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Logix Insulated Concrete Forms Ltd. 7-26318-TWP RD-531 A Acheson, AB, Canada, T 7X5A3

RESEARCH REPORT: RR 25518 (CSI # 03100)

BASED UPON ICC EVALUATION SERVICE REPORT NO. ESR-1642

Attn: Francis Roma (866) 944-0153

REEVALUATION DUE DATE: May 1, 2009

GENERAL APPROVAL - Reevaluation/Clerical Modification - Logix Insulated Concrete Forms.

DETAILS

The above assemblies and/or products are approved when in compliance with the description, use, identification and findings of Report No. ESR-1642 dated January 1, 2005, of the ICC Evaluation Services, Incorporated. The report, in its entirety, is attached and made part of this general approval.

The parts of Report No. ESR-1642 marked by asterisk are modified by the Los Angeles Building Department from this approval.

The approval is subject to the following conditions:

- 1. Complete design and calculation shall be prepared by an engineer licensed in the State of California and approved by the structural plan check.
2. Alternate design shall comply with the Prescriptive Method for Insulating Concrete Forms in Residential Construction (PCA publication No. EB118), dated May 1998, subject to all applicability limits for a flat insulating concrete form (ICF) wall system specified in that document. The PCA document must be available to structural plan check upon request.
3. The maximum allowable pour rate of the forms shall be 4 feet per hour.
4. Continuous inspection by Deputy Inspectors shall be provided for placement of reinforcing steel and concrete. Any exception shall be approved by structural plan check supervisors.

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Logix Insulated Concrete Forms Ltd.
Re: Logix Insulated Concrete Forms

DISCUSSION

The clerical modification is to change the company address.

The approval is based on tests and analyses.

The general approval will remain effective provided the Legacy Report is maintained valid and unrevised with the issuing organization. Any revision to the report must be submitted to this Department, with appropriate fee, for review in order to continue the approval of the revised report.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

The status of the referenced Report No. ESR-1642, dated January 1, 2005, which is currently beyond its re-examination date is still valid. The validity of the evaluation report was verified with ICC.

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Attachments: ICC ES Report No. ESR-1642 (5 Pages)

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C O D E C O M P L I A N C E



ESR-1642

Issued January 1, 2005

This report is subject to re-examination in one year.

ICC Evaluation Service, Inc.
www.icc-es.org

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Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

DIVISION: 03—CONCRETE
Section: 03130—Permanent Forms

REPORT HOLDER:

LOGIX INSULATED CONCRETE FORMS LTD.
12150-160TH STREET
EDMONTON, ALBERTA T5V 1H5
CANADA
(780) 453-5961
www.logixicf.com
francis@logixicf.com

EVALUATION SUBJECT:

LOGIX INSULATED CONCRETE FORMS

ADDITIONAL LISTEES:

AMC INSULATION CORPORATION
151 PARAMOUNT ROAD
WINNIPEG, MANITOBA R2X 2W6
CANADA

BEAVER PLASTICS LTD.
12150-160TH STREET
EDMONTON, ALBERTA T5V 1H5
CANADA

BEAVER PLASTICS LTD.
#215-6333 UNSWORTH ROAD
CHILLIWACK, BRITISH COLUMBIA V2R 5M3
CANADA

FORM SYSTEMS INC.
330 CAINE DRIVE
HAYESVILLE, KANSAS 67060

PERMA R PRODUCTS INC.
106 PERMA R ROAD
JOHNSON CITY, TENNESSEE 37063

PSC MOULDING CORPORATION
840 DIVISION STREET
COBOURG, ONTARIO K9A 4J9
CANADA

1.0 EVALUATION SCOPE

Compliance with the following codes:

- ~~2003-International Building Code[®] (IBC)~~
- ~~2003-International Residential Code[®] (IRC)~~

- ~~1999-Standard Building Code[®] (SBC)~~ *
- 1997 Uniform Building Code[™] (UBC)
- ~~BOCA[®] National Building Code/1999 (NBBC)~~ *

Properties evaluated:

- Formwork for structural concrete
- Surface burning characteristics
- Crawl space fire evaluation
- Fire resistance

2.0 USES

The Logix Insulated Concrete Forms are used as permanent formwork for structural concrete, load-bearing and nonload-bearing, residential and commercial, below-grade and above-grade walls. The forms are used in construction of plain and reinforced concrete beams, lintels, exterior and interior walls, and foundation and retaining walls.

3.0 DESCRIPTION

3.1 General:

The Logix Insulated Concrete Forms are classified as a flat ICF (insulating concrete form) wall system in accordance with ~~Section R 611.3 of the IRC~~. See Figure 1 of this report for illustrations of the forms. The Logix Insulated Concrete Forms consist of two expanded polystyrene (EPS) foam plastic boards separated by injection molded polypropylene webs, which are partially embedded into the EPS boards. The polypropylene webs, which are spaced 8 inches (203 mm) on center horizontally, maintain the EPS board facings at a fixed clear distance of 4 inches (102 mm), 6.25 inches (158 mm), 8 inches (203 mm) or 10 inches (254 mm). For the standard forms, the EPS boards are 16 inches (406 mm) high by 48 inches (1219 mm) long. The EPS boards have a maximum thickness of 2 3/4 inches (69.9 mm). When stacked in a running bond pattern, the Logix Insulated Concrete Forms create a cavity where steel reinforcement bars and concrete are placed. In addition to the standard forms, 45-degree-angle forms, 90-degree-angle corner forms, taper top blocks and brick ledge blocks are also available.

The 45-degree-angle forms and 90-degree-angle corner forms are used to construct wall intersections. The taper top block is used to construct corbels in the wall at the desired locations. The brick ledge blocks are used to construct corbels that serve as ledges, for supporting exterior brick veneers.

3.2 Materials:

3.2.1 Foam Plastic: The EPS foam boards are molded from beads specified in the approved quality control manuals. The foam plastic has a nominal density of 1.45 pcf (23.2 kg/m³), and has a flame-spread index of 25 or less and a smoke-density index of 450 or less when tested in accordance with

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ASTM E 84 (Class 1, UBC Standard 8-1). The foam plastic insulation complies as a Type II rigid cellular polystyrene (RCPS) in accordance with ASTM C 578.

3.2.2 Connector Web Element: The polypropylene webs are 8.5 inches (216 mm), 10.75 inches (273 mm), 12.5 inches (318 mm) or 14.5 inches (368 mm) in length and have a 1.25-inch-wide-by-14.25 inch-high (32 mm by 362 mm), 0.1875-inch-thick (4.8 mm) flange. The plastic flanges, embedded ^{1/2} inch (13 mm) below the outside surface of the EPS foam boards, provide supports for attaching interior and exterior wall coverings. Refer to Figure 1 for details.

3.2.3 Concrete: Concrete shall be normal-weight concrete complying with the applicable code, with a maximum size aggregate of 3/4 inch (19 mm) and a maximum slump of 6 inches (152 mm). The maximum water-cementitious materials ratio shall be 0.5, unless otherwise approved by the code official. Concrete shall have a 28-day minimum compressive strength of 2,500 psi (17.2 MPa).

3.2.4 Reinforcement: Deformed steel reinforcement bars complying with the applicable code shall have a minimum yield stress of 40 ksi (276 MPa).

3.2.5 Other Components: Wood members, if not protected from the concrete, shall be preservative-treated wood or be a naturally durable species, attached to the wall with corrosion-resistant anchor bolts complying with the applicable code. Materials other than wood, such as vinyl, are permitted for window and door framing if approved by the code official.

4.0 DESIGN AND INSTALLATION

4.1 General:

The Logix Insulated Concrete Forms shall be supported on concrete footings complying with Chapter 18 of the UBC ~~or IBC, or Chapter 4 of the IRC.~~ *

Vertical reinforcement bars, embedded in the footing, shall extend a minimum of 24 inches (610 mm) into the block wall system. The Logix Insulated Concrete Form blocks shall be stacked in a running bond pattern such that the polypropylene webs align vertically. Vertical and horizontal reinforcement bars shall be placed as required by the design and the applicable code. All horizontal and vertical reinforcement bars shall have minimum concrete protection in accordance with the applicable code. Concrete quality, mixing, and placing shall comply with the applicable code. Refer to Figure 2 of this report for typical installation details.

~~When regulation is under the IRC, reinforcing steel for the Logix Insulated Concrete Forms used above grade shall comply with Section R611 of the IRC.~~

Pressure-preservative-treated wood ledgers shall be attached to the concrete wall by removing the face shell of the EPS units, with the height of the removed portion equal to the depth of the wood ledger. A maximum concrete lift height of 4 feet (1.2 m), with continuous placement around the perimeter of the foundation until the full height is attained, shall be performed. The minimum ambient temperature during placement shall be in accordance with ACI 306. When concrete is poured into the wall system, the concrete-filled volume, provided for the anchor bolts, forms a solid concrete connection from the ledger board to the horizontal bond beam. The spacing and embedment depth of the anchor bolts shall comply with the structural design and code requirements. Anchor bolts used to connect the wood ledgers or plates to the concrete shall be cast-in-place, with the bolts sized and spaced as required by the design using values as indicated in ~~Section 1912 or Section 1913 of the IBC, or Section 1923 of the UBC.~~ *

4.1.1 Interior Finish Requirements: Logix Insulated Concrete Forms exposed to the interior of the building shall

~~deleted by City of Los Angeles~~

be finished with minimum 1/2-inch-thick (13 mm) regular gypsum wallboard complying with ASTM C 36/C 0036M, attached to the flanges of the polypropylene webs. The minimum 1/2-inch-thick (13 mm) wallboard shall be installed vertically and attached to the flanges of the plastic webs with 1.625-inch-long (41.3 mm), No. 6, Type W or Type S, coarse thread gypsum wallboard screws spaced 16 inches (406 mm) on center horizontally, and 12 inches (305 mm) vertically.

4.1.2 Exterior Finish Requirements:

4.1.2.1 Above Grade: An approved exterior wall covering shall be designed and installed in accordance with the applicable code ~~or an ICC-ES evaluation report.~~ * When the wall covering is required to be attached to structural members, the wall covering shall be attached to the flanges of the polypropylene webs with either No. 6, Type W, coarse thread drywall screws or No. 6, Type S drywall screws. The screws shall be corrosion-resistant and have sufficient length to protrude through the flanges of the polypropylene webs a minimum of 1/4 inch (6.4 mm). The screws have the allowable pullout and lateral load capabilities shown in Table 1. The maximum spacing of the screws shall be designed to support the gravity loads of the wall covering and resist the negative wind pressures. The maximum negative wind pressure is 99 psf (4.74 kPa).

Negative wind pressure capacity of the exterior finish material shall be the same as that recognized in the code for generic materials, ~~or in a current ICC-ES evaluation report for proprietary materials.~~ *

4.1.2.2 Below-grade Construction: Wall surfaces shall be dampproofed and, when required by the code official, waterproofed in accordance with the applicable code. Dampproofing and waterproofing materials shall be approved by Logix Insulated Concrete Forms Ltd. and the code official, and shall be free of solvents that will adversely affect the EPS foam boards.

4.1.3 Foundation Walls: The wall system is permitted to be used as a foundation stem wall when supporting wood-framed construction and when the structure is supported on concrete footings complying with the applicable code. Compliance with Table 18-I-C is mandatory when regulation is by the UBC. Installation of the Logix Insulated Concrete Forms as foundation walls shall comply with the applicable code.

4.2 Crawl Space Installation:

Logix Insulated Concrete Forms located in underfloor crawl spaces are permitted to be exposed to the crawl space, subject to all the following conditions:

- Entry to the crawl space is only to service utilities, and heat-producing appliances are not permitted.
- There are no interconnected basement areas.
- Air in the crawl space is not circulated to other parts of the building.
- Ventilation of the crawl space is provided in accordance with the applicable code.

4.3 Design:

4.3.1 General: Design of concrete in the Logix Insulated Concrete Forms shall comply with Chapter 19 ~~of the IBC, UBC or NBC.~~ * Walls shall be anchored to the floors and roofs in accordance with Section 1633.2.8 of the UBC ~~or Section 1604.8.2 of the IBC.~~ * When required by the code official, plans and calculations showing compliance with this report shall be submitted to the code official for approval.

4.3.1.1 Alternate Design in Accordance with the UBC: In lieu of calculations required by Section 4.3.1 of this report, the

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structural design of residential buildings, constructed with the Logix Insulated Concrete Forms and regulated by the UBC, is permitted to comply with the Prescriptive Method for Insulating Concrete Forms in Residential Construction (publication No. EB118), dated May 1998, published by the Portland Cement Association (PCA), subject to all limits specified in that document for a flat ICF wall system. The PCA document shall be made available to the code official upon request. Buildings constructed with the Logix Insulated Concrete Forms and designed in accordance with this section shall not exceed a height of two stories plus a basement, where the maximum unsupported wall height is 10 feet (3048 mm).

4.3.1.2 Design in Accordance with the IRC: Walls constructed with the Logix Insulated Concrete Forms shall be designed in accordance with Section R611 of the IRC. The Logix Insulated Concrete Forms are defined as a flat ICF system in accordance with IRC Section R404.4.2 or R611.2, and corresponding requirements shall apply.

4.3.1.3 Design in Accordance with the SBC: For applications governed by the SBC, Logix Insulated Concrete Forms are designed and reinforced using the load tables for flat ICF forms in Sections 1916 and 1804.6.2 of the SBC, provided the building conforms to the applicability limits defined in Section 1916.2 and 1804.6.2.1 of the SBC.

4.4 Protection Against Termites:

For applications governed by the SBC or the IRC, Logix Insulated Concrete Forms shall be installed in accordance with Sections 1916.7.5 and 2603.3 of the SBC and Section R324.4 of the IRC.

4.5 Three-hour Fire-resistance-rated Wall Assemblies (ASTM E 119): Design in Accordance with the IBC, IRC, BNBC, UBC and SBC: The wall shall be constructed with Logix Insulated Concrete Forms with a minimum 6 1/4-inch-thick (159 mm) concrete core and 1/2-inch-thick (13 mm) standard gypsum wallboard attached with 1 1/2-inch-long (38 mm) standard drywall screws spaced 12 inches (305 mm) apart vertically and 16 inches (406 mm) apart horizontally.

For jurisdictions enforcing the UBC, concrete walls meeting the construction specifications listed in Item 7-1.1 of Table 7-B of the UBC and formed with the Logix Insulated Concrete Forms have the fire-resistive ratings specified in Table 7-B of the UBC.

4.6 Special Inspection:

Special inspection is required as noted in Section 1701 of the UBC, ~~Section 1705 of the BNBC or Section 1704 of the IBC,~~ for placement of reinforcing steel and concrete, and for concrete cylinder testing, except that special inspection is not required for foundation stem walls conforming to ~~Table 1805.4.2 of the IBC or Table 18-I-C of the UBC.~~ Under the UBC, special inspection is not required if all of the following conditions are met:

1. Wall systems are a maximum of 8 feet high (2.4 m) and are limited to use in single-story construction of Group R, Division 3, or Group U Occupancies.
2. Maximum height of a concrete lift is 48 inches (1219 mm). Succeeding lifts must be placed in accordance with Section 1905.10.5 of the UBC.

3. Installation is by properly trained installers approved by Logix Insulated Concrete Forms Ltd.
4. The installation instructions indicate methods used to verify proper placement of concrete.
5. Specified compressive strength of concrete used in design is one-half of that specified.

5.0 CONDITIONS OF USE

The Logix Insulated Concrete Forms described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Design calculations and details for specific applications shall be required in accordance with Section 4.3 of this report.
- 5.2 The forms shall be limited to buildings of Type V (IBC and UBC), ~~Type 5 (BNBC), and Type VI (SBC)~~ construction, and to buildings constructed under the IRC.
- 5.3 The Logix forms shall be separated from the building interior with an approved 15-minute thermal barrier except for crawl space construction as described in Section 4.2 of this report.
- 5.4 Special inspections shall be required as described in Section 4.6 of this report.
- 5.5 When use is as part of a fire-resistance-rated assembly, Section 4.5 of this report shall apply.
- 5.6 Logix Insulated Concrete Forms are manufactured by Beaver Plastics Ltd. located in Edmonton, Alberta, Canada, and Chilliwack, British Columbia, Canada; AMC Insulation Corporation in Winnipeg, Manitoba, Canada; Form Systems Inc. in Hayesville, Kansas; PermaR Products Inc. in Johnson City, Tennessee; and PSC Moulding Corporation in Cobourg, Ontario, Canada. Logix Insulated Concrete Forms are produced under a quality control program with inspections conducted by Intertek Testing Services NA, Ltd. (AA-688).

6.0 EVIDENCE SUBMITTED

- 6.1 Manufacturer's published installation instructions.
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Concrete and Concrete Masonry Floor, Roof and Wall Systems (AC15), dated June 2003, and the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated October 2004.
- 6.3 Reports of tests in accordance with ASTM E 119.
- 6.4 Quality control manuals.

7.0 IDENTIFICATION

Each pallet of Logix Insulated Concrete Forms shall bear a label that includes the company name (Logix Insulated Concrete Forms Ltd.), the evaluation report number (ESR-1642), the manufacturing location, the date of production, and the name and logo of the inspection agency (Intertek Testing Services NA, Ltd.).

TABLE 1—ALLOWABLE PULLOUT AND LATERAL CAPACITIES OF SCREWS

SCREW TYPE	ALLOWABLE CAPACITY (pounds)	
	Pullout Capacity	Lateral Load Capacity
No. 6, Type S, fine-thread, corrosion-resistant screw	35	49
No. 6, Type W, coarse-thread, corrosion-resistant screw	33	49

For SI: 1 pound = 4.45 N.

* deleted by City of Los Angeles

CODE COMPLIANCE

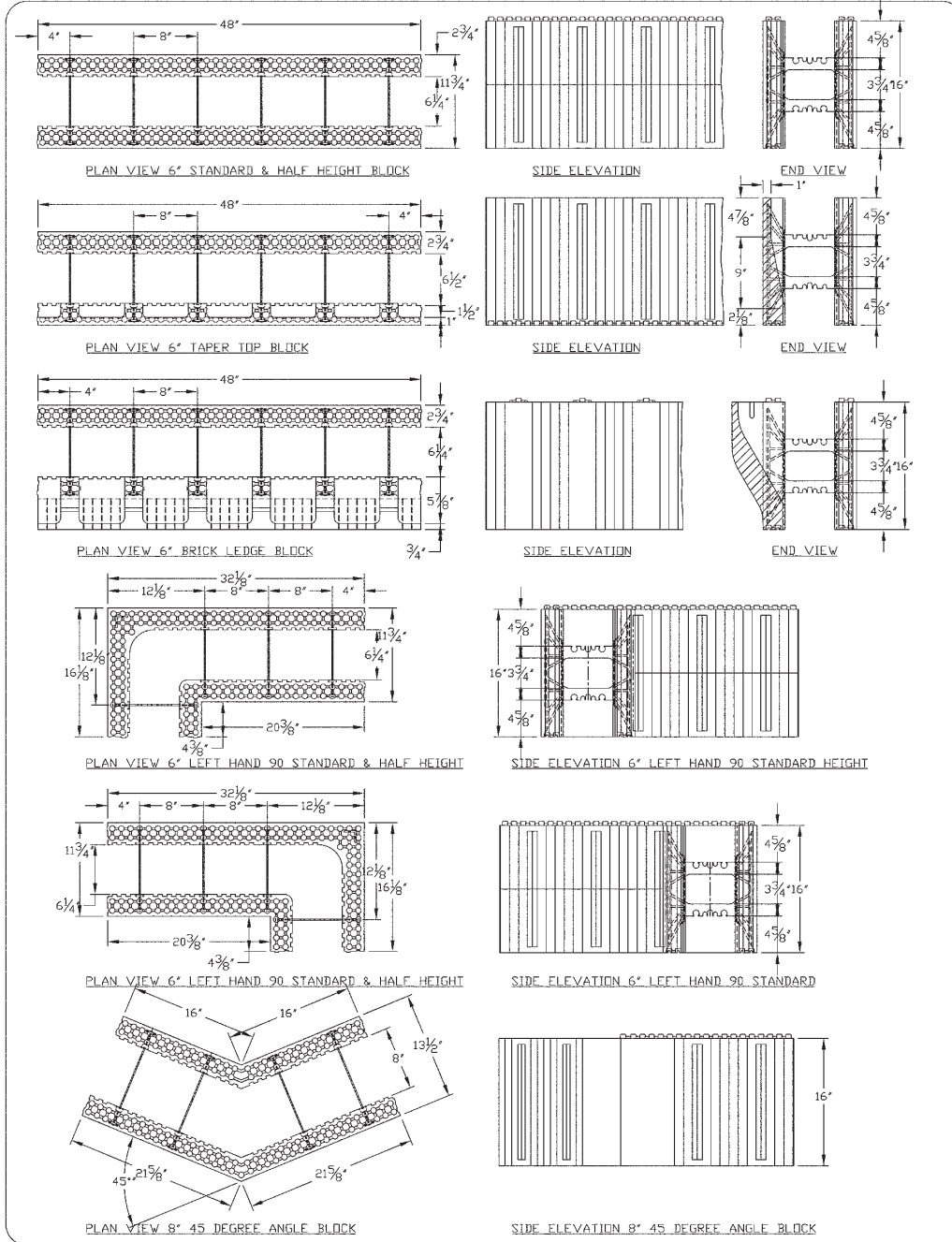


FIGURE 1—LOGIX INSULATED CONCRETE FORMS

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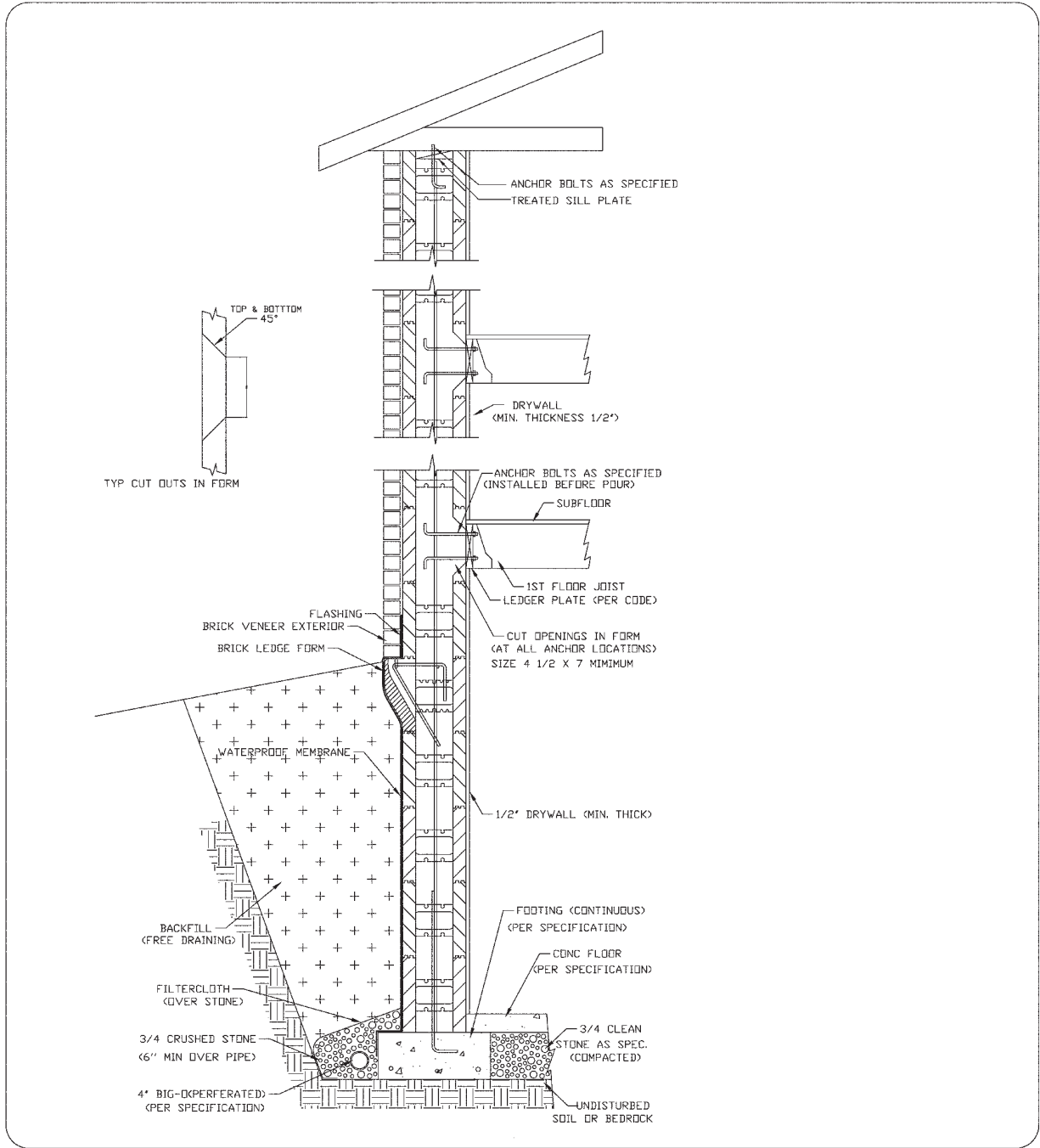


FIGURE 2—TYPICAL INSTALLATION DETAILS

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Good. Solid. Green.

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