehicles parked away from trees.
- Lightning: cease elevated work (roof, ladders), shelter in vehicles or completed structure.
- High winds (sustained > 40 mph): secure loose materials, halt crane/lift operations.
- Heavy rain: halt outdoor work that depends on dry surfaces (ZIP tape, paint, etc.).

10.4 Utility Damage

- Gas leak suspected: evacuate, call gas utility immediately (Nicor: 888-642-6748), notify super.
- Electrical contact: do not touch the contacting equipment or person; call 911 and utility.
- Water line break: shut off at meter if accessible, notify utility and super.
- Before digging or trenching, ALWAYS call IL Locate at 811 — 48 hours minimum lead.

10.5 Theft / Vandalism / Security

- If discovered in progress: do not engage. Call 911, observe from safe distance.
- If discovered after the fact: document with photos, notify super and PM, file police report.
- Lock site daily. Secure tools and equipment in trailer or off-site.

10.6 Site Closure (Weather, Force Majeure)

- Decision to close: Ethos super or PM.
- Communicate via group text to all subs by 6:00 AM if possible.
- Update BuilderTrend daily log with closure reason.

11. Vendor & Material Quick Reference

11.1 Phius-Critical Products

Product	Vendor	Lead Time / Notes
Zola Thermo uPVC triple-pane windows	Zola	12–16 weeks. CRITICAL — verify order placed.
Build Equinox CERV2 ventilation	Build Equinox (sole source)	8–12 weeks. Order with deposit.
Huber ZIP System sheathing	Huber via lumber yard	1–2 weeks. Standard.
Huber ZIP tape	Huber via lumber yard	1–2 weeks. Multiple sizes (3.75" standard).
Huber Liquid Flash (fluid-applied)	Huber via lumber yard	1–2 weeks. 29 oz sausages.
Pro Clima Intello Plus membrane	475 High Performance Building Supply	2–3 weeks.
Pro Clima Tescon Vana tape	475 via 475.supply	2–3 weeks. 60mm/100mm.
Pro Clima Tescon Profil tape	475 via 475.supply	2–3 weeks. 4"/6" flap.
Pro Clima Roflex grommets	475 via 475.supply	2–3 weeks. 20/50/100/150mm.
Pro Clima Contega seals	475 via 475.supply	2–3 weeks.
StegoHome 10-mil vapor barrier	Stego Industries	2 weeks. 14'×100' rolls.
Stego Crete Claw	Stego Industries	2 weeks.
Stego Wrap Tape	Stego Industries	2 weeks.
Huntsman Heatlok HFO spray foam	via insulation sub	VERIFY HFO BLOWING AGENT — reject HFC.
Concrete with CarbonCure	Ozinga	Standard order with mix design notification.
Geothermal heat pump	via geothermal contractor	6–8 weeks for equipment.

11.2 Manufacturer Technical Support

When in doubt, call the manufacturer. Tech support lines are responsive and free.

Manufacturer	Tech Support

Huber (ZIP System)	huberwood.com — tech support phone in product literature
Pro Clima / 475 Supply	foursevenfive.com — chat and phone support
Build Equinox (CERV2)	buildequinox.com — direct support, small team
Stego Industries	stegoindustries.com — installation support
Huntsman (Heatlok)	huntsman.com — chemical support, SDS access
Zola Windows	zolawindows.com — install support

Vendor video library — manufacturer install videos and Phius best practices:

Curated Video Library: https://projects.ethos-builders.com/p/2735/videos

475.supply Training Library: https://projects.ethos-builders.com/p/2735/mfr/475-supply

12. QR Code Master Index

Master list of all QR codes used in this handbook and across the project. Scan any code to open the linked resource. URLs follow the pattern projects.ethos-builders.com/p/2735/[topic]. URLs are stable — print materials can be reused as content updates behind them.

	Project Hub — landing page for all documents https://projects.ethos-builders.com/p/2735/
	Project Handbook (this document — digital version) https://projects.ethos-builders.com/p/2735/handbook
	Phius Core 2021 Construction Curriculum https://projects.ethos-builders.com/p/2735/curriculum
	Full Team Directory & Org Chart https://projects.ethos-builders.com/p/2735/team
	Project Schedule (current) https://projects.ethos-builders.com/p/2735/schedule
	Project Risk Register (open issues) https://projects.ethos-builders.com/p/2735/risk-register
	Materials Takeoff (MTO) https://projects.ethos-builders.com/p/2735/mto

	Photo Upload Destination https://projects.ethos-builders.com/p/2735/photos/upload
	Curated Video Library https://projects.ethos-builders.com/p/2735/videos
	Submit an RFI https://projects.ethos-builders.com/p/2735/rfi
	SOP — Sub-Slab Vapor Barrier https://projects.ethos-builders.com/p/2735/sop/sub-slab-vapor-barrier
	SOP — ZIP System Tape Application https://projects.ethos-builders.com/p/2735/sop/zip-tape-application
	SOP — Window Buck Install https://projects.ethos-builders.com/p/2735/sop/window-buck
	SOP — Window Install & Sealing https://projects.ethos-builders.com/p/2735/sop/window-install
	SOP — Intello Plus Membrane Install https://projects.ethos-builders.com/p/2735/sop/intello-membrane
	SOP — Penetration Sealing https://projects.ethos-builders.com/p/2735/sop/penetration-sealing

	SOP — Top Plate Sealing https://projects.ethos-builders.com/p/2735/sop/top-plate-sealing
	SOP — Airtight Electrical Box https://projects.ethos-builders.com/p/2735/sop/airtight-electrical-box
	SOP — Blower Door Preparation https://projects.ethos-builders.com/p/2735/sop/blower-door-prep
	SOP — Photo Documentation https://projects.ethos-builders.com/p/2735/sop/photo-documentation
	Inspection Form — Pre-Pour https://projects.ethos-builders.com/p/2735/inspection/pre-pour
	Inspection Form — Pre-Sheathing-Tape https://projects.ethos-builders.com/p/2735/inspection/pre-sheathing-tape
	Inspection Form — Pre-Intello https://projects.ethos-builders.com/p/2735/inspection/pre-intello
	Inspection Form — Pre-Drywall Blower Door https://projects.ethos-builders.com/p/2735/inspection/pre-drywall-blower-door
	Inspection Form — Final Blower Door https://projects.ethos-builders.com/p/2735/inspection/final-blower-door

	Stage Hub — Foundation & Slab https://projects.ethos-builders.com/p/2735/stage/foundation
	Stage Hub — Framing & Sheathing https://projects.ethos-builders.com/p/2735/stage/framing
	Stage Hub — MEP Rough https://projects.ethos-builders.com/p/2735/stage/mep-rough
	Stage Hub — Air Sealing & Insulation https://projects.ethos-builders.com/p/2735/stage/air-sealing
	Stage Hub — Insulation https://projects.ethos-builders.com/p/2735/stage/insulation
	Stage Hub — Mechanical https://projects.ethos-builders.com/p/2735/stage/mechanical
	Plan Reference — PH.1 Air Sealing Details https://projects.ethos-builders.com/p/2735/plans/PH1-air-sealing
	Plan Reference — A4 Wall Sections https://projects.ethos-builders.com/p/2735/plans/A4-wall-sections
	Plan Reference — M1 Mechanical https://projects.ethos-builders.com/p/2735/plans/M1-mechanical

	Manufacturer — 475 High Performance Building Supply https://projects.ethos-builders.com/p/2735/mfr/475-supply
	Manufacturer — Huber ZIP System https://projects.ethos-builders.com/p/2735/mfr/huber-zip
	Manufacturer — Build Equinox CERV2 https://projects.ethos-builders.com/p/2735/mfr/cerv2
	Manufacturer — Stego Industries https://projects.ethos-builders.com/p/2735/mfr/stego
	Manufacturer — Pro Clima Intello https://projects.ethos-builders.com/p/2735/mfr/intello

Appendix: Glossary & Abbreviations

Selected terms used throughout this handbook. Not exhaustive — full glossary in the Construction Curriculum (Appendix).

Term	Meaning
ACH50	Air Changes per Hour at 50 Pa — primary blower door metric. Phius target: 0.69.
AHJ	Authority Having Jurisdiction — building department, code official.
BOD	Basis of Design — specific products and assemblies the design assumes.
CERV2	Build Equinox smart ERV with onboard IAQ sensing. Sole-sourced on R.271.
CFM50/ft²	Cubic feet per minute leakage at 50 Pa per square foot of envelope. Phius target: 0.05.
ERV	Energy Recovery Ventilator — exchanges stale and fresh air, recovers heat + humidity.
HFO vs HFC	Spray foam blowing agents. HFO required for Phius; HFC prohibited.
HPWH	Heat Pump Water Heater — all-electric water heating.
IECC	International Energy Conservation Code — Illinois adopted 2021 IECC.
Intello Plus	Pro Clima smart vapor membrane — variable permeability. Interior air barrier.
MEP	Mechanical, Electrical, Plumbing — collectively, the rough-in trades.
MTO	Materials Takeoff — quantities and specifications document.
Phius Core 2021	Current Phius certification standard (effective September 2021).
RO	Rough Opening — framed opening for window or door installation.
RFI	Request for Information — formal field question to architect.
Roflex	Pro Clima penetration grommet for round penetrations through air barrier.
SOP	Standard Operating Procedure — documented work method.
Service cavity	Interior 2x4 wall used for routing MEP, keeping the air barrier continuous.
Tescon Vana	Pro Clima tape for sealing Intello seams. 60mm or 100mm.
Tescon Profil	Pre-creased Pro Clima tape for inside corners and irregular penetrations.
WUFI	Hygrothermal simulation software. Predicts moisture behavior in assemblies.
ZIP System	Huber structural sheathing with integrated water/air barrier.