Special Inspections Program
2009 Edition
(2009-SIP)
Effective: March 1, 2011

Based on
Virginia Uniform Statewide Building Code (2009) Edition
13 VAC 5-63-10… 5-63-500, EFFECTIVE Ma4Rch 1, 2011
Part I Virginia Construction Code
And
International Building Code -2009Edition

Administered by
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This document is also available on the Town of Herndon website:
www.herndon-va.gov/content/town_Services/Building_Inspections

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Preface

Special Inspections Program (2009 SIP) (effective March 1, 2011) must be used in conjunction with the *2009 Virginia Uniform Statewide Building Code Part I, Virginia Construction Code* (VCC), which incorporates and amends the *2009 International Building Code*.

This 2009-SIP document is intended to be useable in offices, and on the job site by containing the pertinent information needed for successful application of the *Special Inspections Program,* but is not a replacement for the governing codes, nor is it a library of all referenced standards. The text summarizes and directly references the pertinent building code sections (denoted by "*VCC – mm.nn"* section numbers), but the actual code language and code tables are not included.

2009-SIP document changes and 2009 *VCC* building code changes from the previous editions:

- Updated *VCC-mm.nn code* section references to the *2009 Virginia construction code.*

Chapter 2 Definitions and organizations:

- Definitions: Deep foundation; high-rise building; shallow foundation; Vertical masonry foundation element.
- Building Construction Organization updated standards.

Chapter 3 Special inspections classifications:

- Statement of special inspections revised.

Chapter 6 Structural steel;

- Clarification for continuous or periodic special inspection of connections.

Chapter 9 Wood:

- Metal-plated-connected trusses spanning 60'-0' or more.

Chapter 10 Masonry:

- Vertical masonry foundation elements.

Chapter 11 Soils and foundations:

- Driven deep foundations and cast-in-place deep foundations.

Chapter 13 Exterior insulation and finish systems:

- Water-resistant barrier coatings.

Chapter 14 Sprayed fire-resistant materials:

- Increased frequency of samples; higher bond strength requirements.

CHAPTER 1
Town of Herndon, Virginia
Special Inspections Program

Section 101 Overview

101.1 Special inspections required. "*Special inspections*," which are observations, inspections and tests that are conducted during the construction of building components, elements and connections that require particular expertise to substantiate adequacy, are required as part of the building code.

The owner must retain a Registered Design Professional to provide these services, and bears the associated cost. Special inspections are required in addition to other inspections prescribed under the *2009 Virginia Uniform Statewide Building Code, Part I, New Construction Code (VCC),* and the *2009 International Building Code (IBC).*

The Special Inspections Program is administered by the Building Inspections Section, Department of Public Works, Herndon, Virginia.

This document, *Special Inspections Program-2009 Edition (2209-SIP),* **shall be used in conjunction with the** *2009 Virginia Construction code.*

This 2009-SIP document:

- Contains the policies and procedures underpinning the *Special Inspections Program.* And applies the *Special Inspections Program* uniformly throughout the Town of Herndon.
- Describes and defines the roles and responsibilities of all parties involved in special inspections.
- Standardizes building code application and implementation for special inspections.
- Provides for an orderly and systematic approach for updating standards which apply to the *Special Inspections Program.*
- Implements and references the requirements of *Virginia Construction Code Section 1704 Special Inspections, et. al.,* and its reference standards. The 2009-SIP document text summarizes the pertinent *Virginia Construction Code* provisions, and the code sections are directly referenced (denoted by "*VCC-mm.nn"* section numbers), but the corresponding code language and code tables are not included. Chapter and procedural outlines in this 2009-SIP document identify the purpose, team members' responsibilities, time requirements, and scope of various construction activities. The *Special Inspections Program* applies throughout the construction project, and a copy of this 2009-SIP document shall be available at the construction site from the time of the Critical Structures preconstruction Meeting through the final

inspections prior to occupancy The Virginia Construction Code should also be available on the construction site.

- At the preconstruction meeting, participants shall discuss the scope and extent of the statement of special inspections, which identifies the special inspection and material test requirements for the project.
- The provisions of the *Special Inspections program* do not relieve any participant from the proper performance of work according to contracts, approved plans and specifications, and compliance with the *Virginia Construction Code* requirements and the applicable Federal and State safety regulations.

101.2 Virginia Construction Code. The *Virginia Uniform Statewide Building Code,* in three parts, incorporates and amends the International Code Council, Inc., model codes*:*

- Part I *Virginia Construction Code (VCC)* incorporates and amends the *International Building code,* for construction of new buildings, additions and new elements. Special Inspections are required during new construction.

  (See VCC-103.10 *Use of certain provisions of reference codes and VCC-1704 Special Inspections).*

- Part II *Virginia Rehabilitation Code (VRC)* incorporates and amends the *International Existing Building Code,* and refers the construction of all building additions and any new elements to the *Virginia Construction Code.*

  (See VRC-103.1 *Application of code, general,* VRC-407 *Repairs, structural,* VRC-507 *Alterations-Level 1, structural,* VRC-607 *Alterations-Level 2, structural,* VRC_707 *Alterations-Level, structural,* VRC-807 *Change of occupancy, structural,* VRC-903 *Additions, structural,* VRC-1006 *Historic buildings, structural,* VRC-1101 *Relocated or moved buildings, general and* VRC-1201 *Compliance alternatives, general*).

- Part III *Virginia Maintenance Code* (VMC) incorporates and amends the *International Property Maintenance Code,* and refers the construction of any new elements to the *Virginia Construction Code.*

  (See VMC-104.5.4 *Notices, reports and order, note).*

Construction for **which** a permit application is submitted after the effective date of the current *Virginia Construction Code* shall comply with the provision of the *Virginia Construction Code* and this 2009-SIP document, except when a permit application is

submitted within one year after such date, construction shall comply with either provisions of this 2009-SIP document or the previous edition. `

101.3 Alternative inspections or tests. Proposals for alternative special inspection procedures, or alternative test method, after review and approval by the appropriate registered design professionals, shall be submitted to the Building Inspection Section for consideration on a case-by-case basis. Substantiation of equivalence to the minimum requirements of the building code, the *Special; Inspections Program* and this 2009-SIP document shall be provided. If such proposals include or require building code modifications, Section 104.4 apply.

101.4 Building code modifications. Proposals for building code modifications shall be separately submitted to the Building Official for consideration on a case-by-case basis (see VCC-106.3 *Issuance of modifications)*. If such proposal include or require alternative inspection methods or material tests, Section 101.3 shall also apply.

101.5 Special Inspections Program revisions. Revisions to the *Special Inspections Program* and this 2009-SIP document are issued on an as needed basis. *Each* page of this 2009-SIP document shall carry the date of issue as a means of identification. Revisions to the *Special Inspections Program* resulting from Virginia Department of Housing and Community Development amendments or revisions to the current edition of the building code shall become effective immediately upon issuance.

101.6

SECTION 102 THE SPECIAL INSPECTIONS ENGINEER OF RECORD

102.1 Special inspections services. The owner of a building (or the owner's duly authorized representative) shall retain a registered design professional, hereafter called the "*special inspections engineer of record"* ("*special inspector"* in *Virginia Construction Code*), who provides special inspection and material testing services in accordance with the requirements of the *Virginia* Construction *Code* and as required in this 2009-SIP document, including responsibility for the services of an inspection and testing agency which shall meet the requirements of ASTM E 329.

Special inspections are conducted by the special inspections engineer of record, not the town, and are in addition to other inspections required elsewhere by the *Virginia Construction Code*. Both the special inspections engineer of record and the inspection and testing agency shall be independent of the contractors executing the work requiring special inspection.

The special inspections engineer of record and the inspection and testing agency are subject to town approval.

The role of town staff is to confirm that the work of the special inspections engineer of record and the inspection and testing agency complies with the requirements of the *Special Inspections Program* and this 2009-0SIP document.

At the completion of the project, the special inspections engineer of record shall prepare a final report of special inspections for review by the appropriate registered design professionals of record, which shall then be submitted to the Building Inspections section for approval, prior to final building inspection approval and issuance of certificate of occupancy.

SECTION 103 THE STRUCTURAL ENGINEER OF RECORD REVIEW/APPROVAL STAMP

103.1 Required stamp on documents. All fabrication and erection documents required to be reviewed and approved by the structural engineer of record (the geotechnical engineer of record as applicable, and the architect of record if the architect of record is also acting as the structural engineer of record or geotechnical engineer of record) shall bear a review/approval stamp conforming to this section. The requirements for review and approval, and the format of the review/approval stamp, are in addition to the seal and signature requirement for construction documents required to be prepared by registered design professionals.

Each individual document shall bear the review/approval stamp of the registered design professional or be otherwise individually identified as being reviewed and approved. An index sheet bearing the review/approval stamp and signature of the registered design professional, and specifically listing the documents and dates thereof, including resubmissions of revised documents, to which the review/approval stamp and signature apply, may accompany submission packages of documents.

103.2 Format and language. The review/approval stamp shall contain language as shown in the following samples of acceptable formats. The review/approval stamp has three parts:

- (Mandatory) Results of the review in specific terms, with corresponding instructions. The words or phrases “Approved”, “Approved as Noted” (or “Approved as Corrected”), and “Disapproved (or “Rejected”) shall appear. Words or phrases such as “Reviewed”, “No Exception Taken”, etc., are not acceptable. The word “Fabrication” can be interchanged with the word “construction”.
- (Optional) Clarification statements to explain the scope or qualify the results of review. The text most commonly used by engineering firms includes provisions that the approval is for general conformance with the design intent and the contract requirements, or that the reviewer does not assume responsibility for fabrication or construction processes, or that the contractor is responsible for coordination of trade and satisfactory execution of the work.
- (Mandatory) Signature and date lines. The signatory area shall be completed.

CHAPTER 2
DEFINITIONS AND ABBREVIATIONS

SECTION 201 DEFINITIONS

The following words and terms shall, for the purposes of the *Special Inspection Program*, have the meanings shown herein. The word, "shall" where used in this SIP-2009 document, indicates mandatory requirements. Words and terms not defined herein shall have the meanings ascribed to them in *Virginia Construction Code* Approved Acceptable to or authorized by the Building Official; or if explicit by the context, as reviewed by a registered design professional, with result that construction or fabrication may proceed (see VCC-202 *Definitions: Approved)*.

Architect of Record — **(AR)** A registered design professional retained by the owner to design or specify architectural construction in accordance with the *Virginia construction Code* and the *Herndon Town Code*, and whose signature and seal appear on the Town-approved architectural construction documents.

Building — Construction with a roof (a "roofed structure"), for use or occupancy (see VCC-202 *Definitions: Building)*.

Building core and shell — the basic configuration and construction of a building or structure, with the "shell" structure and "core" public areas and services.

- Building shell the overall structure of foundations, exterior walls, columns, floors, and roof, and including stairways, elevator hoist ways, common area corridors and grade level exit passageways, and all fire protection (detection, suppression and alarms) systems throughout the building.
- Building core Public areas and services including lobbies, required accessible features and rest rooms, and also including the primary and emergency electrical services, plumbing water and sewer services, and primary heat, ventilation and air condition systems.

Certification of compliance — A certificate of compliance may be issued by a corporate officer (see VCC-1702 *Definitions: Certificate of compliance)*.

Certification — A signed and sealed statement issued by a registered design professional which shall indicate that the items(s) under consideration, In the registered design professional's opinion and to the best of the registered design professional's knowledge:

- Complies with Town-Approved documents or
- Complies with requirements of the *Virginia Construction Code.*

Completion Letter	A certification by a registered design professional which shall indicated that the construction elements subject to special inspection and materials tests for a specific material or phase of construction have been inspected prior to concealment, the construction is satisfactory completed, and in the registered design professional's professional opinion and to the best of the registered design professional's knowledge, complies with Town-Approved documents and project specifications. A completion letter shall carry the signature and seal of the registered design professional making the statement. A completion letter may be a portion of the final report of special inspections.
Construction Documents	Documents prepared for the purpose of obtaining a building permit, (see VCC-02*definitions:Construction documents).*

Town-Approved Documents

- Building construction documents approved by the Building Inspections Section, including all approved revisions.
- Fabrication and erection documents approved by the Building Inspection Section, including all approved revisions
- Soils-related documents approved by the Building Inspection Section, including approved revisions.

Critical structure	See "Special inspection project".
Deep foundation	A foundation element that is not a shallow foundation elements, and usually extends more than 3'-0" below grade. Examples include: driven steel or concrete piles, cast-in-place concrete caissons, helical piles, micropiles, masonry or concrete piers or columns with heights more than four times their minimum thickness, etc. (see VCC-1802 *Definitions:Deep foundations).*
Essential facility	A building or structure that contains occupancies or provides emergency response that must remain operational after a fire, flood, earthquake, hurricane or other disaster (see VCC-1602 *definitions and notations: Essential facilities and VCC-Table 16043.5 Occupancy category of buildings and other structures and VCC-1613.5.6 Determination of seismic design category***).**

Fabrication and Erection	Written, graphic and pictorial documents prepared or assembled after issuance of a building permit and in addition to the Town-approved construction documents, describing the design, location and physical characteristics of the building elements or materials necessary for fabrication, assembly or erection or the components of the project.
Final Report of Special Inspections	A certification by the Special Inspections Engineer of Record which shall indicate that all construction elements subject to special inspections and material tests for all materials or phases have been inspected prior to concealment, the requires special inspections are completed, and, in the special inspections engineer of record's professional opinion and to the best of the special inspections engineer of record's knowledge complies with Town approved documents and project specifications. The Final Report of Special Inspections shall carry the signature and seal of the special inspections engineer of record making the statement.
Formwork, concrete	Temporary structures designed to mold and retain freshly placed concrete until it reaches sufficient solidity and strength to be self-supporting without the formwork (see also "Shores" and Reshores").
Geotechnical Engineer of Record	**(GER)** a registered design professional retained by the owner to design or specify earthwork and foundations in accordance with the *Virginia Construction Code* and The Herndon Town Code, and whose seal and signature appear on the Town-approved geotechnical report.
High-rise building	A building 75'-0" or higher to the topmost occupied floor from the lowest level of fire department access (see VCC 202 *Definitions: High-rise building)*.
Inspection	The continuous or periodic observations of executed work and performance tests, for certain building or structure components, to establish conformance with Town-approved documents as required by the *Virginia Construction Code* and this document.
Inspection and Testing Agency	An established and recognized agency meeting the requirements of ASTM E 329 and accredited by an

	accreditation body recognized by the town, retained by the owner, independent of the contractors executing the work subject to special inspections, and approved by the Building Inspection Section, and approved by the Town to conduct special inspections and materials tests required by the *Virginia Construction Code* and this document (see VCC-1702 *Definitions: Approved agency and VCC-1703.1 Approved agency)*
Non-problem soils	Soils and foundation materials in other than problem soils areas. Geotechnical investigations and recommendations for construction in non-problem soils areas shall be submitted to and approved by the Building Inspections Section.
Non-Structural Elements	Elements of a building that are not primary or secondary structural load-bearing elements. Examples include exterior curtain walls and cladding, non-load bearing partitions, guards, hand rails, etc.
Occupancy category	Used for structural requirements based on the type of occupancy and the occupant load (see VCC-1602 *Definitions and notations: Occupancy category and VCC-1604.5 Occupancy category)*.
Owner	The word "owner" shall be construed as though followed by the words "or the owner's duly authorized representative" (see VCC-202*Definitions"owner*).
Pre-Engineered Structural	Structural elements specified by the structural engineer of record but which may be designed by a specialty registered design professional. Examples are items such as open web steel joists and joist girders; wood trusses; combination wood, metal and plywood joists; precast concrete elements; prefabricated wood or metal buildings; tilt-up concrete panel reinforcement and lifting hardware.
Primary Structural System	The combination of structural (load-bearing) elements which serve to support the weight of the building's structural shell, the applicable live load based upon use and occupancy, and wind, snow, thermal and seismic environmental loads.
Problem soils	Soils of deficient or questionable bearing capacity, or expansive in nature, when classified in accordance

	with ASTM D 2487 and as defined in the Fairfax County Public Facilities Manual. Per the Fairfax County Public Facilities Manual, a geotechnical report is required for construction in problem soils areas and shall be submitted to and approved by the Building Inspection Section.
Registered Design Professional	A professional architect or professional engineer licensed in the Commonwealth of Virginia (see VCC-202 *Definitions: Registered design professional and Code of Virginia §54-1*).
Reshores	Shores placed snugly, but without preloading, under a concrete slab (or other structural member) after the original formwork and shores have been removed, thus allowing the new slab or structural member to deflect, and to support its own weight and existing construction loads applied, prior to the installation of the reshores. Reshores are used to distribute future loads into slabs and members below (see ACI 318-2.2). Reshores may be individual posts, scaffolds, or combination.
Secondary Structural Elements	Building elements that are structurally significant (load-bearing) for the function they serve but are not necessary for stability of the primary structure. Examples include: support beams above the primary roof structure which carry a chiller; elevator support rails and beams; retaining wall independent of the primary building; flagpole or light pole functions; false work required for the erection of the primary structural system; steel stairs, etc., not fully specified on the Town-approved construction documents.
Seismic design category	Classification based on occupancy category and earthquake criteria (see VCC-1613.2 *Definitions: Seismic design category and VCC-1613.5.6 Determination of seismic design category).*
Shallow foundation	A foundation element extending 4'-0" or less below grade. Examples include: strip footings, mat foundation, slab-on-grade, masonry or concrete piers with heights less than four times their minimum thickness, etc. (see VCC-1802 *Definitions: Shallow foundation).*

Shores	Vertical (or inclined) temporary supports designed to carry the dead load weight of the concrete and formwork, and construction live loads above (see ACI 318-2.2). Shores may be individual posts, scaffolds, or combinations.
Special inspections	The continuous or periodic observation of executed work and performance tests, and the conduction of materials tests, during construction of building components, elements and connections requiring special expertise to substantiate adequacy in compliance with town-approved documents and *Virginia construction code* requirements. Special inspections are conducted by the special inspections engineer of record, not the building official, and are in addition to other inspections required elsewhere by the building code (see VCC-1702 *Definitions: special inspections)*.
Special inspection, continuous	Full-time special inspection while the work is being executed (see VCC-1702 *Definitions: Special inspection, continuous)*.
Special inspection, periodic	Part-time or intermittent special inspection where the work has been or is being executed (see VCC-1702 *Definitions: Special inspection, periodic*).
Special Inspections Engineer	refer to as "Special inspector" in the *Virginia Construction Code,*
Of Record	a registered design professional who is directly responsible for special inspections, materials testing and related services as described in the town-approved statement of special inspections and this document. The special inspections engineer of record shall be retained by the owner, independent of the contractors executing the work subject to special inspection, and approved by the town.
Special inspection program	In the Town of Herndon, Virginia, the technical requirements for special inspections and material testing in accordance with the *Virginia Construction Code,* and the administrative procedures of the Building Inspection Section, for a building or structure with elements or components subject to special inspection and material testing during construction.

Special inspections project	A building or structure to be constructed or altered under the Special Inspections Program.
Statement of Special Inspections	The statement of special inspections is a statement prepared by the owner and the appropriate registered design professionals (the architect of record, the geotechnical engineer of record, and the structural engineer of record) and submitted by the permit applicant as a condition for permit issuance in accordance with the *Virginia Construction Code*. The statement of special inspections identifies the scope of the special inspections and material testing services applicable to a construction project and the registered design professionals and inspection and testing agency selected to provide those services.
Structural Engineer of Record	A registered design professional retained by the owner to design or specify structural documents in accordance with the *Virginia Construction Code* and the Herndon Town Code, and whose signature and seal appear on the Town-approved structural construction documents.
Structure	Construction without a roof (a "structure"), such as a platform or retaining wall, for use or occupancy (see VCC-202*Definitions: Structure*).
Tenant space	Construction within a building core and shell to produce a completed, occupiable area. In this context, "tenant space" is construed to mean the additional areas between a building's core public areas and the building's exterior walls.
Vertical masonry foundation element	A foundation pier, pier, column or wall, depending upon its dimensioned (see VCC-1808.9 *Vertical masonry foundation elements and VCC-2102 Definitions: Foundation pier)*.

SECTION 202 BUILDING CONSTRUCTION ORGANIZATIONS

ORGANIZATION, WEBSITE AND SELECTED CONSTRUCTION STANDARDS

(Note: Use of latest standards shown is recommended.)

The American Association for Laboratory Accreditation (A2LA)
(301) 664-3247
www.a2la.org

American Concrete Institute (ACI)
(248) 848-3700
www.concrete.org
ACI 318-08 *Building Code Requirements for Structural Concrete*

American Institute of Steel Construction, Inc. (AISC)
(312)-670-2400
www.aisc.org

AISC 303-10	*Code of Standard Practice for Steel Buildings and Bridges*
AISC STD cert.	*Certification: Standard for Steel Buildings Structures*
AISC CSE cert.	*Certification: Certified Steel Erector*
AISC 341-05	*Seismic Provisions for Structural Steel Buildings, including Supplement No.1 dated 2006*

American Iron and Steel Institute (AISI) ASD
(202) 452-7100
www.steel.org

American Society of Civil Engineers (ASCE/SEI) Structural Engineering Institute
1-800-548-2723
www.asce.org

American Society for Non-Destructive Testing (ASNT)
1-800-222-2723
www.asnt.org

American Society for Testing and Materials (ASTM)
(610) 832-9500
www.astm.org

ASTM A 706-09b	*Standard specifications for low-alloy steel deformed and plain bars for concrete*
ASTM A 751-08	*Standard test methods, practices and terminology for chemical analysis of steel products*
ASTM C 31-10	*Standard practice for making and curing concrete tests specimens in the field*
ASTM C 39-10	*Standard test method for compressive strength of cylindrical concrete specimens*

ASTM 42-10a *Standard test method for obtaining and testing drilled cores and sawed beams of concrete*
ASTM C 94-11a *Standard specification for ready-mixed concrete*
ASTM C 172-10 *Standard practice for sampling ready-mixed concrete*
ASTM C 685-10 *Standard specifications for concrete made by volumetric batching and continuous mixing*
ASTM C 803-03(2010) *Standard test method for penetration resistance of hardened concrete*
ASTM C 1077-11a *Standard practice for laboratories testing concrete and concrete aggregates for use in construction and criteria for laboratory evaluation*
ASTM D 1557-09 *Standard test methods for laboratory compaction characteristics of soil using modified effort (56,000 ft-lb/ft^3)*
ASTM D 2487-11 *Standard practice for classification of soils for engineering purposes (Unified soil classification system)*
ASTM D 3740-10 *Standard practice for minimum requirements for agencies engaged in testing and/or inspection of soil and rock as used in engineering design and construction*
ASTM E 329-11a *Standard specification for agencies engaged in the testing and/or inspection of materials used in construction*
ASTM E 605-93(20110 *Standard test methods for thickness and density of sprayed fire- resistive material (SFRM) applied to structural members*
ASTM E 736-00(2011) *Test method for cohesion/adhesion of sprayed fire-resistive materials applied to structural members*
ASTM F 606-11 *Standard test methods for determining the mechanical properties of externally and internally threaded fasteners, washers, direct tension indictors, and rivets*

The Association of the Wall and Ceiling Industries International
(703) 538-1600
www.awci.org
AWCI 12-B-98 *Technical Manual 12-B, second edition: Standard practice for the testing and inspection of field applied thin film intumescent fire-resistive materials; an annotated guide*

American Welding Society (AWS)
1-800-443-9353
AWS D1.1-10 *Structural welding code-Steel*
AWS D1.3-08 *Structural welding code-Sheet steel*
AWS D1.4-11 *Structural welding code-Reinforcing steel*

Brick Institute of America (BIA)
(703) 620-0010
www.bia.org

Council of American Structural Engineers (CASE)

American council of Engineering Companies
(202) 347-7474
www.acec.org

U.S. Code of Federal Regulations (CFR)
www.firstgov.gov

Cement and Concrete Reference Laboratory (CCRL)
Building and Fire Research Laboratory
National Institute of Standards and Technology
(301) 975-5900
www.bfrl.nist.gov

Concrete Reinforcing Steel Institute (CRSI)
(847) 517-1200
www.crsi.org

International Code Council, Inc. (ICC)
1-888-ICC-SAFE (422-7233)
www.iccsafe.org
Model Codes:
2009 *International Building Code (IBC)*
2009 International Existing Building Code (IEBC)
2009 International Property Maintenance Code (IPMC)
State Codes (Virginia amendments composited with model codes, effective March 1. 2011):
2009 Virginia Construction Code (VCC)
2009 Virginia Rehabilitation Code (VRC)
2009 Virginia Maintenance Code (VMC)

National Concrete Masonry Association (NCMA)
(703)713-1900
www.ncma.org

National Fire Protection Association (NFPA)
(617) 770-3000
www.nfpa.org

National Institute for Certification in Engineering Technologies (NICET)
1-888-IS-NICET (476-4238
www.nicet.org

National Institute of Standards and Technology (NIST)
(301) 975-NIST (6478)
www.nist.gov

National Voluntary Laboratory Accreditation Program (NVLAP)
National Institute of Standards and Technology
(301)-975-4016
www.nist.gov/nvlap

Occupational Safety& Health Administration (OSHA)
U.S Department of Labor
1-800-321-OSHA (6742)
www.osha.gov

Portland Cement Association (PCA)
(847) 966-6200
www.cement.org

Precast/Pre-Stressed Concrete Institute (PCI)
(312) 786-0300
www.pci.org

PCI MNL 116-99	*Quality Control for Plants and Production of Structural precast and Pre-stressed Concrete Products*
PCI MNL 117S-96	*Quality for Plants and Production of Architectural Precast and Pre-stressed Concrete Products*

Post-Tensioning Institute (PTI)
(602) 870-7540
www.post-tensioning.org

Research Council on Structural Connections of the Engineering Foundation (RCSC)
c/o American Institute of Steel Construction
(312) 670-2400
www.boltcouncil.org
Specifications for Structural Joints using High-Strength Bolts, 2009 edition
Specifications for Structural Joints Using A325 or A490 Bolts, 2204 edition

Steel Deck Institute (SDI)
(847) 458-4647
www.sdi.org

Steel Joist Institute (SJI)
(843) 626-1995
www.steeljoist.org

The Masonry Council (TMS)
(303) 939-9700
www.masonrysociety.org

Truss Plate Institute (TPI)
(703) 683-1010
www.tpinst.org

Underwriter Laboratories, Inc. (UL)
1-847-272-8800
www.ul.com
Fire Resistance Directory

Virginia, Commonwealth of
www.virginia.gov
Code of Virginia (http://leg1.state.va.us/000/cod/toc.htm)

Virginia Department of Transportation (VDOT)
(804)786-2801
www.virginiadot.org
Road and Bridges Standards 2008edition

Virginia Occupational Safety and Health Administration VOSHA
(804) 371-2327
www.doli.state.va.us
20 CFR Part 1926 Virginia Occupational Safety and Health Standards for the Construction Industry
Subpart N-Section 1926.550 Cranes and Derricks
Subpart N-Section 1926.552 Materials hoists and Elevators
Subpart Q-Section 1926.700 Concrete and Masonry Construction

WACEL An Association of Engineering Laboratories, Inspection Agencies and Building Officials, Inc. (Formerly Washington Area Council of Engineering Laboratories)
(301) 652-7925
www.wacel.org

Wood Truss Council of America (WTC)
c/o Structural Building Industry Components Association (SBCA)
(608) 274-4849
www.sbcindustry.com
WTCA QC In-Plant Quality Control Program

CHAPTER 3
SPECIAL INSPECTIONS CLASSIFICATIONS

SECTION 301 SPECIAL INSPECTIONS REQUIRED

Special inspections of building elements and components may be required by:

- The *Code of Virginia §54.1-402* requirements for registered design professionals on construction documents;
- *Virginia Construction Code Sections 1704, Special inspections and 1704.1, Special inspections, general;*
- The building's occupancy classification as an "essential facility" or its seismic-resistance/wind-resistance design categories;
- The building's structural frame design by the structural engineer of record or the foundation design by the geotechnical engineer of record;
- Structural fill under the building's foundation;
- Specifications by the structural engineer of record or the geotechnical engineer of record, or the manufacturer's/supplier's product specifications;
- Soil classification as a problem soil (and the problem soil class) under the building's foundations;
- Alteration of an existing building's structural frame, foundation, or other items listed above;
- The owner, for projects not otherwise required to have inspections.

301.1 Code of Virginia and Virginia Construction Code. The *Code of Virginia §54.1-402* requires registered design professionals to sign and seal construction documents for certain buildings, depending upon Group (type of use and occupant load), building height and area (stories and size), and size of electrical, plumbing and mechanical services (see Appendix A).

- Buildings over three stories in height.
- Buildings of any height with large floor areas or large electrical, plumbing or mechanical systems.
- Group A, E, H, I or R-1 buildings of any size.

Special inspections are than required for elements and components of such buildings (see VCC-1704.1 *Special inspections, General)*. *Vcc-1704 Special inspections* requires special inspections and material tests of building components of steel, concrete, masonry or wood, site soils, foundations, sprayed or mastic fire-resistant materials, certain exterior insulation and finish systems, smoke control, seismic-resistant elements, and special cases.

A statement of special inspections is required as part of the construction documents submitted for a building permit. (See Section 302 and Section 303, and VCC-11.2 *Special inspection*

requirements, VCC-1704.1, Special inspections, general and VCC-1705 Statement of special inspections.)

301.2 Essential facilities, seismic resistance and wind exposure.

301.2.1 Essential facilities. Essential facilities are those buildings and structures, which must remain operational after a fire or other disaster. In the Town of Herndon, buildings of *Occupancy Category IV and Seismic Design Category C* are essential facilities that require special inspections.

301.2.2 Seismic or wind resistance. In the Town of Herndon, buildings a*re Seismic Design Category B or C* (see VCC-1613.5.6 *Determination of seismic design category)*, and buildings of *Seismic Design Category C* require special inspections and material tests of seismic-resisting elements and components (see VCC-1705.3 *Structural resistance, VCC-1707 Special inspections for seismic resistance and VCC-1708 Structural testing for seismic resistance).* In the Town of Herndon, the basic wind speed is less than 100 miles per hour, and special inspection is not required for wind resistance.

301.3 Buildings and foundations elements. Special inspection and material tests shall also apply to building elements and components (including "unique design"), fabrication procedures, and foundation elements or soils classification, as specified by the structural engineer of record or geotechnical engineer of record designs. See Section 302.

301.4 Existing buildings and structures. Additions to existing buildings or structures, or modifications to the primary structural system of existing buildings or structures, or new building components, whose elements fall within the special inspections classification criteria, shall be subject to special inspection.

301.5 Elective by owner. Owner of buildings may elect to follow the Special inspection Program on projects that otherwise do not fall under the above criteria. In such cases, the owner shall notify the Building Inspection Section of their intent prior to the issuance of the building permit, and shall follow all applicable requirements of the Special Inspections Program and this 2009-SIP document.

Section 302 FABRICATORS, ELEMENTS AND COMPONENTS

The following shall be subject to special inspections:

302.1 Fabricators. (See Chapters 6,7,8 and 9.)
For fabricated items requiring special inspection, the special inspections engineer of record shall conduct special inspection of the fabricator's shop facilities.

302.2 Structural steel. (See Chapter 6.)

- **Fabricators.** Special inspections of the fabrication process is required, for all steel fabricated assemblies that are themselves subject to special inspection, except as exempted in VCC-1704.3 *Steel construction*.
- **Elements in buildings of any height.** The following steel elements of buildings, regardless of height:
  - Rigid or semi-rigid "moment" connections, field welded or bolted.
  - Bolted connections required to be pre-tensioned beyond snug tight conditions.
  - Beam or column elements with clear spans greater than 50'-0" in length or height.
  - Trusses, open-webbed joist girders or joists (other than those manufactured to SJI specifications).
  - Plate girders of any spans.
  - Space frames with clear spans greater than 35'-0".
  - Floor decks and roof decks designed to act, as diaphragm's to distribute lateral forces to wind resisting frames.
  - Cable supported structures, except tents.
  - Bolted or welded lateral bracing elements.

- **Elements in buildings greater than three stories in height.** In addition to the steel elements in buildings of any height, as listed above, the following steel elements of buildings greater than three stories in height:

  - Open-webbed joist girders and steel joists (including does manufactured to SJI specifications).

  - Stairs and ladders connecting more than three stories.

  - Floor decks and roof decks.

  - Field-welded shear studs.

- **Seismic-resisting systems** 9Seismic Design Category C):

  - Welding as required by VCC-1707.2 *Structural steel and VCC-1708.4 Structural steel.*

  - Cold-formed steel framing as required by VCC-1707.4 *Cold-formed steel framing*.

302.3 Cast-in-place concrete. (See Chapter 7.)

- **Elements.** All structural elements of cast-in-place concrete, including reinforced, pre-stressed, or post-tensioned concrete elements, mat foundations, and concrete topping on stay-in-place steel decking, both composite and non-composite designs, except as listed below:

Exceptions: the construction shall be on undisturbed and stable earth, rock or non-problem soils. Then, as exempted in VCC-1704.4 *Concrete construction, special inspection is not required for:*

- Buildings three stories or less in height, with fully supported concrete footings:
- Isolated spread footings; and
- Continuous footings that support walls of light frame construction, or are designed in accordance with VCC-Table 1805.4.2 *Footings supporting walls of light frame construction, or are based on f'_c no greater than 2,500 pounds per square inch.*

- Non-structural concrete slabs on grade (including pre-stressed slabs, where the effective pre-stressed is less than 150 psi) supported directly on the ground; and patios, driveways and sidewalks, unless part of an accessible route.

- Concrete foundation walls built in accordance with VCC-Table *1805.5(5)*

- **Seismic-resisting systems.** (Seismic Design Category C): Testing of reinforcing steel and pre-stressing steel as required by VCC-1708.3 *Reinforcing and pre-stressing steel.*

302.4 Precast concrete. (See Chapter 8.)

- **Fabricators.** Special inspection of the fabrication process is required, for all precast concrete elements that are themselves subject to special inspection.
- **Elements precast off-site.** All architectural and structural precast concrete building elements manufactured off-site, except miscellaneous cast stone items such as sills, coping, pavers, etc., or as otherwise approved.
- **Elements precast on-site.** All architectural and structural precast concrete building elements manufactured on-site, including tilt-up concrete wall panels, except miscellaneous cast stone items such as sills, coping, pavers, etc., or as otherwise approved.
- **Seismic-resistance systems.** (Seismic Design Category C): Welding of connections as required by VCC-1707.2 *Structural steel.*

302.5 Masonry. (See Chapter 10.)

- **Elements.** Masonry elements, depending upon the type of masonry design, and the classification of the building or type of occupancy (see Section 1001.1)
  - Engineered masonry in Occupancy Category IV (essential) facilities.

- Engineered masonry in Occupancy Category I, II or III (other) facilities.
- Empirically designed masonry, glass unit masonry and masonry veneer in Occupancy Category IV (essential) facilities.

- **Seismic-resisting systems.** (Seismic Design Category C): as required by VCC-1708.1 *Masonry*.
  Exceptions: Empirically designed masonry, glass unit masonry and masonry veneer in Occupancy Category I, II or III (other) facilities, and certain masonry foundation walls, fireplaces and chimneys.

302.6 Wood. (See Chapter 9.)

- **Fabricators.** Special inspection of the fabrication process is required, for all wood elements that are themselves subject to special inspection.
- **Elements.** The following wood elements are subject to special inspection:
  - Structural glue-laminated members;
  - Sandwich panels;
  - Wood trusses, except those built as standard roof trusses for light-frame construction;
  - Wood I-joists, except those built as standard floor ceiling joists for light-frame construction;
  - High-load diaphragms.

- **Seismic-resisting systems.** (Seismic Design Category C): as required by VCC-1707.3 *Structural wood.*

302.7 Soils and foundations. (See Chapter 11.)

- Soils and building foundation elements when either of the following conditions exist:
  - Problem soils. The building footprint is located in a problem soils area, or as indicated by the town-approved geotechnical report; or
  - Structural fill. The bearing material under the building footprint consists of compacted structural fill, except when fill is less than 1'-0" in total depth.
- **Deep foundations.** Building foundation elements for the following systems:
  - Driven deep foundations of all buildings.
  - Cast-in-place deep foundations of all buildings.
  - Specialty piles and deep foundations, including micropiles, helical piles, geopiers or other systems, of all buildings. The statement of special inspections shall specifically include the special inspections required.
  - Pier foundations of all buildings assigned to Seismic Design Category C. the statement of special inspections shall specifically include the special inspections required for the seismic-resisting elements.

- **Foundation bearing loads.** Foundation material, when an allowable load-bearing support capacity greater than 3,000 pounds per square foot is required by the building's foundation design, or is specified by the responsible registered design professional.

302.8 Earth retention systems. (See chapter 12.) Earth retention systems include, but are not limited to:

- Building foundation walls
- Retaining walls
- Soldier piles and lagging, with or without tie-backs, post-tensioning or rock anchors.
- Soil nailing systems
- Drilled piers or other structural means for stabilization of slopes.
- Sheet piling.
- Braced or shored walls.
- Tied-back walls.
- Slurry walls.
- Trench bracing.

- **Elements.**
  - All earth retention systems retaining 10'-0" or more of unbalanced fill;
  - All trenching operations deeper than 8'-0";
  - When special inspection is specified by the structural design, such as
    - Segmented block retaining walls of any height, with geosynthetic restraints when designed as restrained walls rather than gravity walls.
    - Soldier piles and lagging of any height, with post-tensioned tie-backs.

302.9 Exterior Insulation and Finish Systems (EIFS). (See chapter 13.)

- **Elements.** All EIFS applications, except: those installed over a water-resistive barrier with a means of draining moisture to the exterior (but when installed over a sheathing substrate, special inspection of the water-resistive barrier coating is required); or, those installed over masonry or concrete walls.

302.10 Sprayed fire-resistive materials. (See chapter 14.)

- **Elements.** All sprayed fire-resistive materials applications.

302.11 Mastic and intumescent fire-resistive coatings. (See chapter 15.)

- **Elements.** All mastic and intumescent fire-resistive coatings.

302.12 Smoke control systems. (See chapter 16.)

- **Elements.** All smoke control systems.

302.13 Mechanical, electrical and plumbing components. (See chapter 17.)

- **Elements.** In buildings of Seismic Design Category C, mechanical, electrical and plumbing elements and components as required by VCC-1707.7 *Mechanical and electrical*

  components (see VCC-1621 *Architectural, mechanical and electrical component seismic design requirements).*

302.14 Special cases.

- **Elements.** Items of "unique" design or construction characteristics, or unusual materials, or with special inspection requirements, may be subject to special inspection and material tests (see VCC-1704.13 *Special cases and Code of Virginia §54.1-402*). The Building Inspection Section shall consider such items on a case by case basis.

SECTION 303 STATEMENT OF SPECIAL INSPECTIONS

303.1 Contents. The statement of special inspections shall be submitted with the construction documents by the permit applicant (see Section 301.1 and VCC-1704.1.1 *Building permit requirement*).

For special inspections projects with multiple buildings or structures, a listing of the buildings with street addresses and permit application number shall be attached.

The statement of special inspection shall:

- Identify the scope of the special inspection applicable to the project.
- Include the names and firms of the registered design professionals, and the inspection and testing agencies providing special inspection and material tests services.

The special inspections engineer of record and the inspection and testing agency are subject to the Building Inspection Section approval.

303.2 Form. A blank three-page form for the statement of special inspections is provided on the following pages. Page one, to be prepared by the owner, identifies the project and registered design professionals for the project. Pages two and three, to be prepared by the appropriate registered design professionals, describe and specify the scope and extent of special inspection and material test services.

A blank one-page form for a final report of special inspections is also provided, to be prepared by the special inspections engineer of record after all special inspection and material test services are completed.

303.3 Town approval. The Building Inspection Section shall approve the scope of the statement of special inspections prior to the Preconstruction Meeting and release of the building permit.

CHAPTER 4
PRECONSTRUCTION MEETING

SECTION 401 LOCATION AND PARTICIPANTS

A Critical Structures/Building Inspections Section preconstruction meeting is required for every project that will be constructed under the Special Inspections Program, to review the special inspection and material test requirements of the construction project.

The preconstruction meeting shall take place after building permit plan review and approval of the construction documents is completed by the Building Inspections Section, and prior to the issuance of a building permit.

The owner shall call the building Inspections Section at (703)435-6850 to schedule the meeting date and time. The Building Inspections Section will determine the preconstruction meeting location.

Construction team members who shall be represented and participate in the Critical Structures/Building Inspections Section preconstruction meeting include:

- **Owner** (required for all projects)
- **Architect of record** (required for precast concrete building elements; optional for other building/foundation elements and soils/foundation elements)
- **Structural engineer of record** (required for building/foundation elements)
- **Geotechnical engineer of record** (required for soils/foundation elements)
- **General contractor** (required for all projects)
- **Special inspections engineer of record** (required for all projects)
- **Town of Herndon Building Inspections Section** (required for all projects)
- **Other parties** (inspection and testing agencies, subcontractors, etc.) as deemed appropriate by the owner or the Building Inspection Section.

SECTION 402 TOPICS

The owner shall bring a copy of the town-approved construction documents including the Building Inspection Section approved statement of special inspections to the preconstruction meeting. For projects with multiple buildings, a listing of the buildings, or an annotated site plan, with street addresses, and building permit application numbers shall be attached to the statement of special inspections, or separately provided, for use during the construction.

At the preconstruction meeting, a contact sheet with names, addresses, telephone numbers, and e-mail of those in attendance shall be completed.

402.1 Use of *2009-SIP* document. This *2009-SIP* document shall be used in the preconstruction meeting to review, discuss, clarify and approve elements of the Special Inspection Program that apply to the project. It is recommended that, prior to the preconstruction meeting, all parties review the requirements of the *Virginia Construction Code* and the *2009-SIP* document, as they pertain to the specific project.

The following topics shall be discussed:

- **Statement of special inspections:** The scope of special inspections for the project, including required and elective special inspections (see Chapter 3).
- **Construction project requirements:** Construction project requirements of the Town of Herndon, including construction methods, site safety and fire hazard prevention during the construction process.
- **Responsibilities:** The roles and responsibilities of each part.
- **Communication:** Communication channels between the County's and Owner's representatives.
- **Phased Construction:** Requirements for phasing or separations of permits, certificates of completion and occupancy requirements.

402.2 Statement of special inspections approval. The Building Inspection Section shall approve the statement of special inspections during the preconstruction meeting. The statement of special inspections may be omitted during the preconstruction meeting, if necessary. After approval, and following the completion of the Building Inspection Section approval of the construction documents, a building permit can be issued.

CHAPTER 5
SPECIAL INSPECTIONS AND TESTING SERVICES

SECTION 501 PROCEDURAL REQUIREMENTS

501.1 **Owner to employ special inspectors.** The owner shall be responsible for retaining an independent special inspections engineer of record and an inspection and testing agency to provide and conduct special inspections, materials testing, and related services, as described in the statement of special inspections and this *2009-SIP* document. Under no circumstances shall the general contractor or any of its subcontractors, executing the work subject to special inspections be permitted to provide special inspection and material testing services. As part of the statement of special inspections submitted for town approval and permit issuance, the owner shall furnish the town with the names of the special inspections engineer of record and the inspection and testing agency retained to provide special inspection and material testing services.

- The special inspections engineer of record shall be a registered design professional retained by the owner to conduct special inspection and material test services required by the *Virginia Construction Code* and this *2009-SIP* document, and shall be independent of the contractors executing the work subject to special inspection. The special inspections engineer of record is responsible for the work of the inspection and testing agency.
- The inspection and testing agency shall be retained by the owner, shall be an established and recognized agency, and shall be independent of the contractors executing the work subject to special inspection. To be approved by the Building inspection Section, an inspection and testing agency shall meet the requirements of ASTM E329 and shall be accredited by an accreditation body recognized by the town. See VCC-1702 *Definitions: Approved agency and VCC-1703.1 Approved agency and VCC-1704.1 Special inspections, general.*

The general contractor shall coordinate the scheduling of inspections. The inspection and testing agency personnel required on-site shall be in numbers and skill levels sufficient to conduct all required tasks.

501.2 **Review and Approval:** The statement of special inspections is approved by the Building Inspection Section (see Sections 303.3 and 402.2).

The special inspections engineer of record and the inspection and testing agency both are subject to Building Inspection Section approval to conduct special inspection and material tests. After town approval of the statement of special inspections, the special inspections engineer of record shall submit to the Building Inspections Section one copy

of resumes of all inspections and testing agency personnel assigned to the project, inspector's certification and accreditation certificates for laboratory facilities. The personnel and laboratories shall meet the requirements of Sections 503 and 504.

501.3 **Changes in construction team:** In the event that the registered design professionals of record, the general contractor, the special inspections engineer of record, the inspection and testing agency, or other organizations or individuals contracted for special inspections or testing services are changed during the course of the work, the owner shall notify the Building Inspection Section immediately. The owner shall provide a written explanation for such change; identify and obtain town approval for the replacement party; and schedule a new meeting with the Building Inspection Section and the replacement party. The owner shall ensure that there is a timely transfer of information and responsibility to the replacement party.

Change of the architect of record, or change of the structural engineer of record, requires approval by the Building Inspections Section, and may invalidate town-approved construction documents, requiring their resubmission for review and approval for new permits.

Change of the geotechnical engineer of record requires approval by the Building Inspections Section and may invalidate the town-approved geotechnical report.

Change of the general contractor requires notification to the Building Inspection Section, and requires a new building permit if the general contractor is the building permit holder.

Change of the special inspection engineer of record or the inspection testing agency requires approval by the Building Inspections Section and may invalidate further special inspections. In the event the inspection and testing agency has significant changes in management, ownership, personnel certifications or laboratory accreditation, re-approval by the Building Inspections Section is required.

SECTION 502 ROLES AND RESPONSIBILITIES

502.1 **Special Inspections:** The special inspections engineer of record shall conduct and certify special inspections of building components and tests of construction materials where such special inspection and material tests are required by the *Virginia Construction Code*, the statement of special inspections and this 2009-SIP document.

502.2 **Approved Documents:** Prior to conducting special inspections and materials testing, the special inspections engineer of record shall be responsible for verification of the following:

- **Building Permit:** A building permit for the particular construction has been issued and a copy of the building permit is posted at the job site.
- **Approved Construction Documents:** A set of original town- approved construction documents is available at the job site.
- **Approved Fabrication and Erection Documents:** Town-approved fabrication and erection documents, which also bear the structural engineer of record review/approval stamp, are available at the job site. Other approved fabrication and erection documents, which do not require town approval but which bear the structural engineer of record's review/approval stamp, are available at the job site and a record copy of such documents has been received by the Building Inspections Section where required by this 2009-SIP document.
- **Document Revisions:** All revisions to town- approved construction documents, or town-approved fabrication and erection documents, or other documents such as field change orders in response to requests for information, are in writing and have been approved, signed and sealed by the architect of record, the structural engineer of record, the geotechnical engineer of record, and the town as appropriate. If such revisions do not bear the town stamp of approval, the special inspections engineer of record shall confirm with the Building Inspection Section whether the revisions are authorized or whether formal re-approval of revised documents by the Building Inspection Section is required. It shall be the responsibility of the architect of record, the structural engineer of record and the geotechnical engineer of record, as appropriate, to submit written revisions to the Building Inspection Section within seven working days of approval.

502.3 **Deviations:** The special inspections engineer of record and the special inspections engineer of record's representatives/field technicians shall not suggest, direct or authorize the fabricator, erector or contractor to deviate from the contract documents, town-approved construction documents or town- approved fabrication and erection documents, without the express written approval of the architect of record, structural engineer of record, the geotechnical engineer of record and the Building Inspections Section, as appropriate.

502.4 **Special Inspection Reports:** The special inspections engineer of record shall report the results of testing and inspections, both approvals and rejections, to the Building Inspections Section according to the following procedures:

- **Seal and Signature:** Each report shall bear a signature and seal of the special inspections engineer of record and shall include the correct building permit number and project's address. Reports without project identification shall be rejected.
- Submissions: Both approval and rejection reports shall be submitted to general contractor, the owner, and the Building Inspections Section and shall be submitted to the architect of record, the structural engineer of record, and the

geotechnical engineer of record as appropriate. With the exception of situations where a code violation or safety hazard is discovered (see Sections 502.5 and 502.6) and must be reported immediately, all inspection and test reports shall be submitted to the Building Inspections Section within seven working days of the inspection or test performed.

- **Compliance:** Unless deficiencies are discovered or code violations are revealed during the conduct of special inspection and material test services, special inspection and material test reports shall indicate that the specified work has been inspected and found to be in compliance with town- approved documents.
- **Deficiencies:** Deficiency shall be reported to the general contractor for correction. Deficiency reports shall contain the details describing the nature and specific location of the deficiency and include a description of the action recommended by the architect of record, structural engineer of record or the geotechnical engineer of record, as appropriate, to correct it. At the completion of a project, all recorded problems or deficiencies shall be documented as having been corrected and approved by the appropriate registered design professionals
- **Completion Letters:** Upon completion of special inspections and material tests for a particular construction discipline, such as "structural steel", the special inspections engineer of record may, after review by the appropriate registered design professionals, submit a completion letter to the Building Inspections Section as a part of the final report of special inspections.
- **Final Report of Special Inspections:** Upon completion of special inspection and material tests for all construction elements subject to special inspections for all phased of construction, the special inspections engineer of record shall, after review and approval by the appropriate registered design professionals, submit a final report of special inspections to the Building Inspections Section for approval. Any unresolved deficiencies notated by the appropriate registered design professional or Building Inspections Section shall be addressed and corrected prior to final building inspection approval.

502.5 **Code Violations:** In the event that the special inspections engineer of record or the special inspections engineer of record's representatives/field technicians observe a condition during the conduct of special inspections and material tests services that constitutes a violation of the Virginia Construction Code, or the Herndon Town code, the special inspections engineer of record shall immediately notify the appropriate registered design professionals and the Building Inspections Section for resolutions; followed with a written report submitted to the Building Inspection Section within seven working days.

502.6 **Job Site Safety Violations:** In the event that the special inspections engineer of record or the special inspections engineer of record's representatives/field technicians observe a condition that poses an immediate or serious safety hazard to job site workers and/or the general public, the special inspections engineer of record shall immediately notify the general contractor and the Building Inspections Section for resolution.

Section 503 PERSONNEL QUALIFICATIONS

503.1 **Direct Supervision:** The inspection and testing agency personnel assigned to conduct special inspections in the Town of Herndon shall work under the supervision of an approved registered design professional with demonstrated proficiency in the construction discipline to be evaluated.

503.2 **Certification:** Except for individuals who are registered design professionals, inspection and testing agency field inspection personnel shall be certified by examination through American Concrete Institute, American Welding Society, American Society for Nondestructive Testing, the National Institute for Certification in Engineering Technology, WACEL, or other organizations whose programs are recognized by the town. The inspection and testing agency personnel shall conduct only those special inspections and material tests in which they have demonstrated competency through an approved certification or registration program. Different levels or types of special inspections require different levels or types of expertise by the inspector, and competency certifications shall match the tasks. Tests or inspections conducted by unqualified or unapproved inspection and testing agency personnel shall be automatically rejected, and further construction work shall not proceed until re-inspections are conducted and approved.

503.3 **Unusual Functions:** In the event there is no certification program applicable to a specific function or material test function , the special inspections engineer of record shall submit a signed statement attesting to the competency of inspection and testing agency personnel and identifying the basis upon which such statement is made.

SECTION 504 LABORATORY *ACCETANCE STANDARDS*

All laboratory facilities conducting special inspection and material test services in the town shall meet the requirements of ASTM E329, ASTM D3740, and ASTM C1077 as applicable and shall be individually accredited by organizations such as the American Association for Laboratory Accreditation, the National Institute of Standards Technology, the National Voluntary Laboratory Accreditation Program, WACEL, or other organizations whose programs are recognized by the town. Where an inspection and testing agency has multiple offices and laboratory facilities conducting special inspection and test services in the town, each laboratory to be utilized on construction project shall be individually accredited and meet the requirements of ASTM E 329, ASTM D 3740, and ASTM 1077, as applicable. Laboratories shall be reviewed and approved by the Building Inspection Section on a case by case basis and shall conduct only those tests and analyses for which accreditation has been obtained. The special inspections engineer of record shall approve on-site laboratories provided the on-site laboratory demonstrated that it has (and follows) an effective quality control program; equipment calibration program; and a technician program of an accredited laboratory.

CHAPTER 6
STRUCTURAL STEEL

SECTION 601 GENERAL

601.1 **Scope.** The requirements of this chapter, and VCC-1704.3 *Steel construction and VCC-1704.3 Required verification and inspection of steel* construction, shall apply when construction includes structural hot-rolled steel building elements or structural cold-formed steel building elements (see Chapter 14 for sprayed fire-resistant materials and Chapter 15 for mastic and intumescent fire-resistant coatings). Where required, structural steel buildings elements shall also comply with VCC-1705.3 *Seismic resistance, VCC-1707 Special inspections for seismic resistance and VCC-1708 Structural testing for seismic resistance.*

601.2 **Inspection of steel fabricators and fabrication procedures.** The special inspections engineer of record shall conduct special inspections of the steel fabricator and fabrication procedures, as required by VCC-1704.2 *Inspection of fabricators,* for all steel fabricated assemblies that are themselves subject to special inspection, except as exempted in VCC-1704.3 *Steel* construction. The report of special inspection of the fabricator and fabrication procedure shall be submitted to the Building Inspection Section.

- **Certification.** The fabricator may demonstrate to the special inspections engineer of record that the requirements of VCC-1704.2 *Inspection of fabricators* have been met by furnishing AISC STD Certification, or furnishing evidence of compliance with the AISC certification program in the appropriate category.
- **Procedures implementation.** The special inspections engineer of record shall state in writing that the fabricator complies with the fabrication and quality control procedures outlined above. Verification may be on a job by job basis or by inspection within the previous twelve months.

601.3 **Steel elements.** Structural steel elements as listed below shall be subject to special inspections (see Section 603).

- **Buildings of any height.** The following steel elements of buildings, regardless of height:
  - Rigid or semi-rigid “moment” connections, field welded or bolted.
  - Bolted connections required to be pretensioned beyond snug tight conditions.
  - Beams or column elements with clear spans greater than 50’-0” in length or height.

- Trusses, open-webbed joist girders or joists (other than those manufactured to SJI specifications).
- Plate girders of any span.
- Space frames with clear spans greater than 35'-0'.
- Floor decks and roof decks, when designed to act as diaphragms to distribute lateral forces to wind resisting frames.
- Cable supported structures, except tents.
- Bolted or welded lateral bracing elements.

- **Buildings more than three stories in height.** In addition to the steel elements above, the following steel elements of buildings greater than three stories in height:

  - Open-webbed joist girders and steel joists (including those manufactured to SJI specifications).

  - Stairs and ladders connecting more than three stories.

  - Floor decks and roof decks.

  - Field-welded shear studs.

- **Seismic-resisting-systems** (Seismic Design Category C):

  - Welding as required by VCC-1707.2 *Structural steel and VCC 1708.4 Structural steel*;

  - Cold-formed steel framing as required by VCC-1707.4 *Cold-formed steel light- frame construction*.

SECTION 602 *FABRICATION AND ERECTION DOCUMENTS*

602.1 Preparation of fabrication and erection documents. The structural steel fabrication and erection documents shall included designs and details for welded and bolted connections.

- Details for connections shall directly indicate moment connections.
- Details shall clearly indicate seismic-resisting elements of building of Seismic Category C.
- Details for welded shall clearly indicate the type of design and the size and type of welds.
- Details for bolted connections shall clearly indicate the type of design (simple bearing or slip-critical moment), amount of tensioning required (snug tight or fully tensioned) and the ASTM specifications for the bolts, nuts and washers.

- Erection shoring. Shoring for composite construction (concrete slab/steel beam or concrete slab/steel joist), or shoring for erection of structural steel shall be designed to meet the structural engineer of record's requirements.

602.2 **Review and Approval:** Prior to fabrication and erection of steel elements, the structural steel fabrication and erection documents shall be submitted to the structural engineer of record, for approval for compliance with the town-approved construction documents and in accordance with the following requirements.

a. Primary structural system. The structural engineer of record's approval for primary structural elements shall specifically include approval of any connections developed by the steel fabricator. The structural engineer of record shall indicate approval with a signed and sealed statement, attached to the documents, accepting responsibility for the design of connections which shall include language as given in either: The structural steel fabrication and erection documents have been reviewed, including a verification of all the structural steel connections shown. Where marked "Approved" or Approved as Noted", I accept full responsibility for the design of the connections to support the design loads required by the town-approved construction documents for the completed project.

Or

I have reviewed the structural steel fabrication and erection documents (list) as prepared by (company) for the above reference project. My review and approval, or approval as noted, dated (date), included a verification of all the structural steel connections shown. I accept the responsibility for the design of the connections to support the design loads required by the town-approved construction documents for the completed project.

b. Secondary structural elements. The structural engineer of record shall approve the effects the secondary structural elements impose on the primary structural system.

The general contractor shall submit two sets of the structural engineer of record-approved structural steel fabrication and erection documents, including the structural engineer of record's approval of connections, to the Building Inspection Section for approval. After town approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

Section 603 SPECIAL INSPECTIONS AND TESTS

603.1 **Material receiving.** the special inspections engineer of record shall conduct special inspection of steel elements, welding material, and high strength bolts upon receipt on the construction site and in accordance with

VCC-Table 1704.3 *Required verification and inspection of steel* construction. High strength bolts and nuts shall be clearly marked with an identifiable manufacturer's mark on both the bolt head and nut. All shipments of high-strength bolts, nuts and washer, whether form manufacturer, distributor, ore reseller, shall include manufacturer's current tests report for chemical composition (ASTM A751) and mechanical properties, including proof load testing (ASTM F 606).

603.2 **Steel elements.** The special inspections engineer of record shall conduct special inspection of steel elements in accordance with VCC-1704.3 *Steel construction* and VCC-Table 1704.3 *Required verification and inspection of steel construction.*

603.3 **Steel erection.** Erection shall be in conformance with industry standard practice (AISC 303). Adequate guying and bracing shall be used during the erection process to maintain the stability of the structure. Structural steel, joists, etc. shall not be erected on concrete or masonry footings, piers, walls, etc. less than seven days old, or less than 75 percent strength (concrete f'_c or masonry f'_m), unless the concrete and masonry strength criteria that have been established by the structural engineer of record for carrying such loads are satisfied.

The special inspections engineer of record shall conduct special inspection of anchor bolts, bolts, welding, connections, and details. Any observed discrepancies between the town-approved construction documents and the town-approved structural steel fabrication and erection documents shall be brought to the immediate attention the structural engineer of record and the Building Inspections Section. All steel be inspected before they are covered by fire-resistant materials or otherwise concealed.

a. High strength bolts: Installation shall conform to the town-approved construction documents, town-approved structural steel fabrication and erection documents, VCC-1704.3.3 *High-strength bolts,* AISC 360 and the RCSC specification. Snug-tight bolted joints require periodic special inspection. For pretension and slip-critical bolted joints, periodic special inspection is allowed for joints using turn-of-nut with match marking, direct tension indicators, or twist-off bolts; continuous special inspection is required for joints using calibrated wrenches or turn-of-nut without match marking.

In the event any bolt, nut or washer is broken during normal installation (except bolts purposely over-torqued in order to draw the parts together); the special inspections engineer of record shall bring such failures to the immediate attention of the structural engineer of record and the Building Inspections Section. The special inspections engineer of record shall observe the on-site proof load testing of any suspect bolt(s) per ASTM and AISC standards. Should the bolts fail load testing, they shall be rejected and the structural engineer of record shall make recommendations in writing for

remedial actions. All tests results and recommendations shall be reported to the Building Inspections Section.

b. Welding: All welders and weld special inspectors shall be certified in accordance with AWS D1.1. Special inspections shall be in conformance with VCC-1704.3.1 *Welding and VCC Table 1704.3 Item 5 Required verification and inspection of steel construction, inspection of welding*.

Continuous special inspection is required for all welds, except periodic special inspection is permitted for the following items:

- Single pass fillet welds not exceeding 5/16 inch in size.
- Floor and roof decks welding.
- Welded studs when used for structural diaphragm.
- Welded studs for cold-formed steel framing members such as studs and joist.
- Welding of stairs and railing systems.

c. Rigid or semi-rigid connections: When field welding of rigid or semi-rigid connections is required, or when bolted connections are required to be pretensioned beyond snug tight conditions, the special inspections engineer of record shall conduct special inspection of the connections.

d. Details: The special inspections engineer of record shall conduct special inspection of the steel frame to verify compliance with the details shown on the town-approved construction documents and the town-approved fabrication and erection documents, such as bracing, stiffening, member locations, and proper application of joint details at each connection.

e. Composite construction: The special inspections engineer of record shall conduct special inspection of shoring required for erection of composite (steel beams/concrete deck) construction (see Section 702.3 and VCC Table 1704.4 item 11 *Required verification and inspection of concrete construction, inspection of concrete formwork, shoring and reshoring fro design and inspection requirements)*.

f. Seismic-resisting systems:

- The special inspections engineer of record shall conduct special inspection of seismic-resisting systems, as required by VCC-1707.2 *structural steel and VCC-1708.3 Structural steel,* including periodic special inspection of mechanical bolting. Anchoring, and other fastening of components within the seismic-resisting system, and continuous special inspection as required by the quality assurance plan and continuous special inspection as required by the quality assurance plan and AISC 341 for structural welding of the seismic-resisting system, except for periodic special

inspection of single-pass fillet welds not exceeding 5/16 inch in size and floor deck welding.

- The Special inspections engineer of record shall conduct special inspection of cold-form steel framing as required by VCC-1707.4*Cold-formed steel light-frame construction*, including periodic special inspection of welding and mechanical bolting, anchoring, and other fastening of components within the seismic-resisting system.

SECTION 604 COMPLELETION OF STRUCTURAL STEEL CONSTRUCTION

Upon completion of structural steel construction, the special inspections engineer of record may, after review by the structural engineer of record, submit a completion letter to the Building Inspections Section.

CHAPTER 7
CAST-IN-PLACE CONCRETE

SECTION 701 GENERAL

701.1 **Scope:** The requirements of this chapter, and VCC- 1704.4 *Concrete construction and VCC-Table 1704.4 Required verification and inspection of concrete construction,* shall apply when construction includes cast-in-place concrete. Where required, cast-in-place concrete building elements shall also comply with VCC-1705.3 *Seismic resistance, VCC-1707 Special inspections for seismic resistance and* VCC-1708 *Structural testing for seismic resistance.*

701.2 **Concrete elements:** Concrete elements as listed below shall be subject to special inspection and material testing as required by Section 703.

- **Elements:** All structural elements of cast-in-place concrete, including reinforced, prestressed, or post-tensioned concrete, mat foundations, and concrete topping on stay-in-place steel decking, both composite and noncomposite designs, except as listed below.

  Exceptions: The construction shall be on undisturbed and stable earth, rock or non-problem soil. Special inspection is not required for:

  - Buildings three stories or less in height, with fully supported concrete footings that are:

    - Isolated spread footings; or
    - Continuous footings that are support walls of light frame construction, or are designed in accordance with VCC-Table 1809.7 *Prescriptive footings supporting walls of light frame construction*, or are based on a f'_c no greater than 2,500 pounds per square inch.
  - Nonstructural concrete slabs on grade (including prestressed slabs, where the effective prestress is less than 150 psi) supported directly on the ground; and patios, driveways and sidewalks, unless part of an accessible route.
  - Concrete foundation walls built in accordance with VCC-Table 1807.1.6.2 *Concrete foundation walls*.

- **Seismic-resisting systems:** (Seismic Design Category C): Testing of reinforcing steel and prestressing steel as required by VCC-1807.1.6.2 *Concrete foundation walls*.

701.3 **Construction loads:** the general contractor shall coordinate operations so that all times the dead loads, live loads and construction loads delivered to the building while it is under construction shall be within the capacity of the building to carry such loads. In addition, no structural loads shall be imposed on any vertical load carrying member which is less than seven days, or less than 75 percent strength (f'c), unless the concrete strength criteria established by the structural engineer of record for carrying such loads is satisfied.

701.4 **Posting of concrete placement schedule:** As construction proceeds, the general contractor shall post the updated concrete placement schedule, which shall indicate building floor level, placement number, and date of placement, on the door of the general contractor field office. This schedule shall be available for use in case of emergency by the Fairfax County Fire and Rescue Department.

SECTION 702 FABRICATION AND ERECTION DOCUMENTS

702.1 **Seal and signature requirements:** The following fabrication and erection documents shall be prepared, signed and sealed by registered design professionals with experience in the requisite disciplines:

- Concrete formwork and shoring designs.
- Concrete formwork stripping and re-shoring schedules.
- Tendons to be post-tensioned.

702.2 **Formwork, shoring and reshoring design requirements:** The fabrication and erection documents for the concrete formwork, shoring and reshoring of structural concrete slabs, beams, walls, and columns shall include:

- Concrete formwork and shoring design calculations, construction details and placement plans.
  - Formwork and shoring for horizontal concrete construction (slabs, beams and girders) shall include concrete dead loads, formwork loads, and construction live loads.
  - Shoring for concrete frames shall be designed to meet the structural engineer of record's requirements.

- Formwork for vertical concrete construction (walls and columns) shall include lateral concrete pressures and rate of placement assumed or required for walls and columns.

- Shoring and reshoring design calculations, placement plans and reshoring procedures for horizontal concrete construction (slabs, beams and girders) shall include:

  - Number of levels of shores and reshores;

  - Loads to be delivered to the shores and reshores at each level;

  - Shore capacities and reshores capacities;

  - Construction loads to be delivered to the building at each level;

  - Time-dependent strengths of the building components required for the delivered construction loads and assumed construction schedules.

- Temporary erection shoring for composite construction (concrete slab/steel beam, concrete slab/steel joist, or concrete slab/wood joist), or for erection of structural steel shall be design to meet the structural engineer of record's requirements.
- Necessary construction schedules. The general contractor shall coordinate the construction schedule with the registered design professional responsible for formwork, shoring and reshoring design, and with the structural engineer of record.

702.3 **Review and Approval:** Prior to concrete construction and formwork erection, as appropriate, the fabrication and erection documents listed below shall be submitted to the structural engineer of record, for approval for compliance with the town-approved construction documents and in accordance with the following requirements:

- Concrete formwork and shoring designs, and formwork stripping and reshoring designs and schedules, as required by Section 702.2, for compliance with the town-approved construction documents, and verification of the capacity of the building components, exclusive of the formwork and shoring, to carry the construction loads delivered to the building.
- Steel reinforcement (non-prestressed cast-in-place concrete).

- Steel reinforcement and tendons (prestresssed or post-tensioned cast-in-place concrete).
- Concrete mix designs, including any accelerators or other admixtures, for each class of concrete to be used. The structural engineer of record's approval shall include the following language:

  "I have reviewed the concrete mix designs as prepared by *(company*) for the above reference project. My approval or approval as noted, dated (*date*) included approval of the concrete mix designs (*list*), including any accelerators or other add mixtures, for each class of concrete to be used, for compliance with project requirements."

The general contractor shall submit two sets of structural engineer of record approved cast-in-place concrete fabrication and erection documents, including concrete mix designs, reinforcement, and concrete formwork, shoring and reshoring designs to the Building Inspection Section for approval. After town approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspection and tests during construction.

Exceptions: Unless required by project specifications or the structural engineer of record, town approval is not required for the following items. For these items, one set of structural engineer of record-approved fabrication and erection documents shall be available on the job site for use by the special inspections engineer of record to conduct special inspections and tests during construction, and one set shall be submitted to the Building Inspections Section for record purposes.

- Steel reinforcement for non-prestressed cast-in-place concrete.
- Concrete formwork for walls 10'-0" in height or less, and which does not support workmen scaffolding at heights greater than 10'-0' above any adjacent surface.
- Concrete formwork for columns 15'-0"in height or less, and which does not support workmen scaffolding at heights greater than 10'-0"above any adjacent surface.

SECTION 703 SPECIAL INSPECTIONS AND TESTS

703.1 Special inspections: The special inspections engineer of record shall conduct special inspections and material tests in accordance with this chapter, and with VCC-1704.4 *Concrete construction,* and VCC-Table-1704.4 *Required verification and inspection of concrete construction.*

703.2 Particular elements:

a. Concrete formwork, shoring and reshoring erection: Prior to placement of concrete, the special inspections engineer of record shall verify that:

- Formwork materials, cleanliness, size and installation conform to town-approved formwork fabrication and erection documents.
- Shoring and reshoring is installed in conformance with the town-approved documents.

VCC-Table 1704.4 Item 12 *Required verification and inspection of concrete construction, inspection of concrete formwork, shoring and reshoring* requires periodic special inspection of formwork, shoring and reshoring. Inspection reports shall be submitted to the Building Inspection Section within three working days of each inspection.

b. Reinforcing steel and imbedments: The special inspections engineer of record shall conduct special inspection of steel reinforcement, in compliance with town-approved construction documents and approved fabrication and erection documents, including welding of reinforcement of the structural seismic-resisting system.

- Reinforcing steel placement requires periodic special inspection.
- Welding of steel reinforcement requires continuous or periodic special inspection, depending on the use of the reinforcing steel, in accordance with VCC-Table 1704.3 Item 5b *Required verification and inspection of steel construction, inspection of welding, reinforcing steel:*
    - Periodic special inspection to verify weldability of steel reinforcement other than ASTMA 706.
    - Continuous special inspection of welding for reinforcement resisting shear, flexural and axial loads in intermediate and special moment frames, and boundary elements of special reinforced concrete shear walls and shear reinforcement.
    - Periodic special inspection of welding for other reinforcement.

- Special inspection is required for embedded bolts, anchors, dowels and imbeds securely fastened in place, including anchors installed in hardened concrete, in accordance with VCC-Table 1704.4 items 3 and 4.

    - Continuous special inspection is required for bolts and anchors installed where strength design is used or allowable loads have been increased.

    - Periodic special inspection is required for other installations.

c. Tendons to be post-tensioned: The special inspections engineer of record shall conduct special inspection of tendons to be post-tensioned, in compliance with town-approved construction documents and approved fabrication and erection documents, including:

- Periodic special inspection of tendon placement, to include tendon size and strength, chair height, tendon profile, tendon snaking elimination, horizontal ties between chairs and condition of sheathing.
- Continuous inspection of grouting, consolidation and reconsolidation of bonded tendons.
- Continuous inspection and monitoring of tendon stressing operations, in compliance with project specifications. Stressing of tendons shall not start before the specified minimum strength of field-cured test cylinders has been achieved and verified by the special inspections engineer of record and approved by the structural engineer of record. Elongation records shall be made and checked against project specifications. Tendon failures or tendon elongations not in compliance with project specifications shall be rejected, and the structural engineer of record shall make recommendations in writing for remedial actions.

d. Concrete: The special inspection engineer of record shall:

- Verify use of proper concrete design mix.
- Monitor placement of concrete.
- Conduct special inspection and material tests listed in VCC-Table 1704.4 *Required verification and inspection of concrete construction.*

Continuous monitoring of concrete delivery shall be required at the point of discharge from trucks/batch plant, and at the point of deposit/consolidation of concrete. See section 704 for concrete testing requirements and Section 706 for cold weather concrete.

e. Concrete: Placement of concrete, inspections and testing listed in Table SIM-701. Full-time monitoring shall be required at the point of discharge from trucks or batch plant and at the point of deposit and consolidation of concrete.

SECTION 704 CONCRETE TESTING

Concrete shall be tested in accordance with this section, and with VCC-1905.6 *Evaluation and acceptance of concrete.*

704.1 Testing Required: Tests for cast-in-place concrete material properties and attained strength shall comply with the following:, for determining the compressive strength of concrete prior to concrete form removal, and for

determining adequacy of protection and curing during cold weather, shall comply with the following:

a. **Tests cylinders:** Concrete samples for strength testing(both laboratory-cured cylinders and field-cured cylinders) shall be taken in accordance with ASTM C 172. Concrete test cylinders shall be 6x12 inches in size, with two 6x12 cylinders cast for each test.

Exception: Concrete test cylinders may be 4x8 inches in size, subject to the following conditions:

- The use of alternative concrete test cylinders shall be specified by the structural engineer of record on a case by case basis.
- The use of alternative concrete test cylinders shall be considered by the town on a case by case basis, and in accordance with the requirements of Section 101.3
- Concrete mix designs shall be adjusted for the alternative concrete test cylinders and shall be reapproved by both the structural engineer of record and the town.
- Three 4x8 inch cylinders shall be cast for each test.
- Test results shall be de-rated by 5 percent, i.e. normal results shall be multiplied by 0.95 to obtain the final results.

b. **Frequency of Testing:** Samples for strength tests of each class (concrete mix design) shall be taken in accordance with VCC-1905.2 *frequency of testing*. Samples shall be taken not less than once each day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5,000 square feet of surface area of slabs or walls. Additional test cylinders for strength tests shall be cast if required by the architect of record, the structural engineer of record, or town-approved documents.

Additional cylinders to be field-cured shall be required to evaluate strengths of concrete prior to removal of shores and concrete formwork, prior to stressing of post-tensioning tendons, loading of vertical building elements, erection of structural steel, and adequacy of concrete curing and protection methods during cold weather concreting conditions.

A “strength test” is the average of the strengths of two cylinders made from the same sample of concrete and tested at 28 days or other test age designated for determination of fc.

Cylinders for strength tests shall be cast, stored, transported and laboratory-cured in accordance with ASTM C31. Field-Cured cylinders shall be cured as closely as possible to the location of placement of the concrete our they represent, and be exposed as

nearly as possible to the same temperature and moisture environment, in accordance with ACI 318 and ASTM C31.

c. Laboratory-cured cylinders: Cylinders for strength tests for acceptance of concrete shall comply with this section, and with VCC-1905.6.3 *strength tests specimens*. Cylinders for strength tests shall be cast, stored. Transported and laboratory-cured in accordance with ASTM C 31. The testing shall be done at 28 days or the time designated on the town-approved documents for determination of specified compressive strength of concrete, f'_c if different from 28 days. Concrete tests shall be in accordance with ASTM C 39. Test results for multiple samples shall be individually reported. Test results shall not be averaged together.

Test results for a class of concrete shall be considered satisfactory if every arithmetic average of any three consecutive strength tests equal or exceeds f'_c and no individual strength tests falls below f'_c by more than 500psi when f'_c is 5,000 psi or less, or by more than 0.10 f'_c when f'_c is more than 5,000 psi. See Section 704.2 for low-average test results.

d. Field-cured cylinders: Field-cured cylinders, to evaluate strengths of removal of concrete formwork and shoring/reshoring, prior to stressing post-tensioning tendons, and to determine adequacy of curing and protection of concrete during cold weather, shall comply with this section, and with VCC-1905.6.4 *Field-cured specimens*. Field-cured cylinders shall be cured as closely as possible to the location of placement of the concrete pour they represent, and be exposed as nearly as possible to the same temperature and moisture environment, in accordance with ACI 318 and ASTM C 31.

Cylinders may be fabricated on the ground or on the slab, and moved to the curing location no more than 30 minutes after fabrication. If fabricated on the ground, cylinders shall be placed in a temporary open storage location, protected by no mote than insulated blankets, then be relocated into or on the structure as closely as is practicable to the concrete they represent. If molded on the slab, cylinders shall be placed into or on the structure as closely as is practicable to the concrete they represent immediately after molding.

Equivalency may be achieved by storing uncapped cylinders on or immediately adjacent to the structural concrete placement as soon as practicable after casting (and until six hours or less prior to testing), and subjecting them to the same temperature and moisture loss controls as the structure itself. Tests cylinders shall be

protected form cold weather and cured in the same manner as the concrete they represent. Under no circumstances shall field-cured cylinders be subjected to a curing environment that is better than the concrete they represent, such as placement within a temperature and humidity controlled container.

Concrete tests shall be in accordance with ASTM C 39. Tests results for multiple samples shall be individually reported. Tests results shall not be averaged together.

Tests results shall be considered satisfactory if the strength of all cylinders tests equal or exceed the strength required at the age of testing. See both Section 705.3 and Section 704.2 for low-strength test results.

Protection procedures shall be improved when the strength of field-cured cylinders at the test age designated for determination of f'_c is less than 85 percent of that of companion laboratory-cured cylinders, unless the field-cured strength exceeds f'_c by more than 500 psi.

704.2 **Low-strength concrete test results:** The following procedures shall apply when test results do not comply with the acceptance criteria of ACI 318 for concrete strength.

- **Data and recommendations.** The special inspections engineer of record shall submit to the Building Inspections Section a copy of any records pertaining to under-strength concrete, with the written recommendations of the structural engineer of record.
- **Non-Destructive Testing:** If non-destructive testing is recommended by the structural engineer of record to evaluate or confirm the *in-situ* concrete strength, Building Inspections shall only accept testing by concrete cores obtained and tested in accordance with ASTM C 42 and conditioned in accordance with ACI 318, and tested not less than two days nor more than seven days after coring, or by penetration resistance in accordance with ASTM C 803 and calibrated for the particular concrete mix. The impact rebound hammer (ASTM C 805) method of testing concrete shall not be approved.

SECTION 705 CONCRETE FORMWORK STRIPPING AND RESHORING
SPECIAL INSPECTIONS DURING CONCRETING

705.1 Building Inspections Approval Required: Specific Building Inspections Section approval is required prior to removal of concrete formwork and shoring, and installation or removal of reshores. Requests for Building Inspections Section approval shall be submitted in the form of stripping letters (see Section 705.2).

Exception: Stripping approval is not required for certain walls and columns, as listed in Section 702.3.

Removal shall not commence until the Building Inspections Section-approved stripping letter is on-site.

Removal of shores, formwork stripping, and installation of reshores shall conform to the town-approved fabrication and erection documents.

705.2 Requests for Formwork and Shoring Removal (Stripping Letter):

a. Preparation of Stripping Letter: The special inspections engineer of record shall initiate a stripping letter when concrete strengths have achieved the levels specified by the town-approved documents, requesting approval for removal of shores and formwork, and re-shoring operations. This letter shall contain the test results of the field-cured cylinders (and laboratory-cured cylinders when specified by the structural engineer of record) molded for this purpose, and the stripping requirements stated in the town-approved documents. The stripping letter shall contain the original seal and signature of the special engineer of record.

A stripping letter shall state that *in-situ* concrete strength and conditions meet or exceed the project design specifications and design stripping criteria, and shall request approval to remove formwork and shoring. In the event of a deficiency, the structural engineer of record's recommendations shall be included. Stripping letters shall also include:

- **"Design" Data:** The project's requirements, including but not limited to the concrete mix design strength and concrete strength/time specifications for stripping, the formwork shoring, re-shoring or stripping design criteria established by the registered design professional responsible for

formwork and shoring design, and cold weather concreting methods.

- **"Actual" Data:** The construction results attained for the particular stripping request, including but not limited to cold weather concreting temperature logs, concrete cylinder break tests (each tests shall be individually included), post-tensioning stressing records, and formwork shoring/reshoring modifications.

b. Town Approval of Stripping Letter Required: The Building Inspections Section approval of the stripping letter is required prior to shoring removal, formwork stripping and reshoring operations.

- For post-tensioned concrete construction, the stripping letter shall be reviewed and approved by the structural engineer of record prior to submittal to the Building Inspection Section.

- For other concrete construction, the stripping letter shall be reviewed and approved by the structural engineer of record prior to submittal to the Building Inspections Section.

  Exception: The structural engineer of record may elect to waive review of stripping letters for concrete construction. Waiver of review constitutes the structural engineer of record's approval of the stripping letters. The structural engineer of record's election to waive review of stripping letters shall be conveyed to the Building Inspections Section in writing prior to commencement of concrete placement for the project.

After approval, the Building Inspections Section shall return the town-approved stripping letter for use on the job site.

Possession of the town-approved stripping letter does not in any way relieve the general contractor of responsibility to evaluate the removal of formwork and shoring to determine if it is safe and appropriate to do so.

705.3 Low-Strength Concrete: When field-cured concrete strength test results do not meet formwork and shoring removal requirements, the registered design professional who designed the concrete formwork and shoring make a recommendation, either to allow stripping to proceed, or to postpone stripping until specified concrete strengths are attained, for approval by both the structural engineer of record and to the Building Inspections Section. See also Section 704.2

705.4 **Tendon Elongation Records:** When structural members to be stripped are of post-tensioned concrete, tendon elongation records shall be approved by the structural engineer of record and shall be attached to the stripping letter. In the event that tendons are broken, tendon elongations do not meet project specifications, or other deficiencies occur, the registered design professional who designed the post-tensioned tendons shall address the case and make a recommendation, for approval by both the structural engineer of record and the Building Inspections Section.

Section 706 Cold-Weather Concreting

706.1 **Requirements:** The requirements of this section shall apply after three consecutive days of average daily temperatures below 40F (degrees Fahrenheit), or when the internal concrete temperature falls below 50F during curing. The general contractor shall make specific provisions to continuously protect the concrete during cold weather periods. During periods when the average daily temperatures are intermittently above or below 40F on any day, provisions for protection shall be available as needed. In the Town of Herndon, cold weather usually may be expected between November 1 and April 1.

The special inspections engineer of record shall verify adherence to the following requirements:

- **Minimum Temperature of Concrete:** All concrete (slabs, columns, walls, beams, footings, etc.) shall be maintained above 50F and be kept moist during the first seven days (or three days if high-early strength concrete is used) after placement.

- **Maximum Temperature in Enclosures:** If the area is enclosed, the temperature in the enclosure shall be monitored so that it does not exceed 104F, or as otherwise specified by the structural engineer of record. Proper moisture levels shall be maintained at all times.

- **Environmental of Field-Cured Cylinders.** When cylinders are fabricated for acceptance testing, additional cylinders shall be made to be field-cured for purposes of determining adequacy of protection and curing (see VCC-1905.6.4 *Field cured specimens).* Field-cured concrete cylinders shall be cured in the identical environment, and the least favorable curing conditions, as the structural members they represent. Each set of field-cured cylinders shall remain in the exact curing environment of the structural members they represent for 100 percent of the minimum curing

time required by the structural engineer of record prior to transport to the approved testing laboratory for compressive strength testing.

706.2 Temperature Readings and Records

- **Temperature Readings Required:** The special inspections engineer of record shall record ambient temperatures, air temperature under slab (when applicable), and concrete temperatures at regular time intervals on all concrete until 72 cumulative hours of internal concrete temperatures above 50F are achieved, or until the average ambient temperature rises above 40F for more than three successive days. Temperature readings shall be taken by personnel of the special inspections engineer of record, using tamper-resistant devices. Concrete temperatures readings shall be taken at a minimum of four locations along the edge of the slab being monitored. The Building Inspections Section may designate additional locations if the concrete placement is unusually large. Temperature readings and appropriate data shall be recorded on a temperature log sheet which shall be attached to each stripping letter to facilitate approval of the stripping request.

- **Frequency of Readings:** Periodic readings of temperatures are required to verify adequacy of curing and protection methods. During the season when temperature are not within the "cold weather concreting" conditions, high and low readings of concrete temperatures shall be conducted once for each 24-hour period. Such readings shall be labeled, "not cold weather". During "cold weather concreting" conditions, the special inspections engineer of record shall monitor ambient temperature, air temperature under slab, and concrete temperatures at regular intervals for the specified duration of temperature controlled curing. The concrete curing times begins when the last delivery of concrete is deposited into the formwork, with temperatures monitoring beginning immediately after concrete placement and finishing is complete and continuing until the cumulative duration of satisfactory curing is achieved.

  If instantaneous temperature readings only are recorded, there shall be not less than six recordings per 24-hour period (at 4-hour intervals). If there are less than six recordings per 24-hour period, recordings shall include the instantaneous temperature and also include both minimum/maximum temperatures reached during the previous recording period, with not less than two recordings per 24-hour period (12-hour intervals). In all cases, if the temperature reading(s) indicate a minimum concrete temperature below 50F, then that period of time between readings cannot be included in the required curing duration.

- **Use of Automatic Recorders:** Automatic temperature monitoring and maturity metering devices may be used only to verify the temperature data required by this section.

- **Deficiencies.** The general contractor shall adjust cold-weather concreting procedures and protective measures if temperature readings indicate deficiencies in protective measures.

706.3 **Testing of Field-Cured Cylinders:** For cold-weather concreting, testing of field-cured cylinders is required, to verify adequacy of curing and protection measures. The testing shall be done at 28 days or the time designated on the town-approved documents for determination of specified compressive strength of concrete, f'_c, if different from 28 days. Cylinders cured in the field for purpose of determining formwork and shoring removal may be used to satisfy this requirement.

Section 707 COMPLETION OF CAST-IN-PLACE CONCRETE CONSTRUCTION

Upon completion of cast-in-place concrete construction, the special inspections engineer of record may after review structural engineer of record, submit a completion letter to the Building Inspections Section.

TOWN OF HERNDON, VIRGINIA SPECIAL INSPECTIONS PROGRAM
FORMWORK/SHORING
STRIPPING/STRESSING AUTHORIZATION REQUEST

Date _____

PROJECT DATA:

Permit No._____

Name: _____ General Contractor:_____

Address:_____ Concrete Contractor:_____

POUR DATA:

Mix Designation_____ Strength (psi)_____

Date & Time:_____ Volume (cy)_____

Location:_____

_____

STRIPPING DATA:

	DESIGN/REQUIRED	ACTUAL	SATISFACTORY/ UNSATISFACTORY
Age (hrs/days)	_____	_____	_____
and/or			
Avg. Temp (f)	_____	_____	_____
and/or			
Strength (psi)	_____	_____	_____
STRESSING DATA:			
Concrete Strength	_____	_____	_____
Tendon Elongations	_____	_____	_____
ATTACHMENTS:			
Key Plan	_____		
Concrete Break Plan	_____		
Stressing Record	_____		
Temperature Log	_____		
Stripping Criteria	_____		
Stripping Authorization	_____		
Other	_____	_____	_____

Notes: _____

_____

_____ _____

Special inspections engineer of record
Signature & Seal

Structural engineer of record
Signature & Seal

COLD WEATHER CONCRETE SLAB TEMPERATURE LOG

Placement Date:	Project _____ Permit # _____ Description of Pour_____

Finish		Station 1	Station 2	Station 3	Station 4	Air Temp Under Slab	Ambient Air Temp.	Remarks
Day 1	12am							
	4am							
	8am							
	12pm							
	4pm							
	8pm							
Day 2	12am							
	4am							
	8am							
	12pm							
	4pm							
	8pm							
Day 3	12am							
	4am							
	8am							
	12pm							
	4pm							
	8pm							

COLD WEATHER CONCRETE SLAB TEMPERATURE LOG

Placement Date:	Project _____ Permit # _____ Description of Pour_____

Finish		Station 1	Station 2	Station 3	Station 4	Air Temp Under Slab	Ambient Air Temp.	Remarks
Day 4	12am							
	4am							
	8am							
	12pm							
	4pm							
	8pm							

1) Maintain data for 72 hours after finish of placement.
2) Number of temperature monitoring stations may be increased as needed.
3) Stations shall be located near the outer edges.

CHAPTER 8
PRECAST CONCRETE

SECTION 801 GENERAL

801.1 **Scope:** The requirements of this chapter and VCC- 1704.4 *Concrete construction* and VCC-Table 1704.4 Item 10 *Required verification and inspection of concrete construction, erection of precast concrete members,* shall apply when construction includes precast concrete building elements. Where required, precast concrete building elements shall also comply with VCC-1705.3 *Seismic resistance,* VCC-1707 *special inspections for seismic resistance,* and VCC-1708 *Structural testing for seismic resistance*.

801.2 **Inspection of precast concrete fabricators and fabrication procedures:** When precast concrete elements are fabricated off- site, the special inspections engineer of record shall conduct special inspections of the precast concrete fabricator and fabrication procedures, as required by VCC-1704.2 *Inspection of fabricator,* for all precast concrete elements that are themselves subject to special inspections. The report of special inspections of the fabricator and fabrication procedures shall be submitted to the Building Inspections Section.

- **Certification.** The fabricator may demonstrate to the special inspections engineer of record that the requirements of VCC-1704.2 *Inspection of fabricators* have been met by furnishing Precast/Prestressed Concrete Institute Plant Certification in the appropriate category. The special inspections engineer of record may inspect the precast plant at appropriate intervals to verify that materials, methods, products, and quality control comply with project specifications, town-approved fabrication and erection documents, and PCI MNL-116 or PCI MNL-117S, as applicable.
- **Procedures implementation.** The special inspection engineer of record shall state in writing that the fabricator has a documented and implemented quality control program. Verification may be on a job basis or by inspection within the previous twelve months.
- **Certification of compliance.** At the completion of fabrication, the fabricator shall submit a certificate of compliance to the Building Inspections Section.

801.3 **Precast concrete elements cast off-site.:** All architectural and structural precast concrete building elements manufactured off-site, except miscellaneous cast stone items such as sills, coping, pavers, etc., or as otherwise approved.

- **Seismic-resisting systems.** (Seismic Design Category C): Welding of connections as required by VCC-1707.2 *Structural steel.*

801.4 **Precast concrete elements cast on-site.** All architectural and structural precast concrete building elements manufactured on-site, including tilt-up concrete wall panels, except miscellaneous cast stone items such as sills, coping, pavers, etc., or as otherwise approved.

- **Seismic-resisting systems.** (Seismic Design Category C): Welding of connections as required by VCC-1707.2 *Structural steel.*

SECTION 802 FABRICATION AND ERECTION DOCUMENTS

802.1 **Preparation of fabrication and erection documents:** A registered design professional with experience in the design of precast concrete structures shall prepare, sign, and seal fabrication and erection documents for precast concrete building elements, including but not limited to: design drawings and calculation, connection details, design or lifting inserts, rigging requirements, and erection bracing. The concrete mix designs shall be approved by the registered design professional responsible for preparation of precast concrete designs. Documents for site-cast precast concrete shall also include, but are not limited to: element fabrication, form removal, storage and transportation.

802.2 **Review and Approval:** Prior to fabrication and erection of precast concrete elements, the precast concrete fabrication and erection documents, including the concrete mix designs, shall be submitted to both the architect of record and the structural engineer of record, for approval for compliance with the architectural and structural design of the building and the town-approved construction documents. The general contractor shall submit two sets of the architect of record/structural engineer of record- approved precast concrete fabrication and erection documents, including the concrete mix designs, of the Building Inspections Section for approval. After Town review and approval, one set of town-approved concrete mix designs and town-approved fabrication and erection documents shall be return for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 803 SPECIAL INSPECTIONS AND TESTS

The special inspections engineer of record shall conduct special inspections of precast concrete building elements during fabrication and erection as required by VCC-1704.4 *Concrete construction,* and VCC-Table 1704.4 Item 10 *Required verification and*

inspection of concrete construction, erection of precast concrete members for conformance with town-approved documents.

803.1 Fabrication of precast concrete elements cast on-site. During on-site fabrication of precast concrete elements, the special inspection engineer of record shall verify the following:

- **Concrete.** Concrete complies with the town-approved concrete mix design and the applicable provisions of Chapter 7 for cast-in-place concrete.
- **Compressive strength of field-cured cylinders.** The compressive strengths of field-cured cylinders satisfies minimum strength requirements of the town-approved construction documents and the lifting requirements and lifting inserts specifications of the town-approved fabrication and erection documents.
- **Reinforcing steel.** Reinforcing steel, including lifting inserts, is installed in accordance with town-approved documents.

803.2 Precast concrete erection: During erection of precast concrete elements, the special inspection engineer of record shall verify the following:

- **Assembly.** Precast concrete elements are lifted, assembled and braced in accordance with town-approved fabrication and erection documents.
- **Welders.** Welders and weld inspectors are certified in accordance with AWS D1.1, Chapter 5, Part C.
- **Connections.** All welded connections in the structural frame are in accordance with town-approved documents and the applicable sections of AWS D1.1 SJI specifications, AISC specifications, and the *Virginia Construction Code*.

SECTION 804 COMPLETION OF PRECAST CONCRETE CONSTRUCTION

Upon completion of architectural and structural precast concrete construction, the special inspections engineer of record may, after review by the architect of record and the structural engineer of record, submit a completion letter to the Building Inspections Section.

CHAPTER 9
WOOD

SECTION 901 GENERAL

901.1 **Scope:** The requirements of this chapter, and VCC-1704.6 *Wood construction,* shall apply when construction includes wood building elements. Where required, wood buildings elements shall also comply with VCC-1705.3 *Seismic resistance,* VCC-1707 *Special inspections for seismic resistance* and VCC 1708 *Structural testing for seismic resistance.*

901.2 **Inspection of wood fabrication and fabrication procedures.** The special inspections engineer of record shall conduct special inspection of the wood fabricator and fabrication procedures, as required by VCC-1704.2 *Inspection of fabricators,* for all wood fabricated assemblies that are themselves subject to special inspection. Glue-laminated members and sandwich panels shall bear the mark of an approved agency. The report of special inspection of the fabricator and fabrication procedures shall be submitted to the Building Inspections Section.

- **Certification.** The fabricator may demonstrate to the special inspection engineer of record that the requirements of VCC-1704.2 *Inspection of fabricators* have been met by furnishing evidence of compliance with the WTCA QC program, or its equivalent.
- **Procedures implementation.** The special inspections engineer of record shall state in writing that the fabricator complies with the fabrication and quality control procedures outlined above. Verification may be on a job basis or by inspection within the previous 12 months.
- **Certification of compliance.** At the completion of fabrication, the fabricator shall submit a certificate of compliance to the Building Inspection Section.

901.3 **Wood elements.** The following wood elements are subject to special inspection:

- Structural glue-laminated members;
- Sandwich panels;
- Wood trusses, except those built as standard roof trusses for light-framed construction;
- Wood I-joists, except those built as standard floor or ceiling joists for light-frame construction;
- High-load diaphragms;
- Metal-plate-connected trusses spanning 60’-0” or more;
- Seismic-resisting systems. (Seismic Design Category C): as required by VCC-1707.3 *Structural wood.*

SECTION 902 FABRICATION AND ERECTION DOCUMENTS

902.1 Preparation of fabrication and erection documents A registered design professional with experience in the design of prefabricated wood elements and assemblies shall prepare, sign and seal fabrication and erection documents for prefabricated wood elements. The fabrication and erection documents shall include, but are mot limited to: design drawings and calculations, connection details, supports, rigging requirements and lifting procedures, and erection bracing and details. Permanent bracing systems for lateral stability shall be detailed and include in the fabrication and erection documents. Details for welded or bolted connections shall clearly indicate the seismic-resisting elements of buildings of Seismic Design Category C. Details for bolted connections shall clearly indicate the amount of tensioning required and the ASTM specification for the nuts, bolts and washers.

902.2 Review and approval. Prior to fabrication and erection of wood prefabricated elements, the wood prefabricated elements fabrication and erection documents shall be submitted to the architect of record and the structural engineer of record for approval, for compliance with the architectural and structural design of the building and the town-approved construction documents. For prefabricated wood trusses, the architect of record and the structural engineer of record shall also submit a certification of compliance to the Building Inspections Section. The general contractor shall submit the architect of record/structural engineer of record=approved fabrication and erection documents for town approval, in accordance with the following:

- **Structural glue-laminated members.** Two sets of the fabrication and erection documents shall be submitted to the Building Inspections Section for approval.
- **Sandwich panels.** Two sets of the fabrication and erection documents shall be submitted to the Building Inspections Section.
- **Wood trusses.** Three sets of architect of record-approved and structural engineer of record-approved fabrication and erection documents shall be submitted to the Building Inspection Section for approval. At least one set shall bear the original seal and signature of the registered professional responsible for truss design. The architect of record and the structural engineer of record shall also submit a certification of compliance to the Building Inspection Section. After town approval, the Building Inspections Section shall retain one set of town-approved fabrication and erection documents and shall return the other.
- **Wood I-joists.** Architect of record/structural engineer of record-approved fabrication and erection documents shall be available for use on the construction site. Town approval is not required.

After county approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 903 SPECIAL INSPECTION AND TESTS

903.1 Erection of elements. The special inspections engineer of record shall conduct special inspections of wood building elements, including connections, during erection as required by the *Virginia Construction Code* for conformance with town-approved documents. The special inspection engineer of record shall verify the following:

903.2 Connections: Special inspection as required by VCC-1707.3 *Structural wood* shall include verification that all connection of the seismic-resisting elements of buildings assigned to Seismic Category C, regardless of height, are in accordance with town-approved documents and applicable sections of the *Virginia Construction Code*. For all buildings, special inspection shall include nailing, bolting, structural gluing or other fastening of the wood elements subject to special inspections. When bolted connections are required to be pretensioned beyond snug tight conditions, the special inspection engineer of record shall conduct special inspection of the conditions.

903.3 High-load diaphragms. Special inspection of site-built assembli9es, as required by VCC-1704.6.1 *Fabrication of high-load diaphragms,* shall include verification of grade, material thickness and member sizes, fastener size and spacing, and assembly installation.

903.4 Metal-plate trusses. Special inspection of long-span wood trusses, as required by VCC-1704.6.2 *Metal-plate-connected wood trusses spanning 60 feet or greater,* shall include verification of temporary truss restraints and bracing, and permanent individual truss restraints/bracing, in accordance with town-approved documents.

903.5 Seismic-resisting systems. Continuous special inspection of field-gluing operations and periodic special inspections of mechanical nailing, bolting or fastening operations are required, except fastening of sheathing where fastener spacing is greater than 4" on center.

SECTION 905 COMPLETION OF WOOD CONSTRUCTION

Upon completion of wood construction, including connections, the special inspection engineer of record may, after review by the structural engineer of record, submit a completion letter to the Building Inspections

CHAPTER 10
MASONRY

SECTION 1001 GENERAL

1001.1 **Scope:** All masonry construction shall comply with VCC-2104 *Construction, masonry*. (See Section 1001.4 for wall bracing and limited access zones, and Section 1004 for construction in cold or hot weather).

No structural loads shall be imposed on any vertical load carrying masonry member which is less than seven days old or less than 75 percent strength (masonry f'_m), unless the masonry strength criteria established by the structural engineer of record for carrying such loads are satisfied.

The requirements of this chapter, and VCC-1704.5 *Masonry construction,* VCC-1704.11 *Vertical masonry foundation elements,* and VCC-Table 1704.5.1 *Level 1 required verification inspection of masonry construction* and VCC-Table 1704.5.3 *Level 2 required verification and inspection of masonry construction,* shall apply when masonry building components require special inspection. Where required, masonry construction shall also comply with VCC-1705.3 *Seismic resistance,* VCC-1707 *Special inspections for seismic resistance* and VCC-1708 *Structural testing for seismic resistance*.

1001.2 **Masonry elements:** The extent of special inspections depends upon the masonry design method (as "engineered" or empirical") and the building's occupancy classification (as "essential" or "other").

- "Engineered" masonry design usually means reinforced structural load-bearing masonry, supporting vertical or lateral loads in addition to its self-weight. (See VCC-2106 *Seismic design,* VCC-2107 *Working stress design,* and VCC-2108 *Strength design of* masonry).
- "Empirical" masonry design usually means nonstructural or un-reinforced masonry, supporting self-weight only. (See VCC-2109 *Empirical design of masonry*).
- "Essential" facilities are buildings with occupancy classification IV that contain occupancies or provide emergency response services that must remain operational after a fire, earthquake or other disaster. (See VCC-Table 1604.5 *Occupancy category of buildings and other structures*).
- "Other" facilities are buildings with Occupancy Category I, II or III.

The following masonry construction shall be subject to special inspection:

a. Masonry components. Masonry components as listed below:

- Engineered masonry, including vertical foundation elements, in Occupancy Category IV (essential facilities).

- Empirical masonry, including vertical foundation elements, glass unit masonry and masonry veneer in Occupancy Category IV (essential facilities).
- Engineered masonry, including vertical foundation elements, in Occupancy Category I, II or III (other facilities).

b. Seismic-resisting systems. (Seismic Design Category C): as required by VCC-1708.1 Masonry (see Section 1003).

Exceptions: Empirical masonry, glass unit masonry and masonry veneer in Occupancy Category I, II or III (other) facilities, and certain foundation walls, fireplaces and chimneys.

1001.3 Protection During Masonry Wall Construction: The general contractor shall ensure that masonry wall construction complies with this section, and with applicable Virginia Occupational Safety and Health Administration regulations. The special inspection engineer of record shall verify that construction bracing, with limited access zones, is installed as required by Section 1001.3 and shall immediately notify the Building Inspection Section if either construction bracing is not installed or limited access zones are compromised. Masonry walls shall be protected during construction in accordance with the requirements of SIM-1303.0.

Protection measures include:

- **Bracing of walls.** See section 1002.1 for construction bracing design requirements. All masonry walls over 8'-0" in height shall be laterally braced to prevent overturning and collapse unless the wall has adequate permanent lateral support. Construction bracing shall be erected as soon as masonry construction exceeds 8'-0" in height. The bracing shall not be removed for any reason, and shall remain in place until permanent supporting elements of the structure are in place.
- **Limited access zones.** A limited access zone shall be established for construction of any masonry wall greater than 4'-0" in height. Entry to the zone shall be limited to employees actively engaged in constructing the wall. No other persons shall be permitted to enter the zone.

  - **Zone location and extent.** The zone shall be established prior to the start construction of the wall, on the side of the wall, which will be unscaffolded. The zone minimum width shall be at least 4'-0" greater than the maximum height of the wall to be

constructed, and the zone minimum length shall be greater than or equal to the entire length of the wall to be constructed.

- **Zone duration.** The zone shall remain in place until the wall is laterally supported to prevent overturning or collapse, either by construction bracing or adequate permanent supporting elements of the structure.

SECTION 1002 FABRICATION AND ERECTION DOCUMENTS

1002.1 Review and approval. Prior to construction, the general contractor shall submit the masonry fabrication and erection documents, including mortar and grout mix designs, to the architect of record and the structural engineer of record for approval. The general contractor shall submit two sets of the architect of record/structural engineer of record- approved –masonry fabrication and erection documents including mix designs and grout designs, to the Building Inspections Section for approval.

- **Construction bracing design.** Construction bracing designs for masonry walls or columns construction shall include consideration of wind forces, workers and materials loadings, and anchorage, and shall comply with Virginia Occupational Safety and Health Administration requirements. Construction bracing design for walls or columns greater than 12'-0" in height shall be prepared, signed and sealed by a registered design professional. Prior to masonry construction, the general contractor shall submit two sets of construction bracing designs to the Building Inspection Section for approval.

After town approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 1003 SPECIAL INSPECTIONS AND TESTS

The special inspections engineer of record shall conduct special inspection and material tests of masonry construction for conformance with town- approved documents and in accordance with VCC-1704.5 *Masonry construction*, VCC-Table 1704.5.1 *Level 1 special inspection,* and VCC-Table 1704.5.3 *Level 2 special inspection,* as appropriate for the type of masonry design and classification of the building occupancy.

1003.1 Empirical masonry in Occupancy Category IV (essential) facilities. The special inspection engineer of record shall conduct special inspection and material tests in accordance with VCC-Table 1704.5.1 *Level 1 special inspections,* and VCC-Table 1708.1.2 Level 1 quality assurance for seismic resistance, which generally require:

- Periodic special inspections for proportions of site-prepared mortar and grout, placement of masonry units, reinforcement, connections and anchors, cleaning of grout spaces, and construction of mortar joints, as well as cold weather or hot weather protection.
- Continuous special inspection for welding of reinforcement bars, grouting, prestressing, and preparation of mortar specimens, grout specimen, and prisms.
- Certificates of compliance. Verification of f'_m prior to construction.

1003.2 Engineered masonry in Occupancy I, II or III (other) facilities. The special inspections engineer of record shall conduct special inspection and material tests as required by Section 1003.1

1003.3 Engineer masonry in Occupancy Category IV (essential) facilities. The special inspections engineer of record shall conduct special inspection and material tests in accordance with VCC-Table 1704.5.3 *Level 2 special inspection,* and VCC-Table 1708.1.4 *Level 2 quality assurance for seismic resistance,* which generally require:

- Periodic special inspection for proportions of site-prepared mortar and grout, placement of masonry units, reinforcement, and construction of mortar joints, as well as cold weather or hot weather protection.
- Continuous special inspection for connectors and anchors, cleaning of grout spaces, welding of reinforcing bars, grouting, prestressing, and preparation of mortar specimens, grout specimens, and prisms.
- Certificates of compliance. Verification of f'_m prior to construction and every 5,000 square feet during construction, and verification of proportions of materials delivered for mortar and grout.

SECTION1004 COLD-WEATHER AND HOT-WEATHER CONSTRUCTION

1004.1 **Cold Weather:** When either the ambient temperature falls below 40F (degrees Fahrenheit) on any day, or the temperature of masonry units is below 40F, cold weather cold weather construction requirements as specified in VCC-2104.3 *Cold weather construction* shall be implemented, which generally includes heating of water and aggregates, and using blankets and heated enclosures as required. In Fairfax County, cold weather usually may be expected between November 1 and April 1.

1004.2 **Hot Weather:** When either the ambient temperature equals or exceeds 100F on any day, or the ambient temperature equals or exceeds 90F with a wind velocity greater than eight mile per hour on any day, hot weather construction requirements as specified in VCC-2104.4 *Hot weather construction* shall be implemented, which generally includes cooling of water, and using shades and fog spray as required.

1004.3 **Temperature Records:** The special inspections engineer of record shall record ambient air temperatures at regular time intervals during cold weather and hot weather periods. Temperature readings shall be taken by personnel of the special inspections engineer of record, using tamper-

resistant devices. Periodic readings of temperature are required to verify adequacy of protection methods.

1004.4 Deficiencies. The general contractor shall adjust cold-weather concreting procedures and protective measures if temperature readings indicate deficiencies in protective measures.

SECTION 1005 COMPLETION OF MASONRY CONSTRUCTION

Upon completion of masonry special inspections, the special inspections engineer of record may, after review by the structural engineer of record, submit a completion letter to the Building Inspections Section.

CHAPTER 11
SOILS AND FOUNDATIONS

SECTION 1101 GENERAL

1101.1 **Scope:** The requirements of this chapter and VCC-1704.7 *Soils,* VCC-1704.8 *Driven deep foundations,*VCC-1704.9 *Cast-in-place deep foundations,* VCC-1704.10 *Helical pile foundations,* and VCC-1704.11 *vertical masonry foundation elements,* as applicable, shall apply when construction includes soil-related conditions or foundation systems. Where required, soils and foundations shall also comply with VCC-1705.3 *Seismic resistance,* VCC-1707 *Special inspections for seismic resistance* and VCC-1708 *Structural testing for seismic resistance.*

1101.2 **Soils and Foundations Components:** The following elements and components of soil-related conditions or foundation systems are subject to special inspection:

a. Shallow footings and foundations components. Soils and building foundation components when any of the following conditions exist:

- Problem soils. The building footprint is located in a problem soils area, or as indicated by the town-approved geotechnical report ; or
- Compacted fill material or controlled low-strength material (CLSM). The bearing material under the building footprint consists of compacted structural fill or controlled low-strength material, except when the bearing material is less than 1'-0" in total depth.

b. Deep foundation. Building foundation components for the following systems:

- Pile foundations of all buildings.
- Specialty piles and piers, including micropiles, geopiers or other systems. The statement of special inspections shall specially include the special inspections required.
- Pier foundations of all buildings assigned to Seismic Design Category C. The statement of special inspections shall specially include the special inspections required for the seismic resistance elements.

c. Foundation bearing loads. Foundation materials, when an allowable load-bearing support capacity greater than 3,000 pounds per square foot is required by the building's foundation design, or as specified by the responsible registered design professional.

1101.3 Geotechnical report and investigation. In problem soils areas, the geotechnical report as required by VCC-1802.2 *Foundations and soils*

investigations, where required and VCC-1802.6 *Foundations and soils investigations,* reports shall be prepared , signed and sealed by the geotechnical engineer of record and shall be submitted to the Building Inspections Section for approval prior to permit issuance. In non-problem soils areas, the geotechnical investigations and recommendations shall be submitted to the Building Inspection Section for approval prior to permit issuance. After approval, one copy of the town-approved geotechnical report shall be returned for use on the construction site. Town-approved documents shall be used by the special inspections engineer of record to conduct special inspections and tests during construction.

SECTION1102 FABRICATION AND ERECTION DOCUMENTS

1102.1 **Preparation of Fabrication and Erection Documents:** A registered design professional with experience in the design of deep foundation elements shall prepare, sign and seal fabrication and erection documents for pile and pier foundations. The fabrication and erection documents for cast-in-place concrete shallow foundations shall comply with Chapter 7.

1102.2 **Review and Approval:** Prior to construction, the soils and foundations fabrication and erection documents shall be submitted to the geotechnical engineer of record and the structural engineer of record, as appropriate, for approval. The general contractor shall submit two sets of the geotechnical engineer of record/structural engineer of record-approved fabrication and erection documents to the Building Inspections Section for approval. After approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction

SECTION 1103 SPECIAL INSPECTIONS AND TESTS

1103.1 **SOILS:** The geotechnical engineer of record shall conduct special inspection and material tests of soils in accordance with VCC-1704.7 *Soils,* VCC Tbale-1704.7 *Required Verification and Inspection of* Soils and VCC-1803 *Excavation, grading and fill.* Special inspection and material tests shall be conducted to determine compliance with the town-approved geotechnical report and the Town approved construction documents as specified in the town-approved construction documents, and shall include:

- **Subgrade:** Subgrade shall be specifically inspected for compatibility of bearing material and ground water conditions with

the town-approved geotechnical report, prior to construction of footings and slabs.

- **Fill material:** Fill material shall be specifically inspected for compliance with town-approved structural fill specifications prior to, during, and following its placement in each lift, for structural fill 1'-0" or greater in total depth. Fill material less than 1'-0" in total depth does not require special inspection, nor need it comply with an approved report, provided it complies with the provisions of VCC-1803.5 *Exception for materials and compaction,* unless otherwise specified.

- **Compaction:** Special inspection of the compaction process shall be conducted to determine that materials' quality and in-place density tests comply with the town-approved specifications and geotechnical notes.

- **Controlled low-strength material.** Special inspection shall be conducted to comply with the provisions of an approved report, in accordance with VCC-1803.6.

1103.2 DEEP FOUNDATIONS: The geotechnical engineer of record shall conduct special inspections of deep foundations to determine their in-place load-bearing capacity. Special inspection shall include the following:

- **Driven deep foundations:** Special inspections as required by VCC-1704.8 *Driven deep foundations* and VCC-Table 1704.8 *Required verification and inspection of driven deep foundation elements,* and VCC-1704.9 *Cast-in-place deep foundations,* and VCC-Table 1704.9 *Required verification and inspection of cast-in-place deep foundations elements,* and VCC1704.10 *Helical pile foundations,* and VCC-1810.4.10 *Micropiles,* and VCC-1810 *Deep foundations,* as appropriate. Special inspections shall include inspection of piles before, during, and after driving. Inspection reports shall contain an evaluation of the pile capacity based on driving resistance, and dynamic or static pile testing. Pile driving records shall be submitted to the Building Inspections prior to placement of pile caps.

- **Cast-in-place deep foundations:** Special inspection and material tests as required by VCC-1704.9 *Cast-in-place foundations,* and VCC-Table 1704.9 *Required verification and inspection of cast-in-place deep foundation elements,* and VCC-1810.4.10 *Micropiles,* as appropriate. Special inspection and material tests shall be as required by the statement

of special inspections, including drilling operations, dimensions and lengths, concrete volumes, and additional inspections in accordance with VCC-1704.4 *Concrete construction*. Special inspection and material tests shall include concrete strength, steel reinforcement, orientation and shape of caissons, and bearing capacity at the base of the caisson. Inspection reports shall be submitted to the Building Inspections Section prior to the placement of grade beams. Special inspection and material tests for micropiles shall include pile diameter and depth, grout testing, reinforcement, and grout placement.

1103.3 Shallow Footings and Foundations: The special inspections engineer of record or the geotechnical engineer of record shall conduct special inspection and material tests of footings and foundation systems, including shallow foundations, foundation walls, mats, slabs. Special inspection and material tests of cast-in-place concrete shall be conducted in accordance with Chapter 7, to include monitoring the placement of concrete, concrete reinforcement, and the dimensions, shapes and locations of footings, slabs, and foundation walls. Special inspection and material tests of masonry shall be conducted in accordance with Chapter 10.

SECTION 1103 SOILS-RELATED DEVIATIONS AND REVISIONS

In the event that field conditions vary materially from the town-approved geotechnical construction documents, the special inspections engineer of record or the geotechnical engineer of record shall notify the general contractor, and the requirements of this section shall apply.

1104.1 Preparation of Revisions: The geotechnical engineer of record shall prepare, sign and seal revisions to the town-approved geotechnical construction documents if on-site soil or ground water conditions vary materially from those presumed to exist based on the initial subsurface exploration and as indicated in the town-approved geotechnical construction documents. The geotechnical engineer of record shall coordinate revisions to the town-approved geotechnical construction documents and town-approved fabrication and erection documents with the structural engineer of record responsible for deep foundations, if applicable. The structural engineer of record and the registered design professional responsible for deep foundations, if applicable, shall prepare, sign and seal revisions to the town-approved construction documents and town-approved fabrication and erection documents.

1104.2 Review and Approval: Revisions to the town-approved geotechnical report, town approved geotechnical construction documents, and the

town-approved fabrication and erection documents shall bear the seal and signature of the appropriate registered design professionals and shall be submitted to the Building Inspections Department, for approval prior to continuation of construction. The Building Inspections Section Inspector shall determine if the construction can proceed, pending approvals by the Building Inspections Department. After approval, one set of town-approved documents shall be returned for use on the construction site. Town-approved documents shall be used by the special inspections engineer of record to conduct special inspections and tests during construction.

SECTION 1105 COMPLETION OF SOILS AND FOUNDATIONS CONSTRUCTION

1105.1 **Soils:** Upon completion of soil related special inspections, the geotechnical engineer of record may, after review by the structural engineer of record as applicable, submit a completion letter to the Building Inspections Section.

1105.2 **Deep Foundations:** Upon completion of all piling and caisson deep foundations, including specialty piling and piers, the geotechnical engineer of record may, after review by the structural engineer of record as applicable, submit a completion letter to the Building Inspections.

1105.3 **Shallow Footings and Foundations:** Upon completion of structural special inspection and material tests of footings and foundations, the special inspections engineer of record or the geotechnical engineer of record, as applicable, may after review by the structural engineer of record and the geotechnical engineer of record as applicable submit a completion letter to the Building Inspections Section.

CHAPTER 12
EARTH RETENTION SYSTEMS

SECTION 1201 GENERAL

1201.1 Scope. The requirements of this chapter shall apply when construction includes earth retention system or trenching operations, whether permanent or temporary. Earth retention system include, but are not limited to:

- Building foundation walls.
- Retaining walls.
- Soldier piles and lagging, with or without tie-backs, post-tensioning or rock anchors.
- Soil nailing systems.
- Drilled piers or other structural means for stabilization of slopes.
- Sheet piling.
- Braced or shored walls.
- Tied-back walls.
- Slurry walls.
- Trench bracing.

1201.2 Systems. The following earth retentions systems are subject to special inspection:

a. All earth retention system retaining 10'-0" or more of unbalanced fill;
b. All trenching operations deeper than 8'-0";
c. When specified by the structural design, such as, but not limited to:
- Segmented block retaining wall of any height, with geosynthetic restraints when designed as restrained walls rather than gravity walls.
- Soldier piles and lagging of any height, with post-tensioned tie-backs.

1201.3 Construction Documents: Earth retention system construction documents, including the related design calculations, shall be prepared, signed and sealed by a registered design professional experienced in the design of such systems. In addition to structural design, the construction documents shall include the following:

- **Adjoining Properties:** Recommendations for protecting adjoining properties, including existing public and private streets.

- **Slope Protection:** Specification of responsibility for protecting all slopes throughout the course of the project in accordance with general practice.

- **Dewatering:** Any requirements for dewatering of the excavation, as specified or assumed in the earth retention system design.

- **Installation:** System installation criteria, including allowable inward movement, pile installation and tie-back criteria.

- **Special inspections:** Special inspection and material tests criteria for the earth retention system construction

Earth retention system construction documents shall be submitted to the Building Inspections Section for approval. Construction documents, including field inspection requirements, for earth retention systems, which are to become, a permanent part of the final structure shall be approved by the structural engineer of record prior to submission to the Building Inspection Section. After town approval, one set of town-approved construction documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 1202.0 FABRICATION AND ERECTION DOCUMENTS

1202.1 **Preparation of fabrication and erection documents.** The registered design professional responsible for the construction documents shall also prepare, sign and seal the fabrication and erection documents.

1202.2 **Review and approval:** The earth retention system fabrication and erection documents shall be submitted to the structural engineer of record and the geotechnical engineer of record, as appropriate, for approval. The general contractor shall submit two sets of structural engineer of record/geotechnical engineer of record-approved fabrication and erection documents to the Building Inspection Section fpr approval prior to construction. After town approval, one set of town-approved fabrication and erection construction documents shall be returned for use on the construction site. The special inspection engineer of record shall use the town-approved documents to conduct special inspections and test during construction.

SECTION 1203.0 SPECIAL INSPECTIONS AND TESTS

1203.1 **Special Inspections.** In problem soils area, the geotechnical engineer of record shall conduct special inspection and tests of the earth retention system. In non-problem soils areas, either the geotechnical engineer of record or the special inspections engineer of record shall conduct special inspection and material tests of the earth retention systems.

Earth retention systems shall have special inspection and material tests conducted for compliance with town-approved documents, including, but not limited to the following:

- **Installation criteria and anchorage.** Verification of pile-tip depth, tie-back, post-tensioned anchorage, geosynthetic restraints, or other items as specified by the system design.
- **Compaction:** Compaction process to determine that materials' quality and in-place density tests comply with town-approved specifications and geotechnical notes.
- **Backfill, Drainage and Waterproofing:** Backfill, foundation drainage systems, and waterproofing during and following their placement for compliance with town-approved backfill, foundation drainage systems and waterproofing specifications.

1203.2 **Inspection Reports:** Inspection reports shall be submitted to the appropriate registered design professionals of record and the Building Inspections Section.

1203.3 **Deviations:** Deviations from the town-approved earth retention system construction documents shall be subject to approval by the appropriate registered design professionals and the Building Inspections Section prior to work continuing in the affected area.

1202.2

SECTION 1204 COMPLETION OF EARTH RETENTION SYSTEM CONSTRUCTION

At the completion of the earth retention system construction, the special inspection engineer of record may, after review by the appropriate registered design professionals, submit a completion letter to the Building Inspections Section.

When the earth retention system is to become a permanent part of the final structure, the structural engineer of record shall approve the completion letter, with such approval indicating that the system is acceptable as a structural element of the final structure prior to the Building Inspection Section.

CHAPTER 13
EXTERIOR INSULATION AND FINISH SYSTEMS

SECTION 1301 GENERAL

1301.1 Scope. The requirements of this chapter, VCC-1704.14 *Exterior insulation and finish systems (EIFS),* shall apply for all exterior insulation and finish systems (EIFS) applications.

Exceptions:

- EIFS installed over a water-resistance barrier with a means of draining moisture to the exterior (but when installed over a sheathing substrate, special inspection of the water-resistance barrier coatings is required, in accordance with VCC-1704.14.1 *Water-resistive barrier coatings)*;
- EIFS installed over masonry or concrete walls.

130.1.2 Construction documents. Construction documents for the EIFS, including the related design calculations, shall be prepared, signed and sealed by a registered design professional. The construction documents shall include, but not limited to, the following information and details:

- Copy of the EIFS research report.
- Design wind pressure on the EIFS and related calculations.
- Waterproofing and drainage provisions including weep holes and any limitations on EIFS or building materials, especially substrate and building framing, for prevention of moisture infiltration to building sheathing or framing.
- EIFS material types and thicknesses, including flame spread and smoke development ratings.
- Details consistent with intent of the research report and manufacturer's instructions for method of installation at all openings, corners and panel terminations.
- Location and configuration of control joints, weep holes, and flashing.
- Typical cross-sectional configuration showing all components of the wall. All buildings sheathing and framing materials in contact with the EIFS shall be damp proofed in accordance with VCC-1805.2 *Damp proofing required*. Wood shall also be naturally durable or preservative-treated in accordance with VCC-2304.11 *Protection against decay and termites* and VCC-2303.1.8 *Preservative-treated wood*.
- Typical wall configuration showing details of system penetrations.
- System installation criteria, including ambient temperature limitations.

Three sets of the EIFS construction documents shall be submitted to the Building Inspections Section for approval. After town approval, the Building Inspections Section shall retain one set of town-approved construction documents and return the others. One set of town-approved construction documents shall be returned for use on the construction site. The special inspections engineer of record shall use the town-approved construction documents to conduct special inspections and tests during construction.

SECTION 1302 FABRICATION AND ERECTION DOCUMENTS

1302.1 Preparation of fabrication and erection documents. The registered design professional responsible for preparation of the EIFS construction documents shall also prepare, sign and seal the EIFS fabrication and erection documents. Information shall include, but not limited to:

- Reference to research report number and identification of EIFS manufacturer.
- EIFS manufacturer installation and application instructions.
- Layout and details for application of insulation boards.
- Details for control joints, flashing, weep holes, sealants and caulking.
- System installation criteria, including ambient temperature limitations.
- Criteria and timing for special inspection during construction.

1302.2 Review and approval. The architect of record and the structural engineer of record shall approve the fabrication d erection documents for compliance with the architectural and structural design of the building and the town-approved construction documents. The general contractor shall submit two sets of architect of record/structural engineer of record-approved EIFS fabrication and erection documents to the Building Inspections Section for approval prior to EIFS element's fabrication, erection or application as appropriate. After approval, one set of town-approved fabrication and erection documents shall be returned for use on the construction site. The special inspection engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION1303 SPECIAL INSPECTIONS AND TESTS

EIFS installation shall be executed by trained applicators. All EIFS elements shall be subject to special inspection during erection and application. The special inspections engineer of record shall conduct special inspection of EIFS installation during erection for conformance with town-approved documents, including the information required by Sections 1301.2 and 1302.1, and as required by VCC-1704.14.1 *Water-resistive barrier coating*.

For EIFS systems otherwise exempted in accordance with Section 1301.1, when a water-resistive barrier coating is installed over a sheathing substrate, special inspection of the water-resistive barrier coating is required.

SECTION 1304 COMPLETION OF EIFS CONSTRUCTION

Upon completion of EIFS construction, the special inspection engineer of record may, after review by the architect of record and the structural engineer of record, submit a completion letter to the Building Inspection Section.

CHAPTER 14
SPRAYED FIRE-RESITANT MATERIALS

SECTION 1401 GENERAL

1401.1 Scope. The requirements of this chapter, and VCC-1704.12 *Sprayed fire-resistant materials,* shall apply for all applications of sprayed fire-resistant materials used to provide required fire-resistant ratings for structural elements until al other required inspections of the building elements and connections have been conducted and approved. Sprayed fire-resistant materials shall be inspected and approved prior to attachment of other elements of the building and re-inspected prior to concealment.

The special inspections engineer of record shall conduct special inspection and material tests of sprayed fire-resistant materials, including:

- Preparation of structural member surfaces (substrates).
- Verification of substrate ambient temperatures.
- Ventilation requirements.
- Testing samples for:
  - Thickness
  - Density
  - Bond strength

1402.2 Construction documents. Designs for sprayed fire-resistant materials shall be listed in the Underwriters laboratories, Inc. (UL) *fire Resistance Directory* to provide the required fire-resistance rating for structural elements and decks. Structural elements shall be classified as "thermally unrestrained" in accordance with the UL *Fire Resistance Directory* unless written certification by the structural engineer of record is provided to the Building Inspections Section that the assembly meets "thermally restrained" criteria.

The fire-resistance designs shall be designated on the town-approved construction documents. Copies of the UL listings shall be provided on the construction site. After town approval, one set of town-approved construction documents shall be returned for use on the construction site. The special inspections engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 1402 FABRICTION AND ERECTION DOCUMENTS

1402.1 Preparation of fabrication and erection documents. The sprayed fire-resistant material manufacture's installation requirements and details, including specific UL listing information, shall be included on the fabrication and erection documents. Unusual or special design features such as adhesives, overcoats, metal lath, netting, etc., and clips, standoffs or other devices necessary for attachment of other elements of the building shall be specifically detailed.

1402.2 Review and approval. The fabrication and erection documents shall be approved by both the architect of record and the structural engineer of record. The general contractor shall submit two sets of the architect of record/structural engineer of record-approved fabrication and erection documents to the Building Inspections Section for approval. After approval. One set of town-approved documents shall be returned for use on the construction site. The special inspection engineer of record shall use town-approved documents to conduct special inspections and tests during construction.

SECTION 1403 SPECIAL INSPECTIONS AND TESTS

1403.1 Special inspections. The special inspections engineer of record shall conduct special inspection and material tests of sprayed fire-resistant materials to verify compliance with VCC-1704.12 *Sprayed fire-resistant materials* and the following:

1403.1.1 Building elements and connections. In additions to other required inspections of the building elements and connections, inspections shall include any unusual or unique design features or devices as shown on the town-approved fabrication and erection documents for sprayed fire-resistant materials. Sprayed fire-resistant materials shall not be applied to building elements until all other required inspections of the building elements and connections that will be concealed have been conducted and approved. The spray fire-resistant materials shall be applied to all surfaces and lengths of members such that the continuity of fire-resistance required by the town-approved fire-resistive designs is obtained.

1403.1.2 Sampling and testing.

- **Thickness.** Sampling and testing shall be in accordance with VCC-1704.12.4 *Thickness* and ASTM E 605, at least four measurements for each 1,000 square feet of sprayed area for floors, roofs and walls in each story, and 25 percent of the structural members (beams, girders, trusses, pipe columns and columns) on each floor.
- **Density.** Sampling and testing shall be in accordance with VCC-1704.12.5 *Density* and ASTM E 605, at least once for each 2,500 square feet of sprayed area in each story, and at least one sample of each type of structural member for 2,500 square feet of floor area in each story.
- **Bond strength.** Sampling and testing shall be in accordance with VCC-1704.12.6 *Bond strength* and ASTM E 736, and VCC-403.2.4 *Sprayed fire-resistant materials (SFRM),* at least once for each2,500 square feet of sprayed area for floor, roofs and walls and at least one sample of each type of structural member per 2,500 square feet of floor area in each story. (When applied over a prime, painted or encapsulated surface, a qualification bond test for the coating shall be performed first.) Required bond strength shall be at least:
  - Low-rise buildings less than 75’-0”: 150 pounds per square foot (psf);
  - High-rise buildings 75’-0”-420’-0”high:430 pounds per square foot (psf);

- Super-tall buildings greater than 420’-0” high: 1,000 square foot (psf).

1403.1.3 Attachment of other elements. Other building elements such as precast concrete spandrel panels, electrical conduits, mechanical ductwork or metal studs whose installation would interfere with the application of sprayed fire-resistant materials shall not be installed until after approval of the sprayed fire-resistant materials. Sprayed fire-resistant materials shall be inspected and approved before attachment of other elements of the building, and shall not be scraped off or removed to attach other building elements. Any damage sprayed fire-resistant materials shall be repaired. Prior to concealment, sprayed fire-resistant materials shall be re-inspected and approved after attachment of other elements of the building.

SECTION 1404 COMPLETION OF SPRAYED FIRE-RESISTANT MATERIALS

Upon completion of sprayed fire-resistant material construction, the special inspections engineer of record may, after review by the architect of record and the structural engineer of record, submit a completion letter to the Building Inspections Section.

CHAPTER 15
MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS

SECTION 1501 GENERAL

1501.1 Scope. The requirements of this chapter, and VCC-1704.13 *Mastic and intumescent fire-resistant coatings*, shall apply for all applications of mastic and intumescent fire-resistant coatings used to provide required fire-resistant ratings for structural elements and decks. Mastic and intumescent fire-resistant coatings shall not be applied to building elements until all other required inspections of the buildings elements and connections have been conducted and approved. Mastic and intumescent fire-resisting coatings shall be inspected and approved prior to attachment of other elements of the building and re-inspected prior to concealment.

The special inspections engineer of record shall conduct special inspection and material tests of mastic and intumescent fire-resisting coatings, including preparation of structural member surfaces, verification of substrate ambient temperature and ventilation requirements, and testing samples for thickness.

1501.2 Construction documents. Design for mastic and intumescent fire-resisting coatings shall be listed in the Underwriters Laboratories, Inc. (UL) *Fire Resistance Directory* to provide the required fire-resistance rating for structural elements and decks. Structural elements shall be classified as "thermally unrestrained" in accordance with the UL *fire Resistance Directory* unless written clarification by the structural engineer of record is provided to the Building Inspections Section that the assembly meet "thermally restrained" criteria.

The fire-resistance designs shall be designated on the town-approved construction documents. The manufacturer's installation requirements and details, including coating thickness and unusual or special design features such as adhesives, over coats, metal lath, netting, etc., and clips, standoffs or other devices necessary for attachment of other elements of the building shall be specifically detailed.

After town approval, one set of town-approved construction documents shall be returned to the construction site. Copies of the UL listings shall be provided on the construction site. The special inspections engineer of record shall use town-approved documents to conduct the special inspections and tests during construction.

SECTION 1502 SPECIAL INSPECTIONS AND TESTS

1502.1 Coatings. The special inspections engineer of record shall conduct special inspection and material tests of mastic and intumescent fire-resistant coatings to verify

compliance with VCC-1704.13 *Mastic and intumescent fire-resistant coatings* and the following:

1502.1.1 Building elements and connections. In additions to other required inspections of the building elements and connections, inspections shall include any unusual or unique design features or devices as shown on the town-approved construction documents for mastic and intumescent fire-resisting coatings. Mastic and intumescent fire-resistant coating shall not be applied to building elements until all other required inspections of the building elements and connections that will be concealed have been conducted and approved. The mastic and intumescent fire-resistant coatings shall be applied to all surfaces and lengths of members such that the continuity of fire-resistance required by the town-approved fire-resistive designs is obtained.

1502.1.2 Sampling and testing. Sampling and testing of mastic and intumescent fire-resisting coatings shall be in accordance with AWCI 12-B.

1502.1.3 Attachment of other elements. Other building elements such as precast concrete spandrel panels, electrical conduits, mechanical ductwork or metal studs whose installation would interfere with the application of mastic and intumescent fire-resistant coatings shall not be installed until after approval of the mastic and intumescent fire-resistant coatings. Mastic and intumescent fire-resistant coatings shall be inspected and approved before attachment of other elements of the building, and shall not be scraped off or removed to attach other building elements. Any damage mastic and intumescent fire-resistant coatings shall be repaired. Prior to concealment, mastic and intumescent fire-resistant coatings shall be re-inspected and approved after attachment of other elements of the building.

SECTION 1503 COMPLETION OF MASTIC AND INTUMESCENT FIRE-RESISTANT COATINGS

Upon completion of mastic and intumescent fire-resistant coatings, the special inspections engineer of record may, after review by the architect of record and the structural engineer of record, submit a completion letter to the Building Inspections Section.

CHAPTER 16 SMOKE CONTROL SYSTEMS

SECTION 1601 GENERAL

1601.1 Scope. the requirements of this chapter, VCC-909 *Smoke control systems*, VCC-909.18 *Special inspections for smoke control*, shall apply for all smoke control systems.

SECTION 1602 FABRICTION AND ERECTION DOCUMENTS

1602.1 Preparation of fabrication and erection documents. A registered design professional with experience in the design of smoke control systems shall prepare, sign and seal fabrication and erection documents for the smoke control system. In accordance with VCC-909 *Smoke control systems*, the fabrication and erection documents shall include, but are not limited to, the following information (see also Section 1603.2 below):

- Design method, calculations and analysis (see VCC-909.4 *Analysis).*
- System components, elements and details.
- Scope, extent, procedures and methods for special inspection and tests. The design shall clearly identify the procedure and methods to be used to verify the proper commissioning of the smoke control system in its final condition (see VCC-909.3 *Special inspection and test requirements).*

Three sets of fabrication and erection documents shall be submitted to the Fire Protection Systems Testing Section, Fire Prevention Division for approval. At least one set shall bear the original seal and signature of the responsible registered design professional. After town approval, one set of town-approved construction documents shall be returned for use on the construction site. The special inspections engineer of record for smoke control systems shall use town-approved documents to conduct the special inspections and tests during construction.

SECTION 1603 SPECIAL INSPECTIONS AND TESTS

1603.1 Special inspector. As required by VCC-1704.16.2 *Qualifications,* special inspection and tests for smoke control systems shall be conducted by qualified individuals, agencies or firms with expertise in fire protection engineering, mechanical engineering and certification as air balancers. The special inspections engineer of record for smoke control systems shall be approved by the Fire Protection Systems Testing Section, Fire Prevention Division, on behalf of the Building Official. The special inspections engineer of record for smoke control systems might be different from the special inspections engineer of record for other special inspections.

1603.2 Special inspection. The special inspection engineer of record for smoke control systems shall conduct special inspections and tests as required by this section, and VCC-1704.16.1 *Testing scope*. Special inspections and tests shall be conducted during erection of ductwork ad prior to concealment, and after completion and prior to occupancy.

a. Special inspections. Special inspection of smoke control systems shall access, document and verify the following systems and element
- Automatic dampers
- Control air tubing and direct digital control wiring.
- Control diagrams and sequences.
- Fan belts.
- Exhaust fan components.
- Power: normal and standby.

b. Tests. Tests of smoke control systems shall document and verify the adequate performance of:
- Control elements and sequences.
- Control air tubing and direct digital control wiring.
- Control devices.
- Dampers.
- Detection devices and their tolerances.
- Doors.
- Ducts and shafts.
- Fans.
- Inlets and outlets, including sizes and positions.
- Pressurized stair enclosures.
- Smoke zone or area boundary elements and barriers.
- Response time.
- Leakage of boundary or barrier elements, including doors and partitions.
- Power: normal and standby.

All special inspection and tests results, including rejections and subsequent follow-up retests and corrective actions, shall be recorded and form part of the final report. Final reports shall verify compliance with all portions of VCC-909.18 *Acceptance testing*, and VCC-909.19 *System acceptance* and VCC-909.20 *Smoke proof enclosures,* as applicable.

SECTION 1604 COMPLETION OF SMOKE CONTROL SYSTEMS

Upon completion of smoke control systems, the special inspection engineer of record for smoke control systems shall prepare a complete final report of testing (see VCC-909.18.8.3 *Reports*) for review by the registered design professional responsible for smoke control system design. After approval, the registered design professional shall sing and seal the final report, for submittal to both the Fire Protection Systems Testing

Section, Fire Prevention Division and the Building Inspections Section. In addition, a permanent copy of the final report shall be maintained in an approved location in the building, in accordance with VCC-909.18.8.3.1 *Report filing*.

CHAPTER 17
MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS

SECTION 1701 GENERAL

1701.1 Scope. Mechanical, electrical and plumbing components in buildings assigned to Seismic Design Category C shall be specifically inspected and tested for seismic resistance, in accordance with VCC-1707.7 *Mechanical and electrical components*, and as by the component-specific information included in the town-approved construction documents and the statement of special inspections.

The information to be included in the statement of special inspections shall be prepared by a registered design professional and shall specify the type and frequency of special inspections and testing (see section 1702 below).

All manufacturers involved shall submit a certificate of compliance and manufacturer installation instructions to the general contractor for approval by the architect of record. The general contractor shall submit two sets of the architect of record-approved certificate of compliance and manufacturer installation instructions to the Building Inspections Section for approval. After approval, one set of town-approved documents shall be returned to the construction site. The special inspections engineer of record shall use town-approved documents to conduct inspections and tests during construction.

SECTION 1702 SPECIAL INSPECTION AND TESTS

Pursuant to VCC-1707.7 *Mechanical and electrical components*, periodic special inspections are required for mechanical, electrical and piping components during their installation and anchorage. The special inspections engineer of record shall verify that the label, anchorage or mounting conforms to the certificate of compliance, manufacturer installation and town-approved construction documents.

For buildings in Seismic Design Category C, periodic special inspections are required for:

- Anchorage of electrical equipment for emergency or standby power systems;
- Piping systems intended to carry hazardous materials;
- HVAC ductwork systems intended to carry hazardous materials;
- Vibration isolation systems with small clearances.

SECTION 1703 COMPLETION OF MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS

Upon completion of mechanical, electrical and plumbing components, the special inspections engineer of record may submit a completion letter to the Building Inspections Section.

CHAPTER 18
SAFEGUARDS DURING CONSTRUCTION

The requirements of this chapter and VCC Chapter 33 *Safeguards during construction,* shall apply to all construction sites.

SECTION 1801 PROTECTION OF THE PUBLIC

1801.1 Materials and equipment. The general contractor is responsible for safe storage and placement of materials and equipment, as required by VCC-3301.2 *Storage and placement*. See also Section 1806.2

1801.2 Occupied buildings. Means of egress from occupied buildings shall be maintained at all times, shall not be blocked, and shall not pass through construction areas. In the event that existing exits are proposed to be blocked by construction, alternative exits shall be provided or constructed in advance and approved by the Building Inspections Section and by the Inspection Section, Fire Prevention Division, Fairfax County Fire and Rescue. Occupied buildings undergoing remolding or additions shall also comply with the requirements of VCC-3302 *Construction safeguards.* Fire protection devices and equipment shall be maintained at all times throughout the building. See Sections 1805 and 1806.

1801.3 Fencing, construction railings, barriers and covered walkways. The general contractor shall install construction site fencing, construction railings, barriers and covered walkways for protection of the public, in accordance with section and VCC-3306 *Protection of pedestrians,* prior to the excavation for footings or underground utilities, and continuing for the duration of the construction project. Impact barricades required for projects located in close proximity to a public use roadway shall be installed in accordance with the Virginia Department of Transportation regulations. Upon written request by the general contractor, the criteria outlined below may be modified by the Building Inspections Section when a natural barricade surrounding a construction site exists. The special inspections engineer of record shall notify the Building Inspections Section if protection is not installed or maintained.

1801.3.1 Site fencing. Every construction site shall be enclosed with a non-climbable fence not less than 6'-0" high. The general contractor shall have the option of fencing the total perimeter of a construction site or an area within a minimum of 20'-0" away from the structure. Fencing shall be maintained until the building can be secured against entry and the exterior site is free of hazards.

1801.3.2 Construction railings, barriers and covered walkways. Covered walkways, construction railings and barriers shall be of noncombustible or fire-retardant treated materials and shall comply with VCC-3306.1 *Protection of pedestrians*

and VCC-Table 3306.1 *Protection of pedestrians,* except that construction railings or barriers located outside the building may be of approved material.

Construction railings shall be at least 3'-6" high. Covered walkways shall be as wide as required for corridors or exits, or at least 4'-0" wide, whichever is greater, and shall include necessary illumination. See VCC-3306.7 *Covered walkways,* for construction criteria. Barriers, when required by VCC-Table 3306.1 *Protection of pedestrians,* shall comply with VCC-3306.5 *Barriers* and VCC-3306.6 *Barrier design*. The general contractor shall submit designs for barriers and covered walkways to the Building Inspection Section for approval.

SECTION 1802 ON-SITE CONCRETE BATCH PLANTS

The requirements of this section, ASTM C 94 and ASTM C685 shall apply whenever a concrete batch plant is erected on-site. Prior to the manufacture of concrete, the special inspections engineer of record shall inspect the concrete batch plant site and batch plant and state in writing that:

- The scales are accurate
- The batch plant is capable of producing concrete in compliance with ACI 318.5.8.3, and the batch plant complies with requirements of ASTM C 94 and ASTM C 685.
- Access roads are at least 20'-0" wide, located such that delivery trucks shall not contaminate stock piles. Mud mats are large enough to prevent stock pile contamination.
- Barricades and warning devices are installed to prevent workers from entering the working radius of the scraper boom. Stock piles are separated by walls having a 45-degree minimum angle from the leading edge of the stock pile, and extending to the outside perimeter of the boom radius.

SECTION 1803 VIRGINIA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

The general contractor shall ensure that the construction site is safe and in compliance with all applicable Virginia Occupational Safety and Health regulations. A copy of the "Virginia Occupational Safety and Health Standards for the Construction Industry" (29 CFR Part 1926) shall be available on the construction site at all times.

SECTION 1804.0 TOWER CRANES, PERSONNEL HOIST, MATERIAL HOISTS AND CONSTRUCTION ELEVATORS

1804.1 General.

a. Scope. The requirements of this section shall apply whenever a tower crane, personnel hoists, material hoists and construction elevator (herein called "equipment") is to be erected on-site, whether free-standing or attached to the building under construction. Documents shall include the crane or hoist location and crane boom swing. The general contractor and suppliers of tower cranes, personnel hoists, material hoists and construction elevators are responsible for safe construction, installation and use of the crane, hoists or elevator. The structural engineer of record is responsible for the structural design strength of the building to support the loads imposed on it by the crane, hoists or elevator. Crane booms shall not swing over public streets without special approval by the Building Inspections Section.

b. Permits requirements.

- **Tower Crane:**
  - An electrical permit is required
  - A building permit for the crane and its foundation is required.

- **Personnel hoist, material hoist or construction elevator:**

  - An elevator permit is required

  - An electrical permit is required

  - A building permit for the hoist/elevator and its foundation is required

1304.2 Documents.

Construction documents and fabrication and erection documents for the crane, hoist or elevator and its foundation shall be prepared by registered design professionals. Prior to the placement of the crane, hoist or elevator foundation, the general contractor, or the owner, or contractor for the crane, hoist or elevator shall submit one record copy of the following information to the Building Inspections Section:

- **Crane Specifications:** Specifications for cranes shall include manufacturer's operating model number, hook height, boom length, and manufacturer's specifications relative to overturn moment, slewing moment, vertical load (minimum and maximum), shear per bolt group, uplift per bolt group, compression per corner and horizontal shear (minimum and maximum). Fabrication and erection documents shall include the crane location and crane boom swing.
- **Personnel hoist and material hoist specifications.** Specifications for hoists shall include load lines, load and boom hoist drum brakes, swing brakes and locking devices such as pawls or dogs. The personnel platform shall be designed by a registered design professional. Hoists shall also comply with VCC-3005.4 *Personnel and material hoists requirements,* including service loads, construction, installation and field testing criteria.
- **Foundations.** Fabrication and erection documents shall include structural calculations and design of equipment foundations. Plans and calculations shall clearly indicate footing dimensions, required compressive strength of concrete, steel reinforcement, and allowable soil bearing pressure. The allowable soil bearing pressure shall be consistent with values shown in the soil test report for the project prepared by the geotechnical engineer of record. Concrete mix design, and steel reinforcement, shall be reviewed and approved by a registered design professional responsible for design of equipment foundations.
- **Cranes, hoists or elevators within or attached to the structure.** For cranes, hoists or elevators located within or supported by the structure, the fabrication and erection documents shall indicate the size and location of slab openings, method of support or attachment of the crane, hoist or elevator, service loads to be delivered to or imposed on the structure, and the inspections required. Such documents shall be reviewed and approved by the structural engineer of record.

1804.3. Inspections.

1804.3.1 Foundations. The special inspections engineer of record shall conduct inspections in accordance with Chapters 7 and 11, including special inspections for soil bearing capacity, footing construction, and concrete tests. Upon completion of the foundation the special inspections engineer of record shall after review by the appropriate registered design professionals, submit a completion letter to the Building Inspections Section.

1804.3.2 Crane or hoist erection.

- **Components.** Prior to assembly, the crane or hoist components shall be inspected for structural defects by the crane or hoist manufacturer or a registered design professional.
- **Assembly.** The crane or hoist shall be assembled according to the manufacturer's specifications. All bolts shall be secured in accordance with manufacturer's project specifications, and shall be inspected by the general contractor at erection, thirty days after erection and every ninety days thereafter.

1804.3.3 Electrical and mechanical inspection: An inspection by a Town of Herndon Inspector shall be conducted and approved. Material hoists, personnel hoists and construction elevators shall also be inspected and approved by a Town of Herndon Elevator Inspector.

1804.3.4 Building Inspections Section approval prior to use: The general contractor shall, after review by the appropriate registered design professionals, submit a letter of completion of installation to the Building Inspections Section for approval. The building Inspections Section approval is required prior to use of the crane, hoist or elevator.

1804.4 Safety rules and regulations. The Building Inspections Section can require a load test for a crane, hoist or elevator at any time. Virginia Occupational Health and Safety Administration regulations shall also apply to cranes and derricks (Subpart N), Material Hoists, Personnel Hoists and Elevators (Subpart N), and Concrete and Masonry Construction (Subpart Q).

SECTION 1805 FIRE PROTECTION

1805.1 Fire extinguishers. The general contractor shall be responsible for installing and maintaining portable fire extinguishers during construction, at each floor level, in storage sheds. And wherever flammable or combustible materials are used or stored, as required by VCC-3309 *Fire extinguishers*.

1805.2 Standpipes. In buildings four stories or more in height, the general contractor shall be responsible for installing and maintaining standpipes during construction as required by VCC-3311 *Standpipes*. Standpipes shall be installed during construction as the work of the building progresses, beginning at 40'-0" in height. Standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring and shall be installed and ready for use as each floor progresses. Free access from the street to such standpipes shall be maintained at all times. Materials shall not be stored within 5'-0" of any fire hydrant or in the roadway between such hydrant and the centerline of the street. Failure to comply with this section shall result in the immediate stop of all work on the project until such time as the standpipes are properly placed.

1805.3 Fire suppression system.
Sprinkler systems shall comply with Section 1806.3 and VCC-3312 *Automatic sprinkler systems*. Sprinkler systems shall be tested and approved by the Fire Prevention Division, Fairfax County Fire and Rescue prior to occupancy of any portion of the building. sprinkler control valves shall only be operated by authorized personnel after due notification to the Fire Prevention Division, Fairfax County Fire and Rescue.

SECTION 1806 FIRE PROTECTION AND SAFETY REQUIREMENTS FOR PARTIALLY OCCFUPIED BUILDINGS

1806.1 General. The existing fire protection, egress paths, and fire-resistant construction protection required for occupied areas shall be maintained at all times while ongoing construction in unoccupied areas is in progress.

1806.2 Material storage.

- **Noncombustible storage, area limitations.** Noncombustible materials are those that do not support combustion and are not readily ignitable. Examples of noncombustible materials are: drywall; metal studs, fire retardant lumber; metal doors; solid core wood doors, including packaging aid without voids; sheet metal ducts; masonry; noncombustible insulation; plumbing fixtures; light fixtures wrapped in tight plastic; and other materials of similar characteristics.

  Noncombustible storage may be unlimited in area; however, the weight of material stored shall not exceed the structural design capacity of the floor.

- **Combustible storage, area limitations.** Combustible materials are those that readily support combustion are readily ignitable. Example of combustible materials are: hollow core wood doors; wood studs, paneling and other wood products; carpet and padding; vinyl core trim and base; insulation with combustible vapor facing; noncombustible materials wrapped in large quantities of combustible packaging or storage aids, and other materials of similar characteristics.

  Combustible storage shall be limited to 2,500 square feet or 10 percent of the floor area, whichever is smaller; however, the weight of material storage shall not exceed the structural design capacity of the floor. The owner shall be responsible for obtaining a Fire Prevention Code Permit for combustible storage exceeding these limitations pursuant to the Virginia Statewide Fire Prevention Code. Combustible storage areas located on an occupied floor shall be separated from the occupied area by a fire rated partition of at least one-hour fire-resistance.

- **Storage arrangements.** Stored materials shall be arranged in neat piles with the floor kept clean and free of construction debris. Egress aisles shall be maintained. Storage shall be kept a minimum of 2'-0" below ceilings, sprinkler heads, or the lowest member of the floor/ceiling or roof/ceiling assembly.

1806.3 Fire suppression system requirements.

Sprinkler systems shall comply with this section and VCC-3312 *Automatic sprinkler system.*

In fully sprinkler-protected buildings, sprinkler protection shall be operational at all times throughout the entire building, including areas under construction (see 1807.2.1 for additional information).

a. Sprinkler heads that are or will be installed within 1'-0" of the floor/roof above shall be installed in either the upright position with upright heads, or the pendant position with pendant heads. If the ceiling or ceiling grid is in place, the sprinkler heads shall be installed in the pendant position, with pendant heads.

b. Sprinkler heads that are or will be installed at a ceiling line located lower than 1'-0" below the floor/roof above shall be installed either in the upright position and turned up to within 1'-0" of the floor/roof above with upright heads, or in the pendant position with pendant heads at the ceiling line. In the pendant position, the entire ceiling line must be constructed, or the ceiling grid with all tiles must be in place. If the entire ceiling is not constructed, or the ceiling grid does not have all ceiling tiles in place, then in lieu of standard response sprinkler heads, the use of commercial, rapid or quick response sprinkler heads, with at least a 2'-0" x 2'-0" ceiling tile suspended at each sprinkler head to act as a heat trap, shall be subject to approval by the Fire Prevention Division, Fairfax County Fire and Rescue. Such rapid and quick response sprinkler heads may later remain as part of the permanent sprinkler system.

c. Where in the opinion of the Building Inspection Section or the Fire Prevention Division, Fairfax County Fire and Recue, the type or quantity of combustible storage exceeds the limitations of the existing sprinkler system design; the sprinkler system in those areas shall be modified to conform with the fire hazard posed by the combustible storage.

1806.4 Special cases. The criteria for fire prevention measures set forth in this section cover the majority of field conditions. It is conceivable that individual situations may arise which shall be evaluated for compliance on a case by case basis.

Chapter 19
Occupancy Requirements for New Buildings And Alterations to Existing Buildings

The requirements of this section shall apply for all nonresidential commercial construction projects of Groups A (assembly), B (business), E (education), F (factory), H (high-hazard), I (industrial), M (mercantile), S (storage), and U (utility, miscellaneous), and for all residential construction projects of Groups R-1 (hotels, motels) and R-2 (multi-family residential dwelling units). A "building" is identified by a unique street address. It is the responsibility of the owner to obtain a certificate of occupancy for the building shell prior to any tenant occupancies. It is the responsibility of building "tenants" to file for and obtain a certificate of occupancy for individual tenant spaces prior to occupancy. For purpose of this section, the terms "tenant space", "tenant occupancy", etc., refer to all space and occupancy, whether occupied by a tenant or an owner.

1901.1 Certificate of occupancy. A certificate of occupancy is required prior to initial use or occupancy, or a change in use or occupancy, of a building or tenant space per VCC 116 Certificate of Occupancy. The certificate of occupancy is issued by the Building Inspections Section.

- A new certificate of occupancy is required for:
  - A new building or tenant space;
  - Change of group classification of a building or tenant space
  - Increase or decrease in gross floor area of a building or tenant space

- For a new Group R-2 building, a certificate of occupancy is not issued for the building shell upon its completion, but final inspection approvals may serve as a certificate of completion for the shell building. Individual Residential Use Permits are subsequently issued for each dwelling unit ("tenant space") upon its final inspection approval.
- In renovations of an existing building or an existing tenant space having a valid certificate of occupancy, final inspection approvals may serve as the revised certificate of occupancy, and a new certificate of occupancy is not required.

1901.2 Procedural requirements

1901.2.1 Building core and shell completion. The following building components, fire protection systems and life safety features shall be completed:

- Exit stairs
- Grade level exits, lobbies, corridors and passageways
- Required exit lights and emergency lighting

- Elevator shaft enclosures
- Elevators and elevator emergency recall system (at least one elevator shall be approved and operational in high-rise buildings), or elevators shall be locked out of service
- Required fire proofing of structural members in the core and occupied areas.
- Firestopping of wiring, piping and other penetrations, both vertical and horizontal, in floors, ceilings and walls.
- Sprinkler systems and fire suppression systems – building core and shell (see Section 1806.3 for further information)
- Fire alarm systems – building core and shell
- Material storage areas complying with Section 1806.2
- Removal of combustible trash and construction debris.

All sprinklers, standpipes, alarms, signaling systems and other required fire suppression or firefighting systems shall be activated throughout the entire structure prior to building shell certificate of occupancy. Under no conditions shall any fire suppression or firefighting system be shut off in any occupied area, unless the valve or other activation control mechanism is continuously manned, during the period the system is shut off. If this provision is deemed unworkable, any work shall be done after normal business hours.

Subject to prior approval by the Fire Prevention Division, Fairfax Fire and Rescue, and by the Building Inspection Section, a fire watch shall be instituted during the time any fire suppression or firefighting system is out of service, with the number of persons required for fire watch such that the entire building shall be checked every hour, except residential buildings of Group R, educational buildings of group E and institutional buildings of Group I shall be checked every half hour. The general contractor shall submit a written record of fire watch activities to the Fire Prevention Division. The general contractor shall also notify the Fairfax County Emergency Operations Center when any fire suppression or firefighting system is placed out of service.

1901.1.2 Building core and shell final inspections. A certificate of occupancy for a building shell may be obtained after building core and shell final inspections are approved by the appropriate Town of Herndon and Fire Prevention Division, Fairfax Fire and Rescue organizations:

- For buildings subject to special inspections, the final report of special inspections – by Building Inspections Sections
- Electrical systems final – building core and shell – by Electrical Inspections Section
- Mechanical systems final – building core and shell – by Mechanical Inspections Section
- Plumbing systems, including cross connection, final – building core and shell – by Plumbing Inspections Section

- Elevator final and Certificate Approved – by Elevator Inspector
- Sprinkler system and fire suppression system finals – building core and shell – by Fire Protection Systems Testing Section, Fire Prevention Division
- Fire alarm system final – building core and shell – by Fire Protection Systems Testing Section, Fire Prevention Division
- Special locking devices final – building core and shell – by Fire Protection Systems Testing Section, Fire Prevention Division
- Fire lanes final – by Inspections Section, Fire Prevention Division
- Fuel storage tanks final – by Inspections Section, Fire Prevention Division
- Health systems final – building core and shell – by Department of Health Services (as applicable, for health spas, food establishments, medical buildings, swimming pools, commercial kitchens, etc.)

All of the above final inspections are required prior to:

- Occupancy – building core and shell – by Inspections section, Fire Prevention Division. For Groups A,E,H,I or R, the owner shall request this inspection prior to applying for the certificate of occupancy (before the building final inspection).
- Building final – building core and shell – by the Building Inspections Sections.
- Site work final – building core and shell – by Engineering Section (before the building final inspection).

After all the above items are satisfied the request may be made for the building core and shell certificate of occupancy to the Building Inspections Section.

After Occupancy:

- Occupancy – building core and shell – by Inspections Sections, Fire Prevention Division. For Groups B,F,M,S or U, the owner shall request this inspection within five working days after the certificate of occupancy.
- Occupant load postings – by the Building Inspections Section. The owner shall request occupant load posting documents for common area rooms of assembly within an occupant load of 50 or more, and as otherwise required by the Virginia Construction Code.

1901.1.3 Tenant space final inspections. The certificate of occupancy for a building core and shell is required prior to a certificate of occupancy for any tenant space in a building. A certificate of occupancy for a tenant space may be obtained after tenant space final inspections are approved by the appropriate Town of Herndon organizations:

- For tenant spaces subject to special inspections, the final report of special inspection – by Critical Structures/Building Inspections Section.

- Electrical systems final – tenant space – by Electrical Inspection Section.
- Mechanical systems final – tenant space – by Mechanical Inspection Section.
- Plumbing systems, including cross connections, final – tenant spaces – by Plumbing Inspections Section.
- Elevator final – tenant space – by Elevator Inspection Section and Certificate Approval
- Sprinkler system and fire suppression system finals – tenant space – by Fire Protection Systems Testing Section, Fire Prevention Division.
- Fire alarm system final – tenant space – by Fire Protection Systems Testing Section, Fire Prevention Division.
- Special locking devices final – tenant space – by Fire Protection Systems Testing Section, Fire Prevention Division.
- Health systems final –tenant space – by Department of health Services (as applicable, for health spas, food establishments, medical buildings, swimming pools, commercial kitchens, etc).

All the above final inspections are required prior to:

- Occupancy – tenant space – by Inspections Section, Fire Prevention Division. For Groups A,E,H,I or R, the owner or tenant shall request this inspections prior to applying for the certificate of occupancy (before the building final inspection).
- Building final – tenant space – by the Building Inspections Section.

After all the above items are satisfied, request may be made for the tenant space certificate of occupancy to the Building Inspection Section (see section 1807.1 above).

After occupancy:

- Occupancy – tenant space – by Inspections Section, Fire Prevention Division. For Groups B,F,M,S or U, the owner or tenant shall request this inspection within five working days after the certificate of occupancy.
- Occupant load postings – by the Building Inspections Section. The owner or tenant shall request occupant load posting documents for rooms of assembly with an occupant load of 50 or more, and as otherwise required by the Virginia Construction Code.

APPROVAL FOR GENERAL COMPLIANCE WITH STRUCTURAL CONTRACT DOCUMENTS

☐ Approved	Fabrication may proceed as show
☐ Approved as Corrected	Fabrication may proceed based on corrections indicated
☐ Approved As Corrected Resubmit File Copy	Fabrication may proceed based on correction indicated. Correct Submission and resubmit for record purposes only
☐ Disapproved	Fabrication may not proceed. Correct submissions for further review.
☐ Reviewed for Information	Approval not required. Accepted for information purposes only

Approval is for general compliance with the structural contract documents only. This approval assumes no responsibility for dimension, quantities and conditions that pertain to fabrication and installation or for processes and techniques of construction. The Contractor is responsible for coordination of the work of all trades and the performance of this work in a safe and satisfactory manner.

BY _____

DATE _____

_____

NAME OF COMPANY

APPROVAL FOR DESIGN CONFORMITY

- ☐ Approved
- ☐ Approved As Noted
- ☐ Revise as Noted and Resubmit
- ☐ Rejected/Resubmit as Specified
- ☐ Furnish ( ) Corrected Copies

Notations do not authorize changes to contract sum.

Submittal was reviewed for design conformity and general conformance to contract documents only. The Contractor is responsible for confirming and correlating dimensions as job sites for tolerances, clearances, quantities, fabrication processes and techniques of construction, coordination of his work with other trades and full compliance with contract documents.

BY _____

DATE _____

_____

(Name of Company)

APPROVAL FOR DESIGN CONCEPT

☐	Approved	Final Approval. Fabrication may proceed on work as shown.
☐	Approved As Noted	Fabrication may proceed on the basis of corrections indicated
☐	Disapproved	Fabrication may not proceed. Revisions shall be made and submitted for further review

Approval is only for conformance with the design concept of the project and compliance with the information given in the contract documents. The contractor is responsible for dimensions to be confirmed and correlated at the job sites, for information that pertains solely to the fabrication process or to techniques of construction, and for the coordination of the work of all trades.

BY _____

DATE _____

NAME OF COMPANY _____