DSA 152 INSPECTION CARD MANUAL
A GUIDE FOR COMPLETING THE PROJECT INSPECTION CARD DSA 152

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PREFACE
PREFACE

This manual provides detailed descriptions of documentation and inspection requirements to properly fill in the DSA 152 Project Inspection Card (IC). Proper inspection of construction work is a crucial component in the Division of the State Architect (DSA) certification process that ensures compliance with the DSA approved construction documents. Project inspectors play a significant role in construction inspection. Duties and responsibilities for inspectors and others involved in the construction process for projects under DSA jurisdiction are outlined in California Code of Regulations, Title 24, Part 1. Procedure PR 13-01 provides specific required duties of the project inspector and others with respect to relevant portions of Title 24, Part 1, and the IC. The DSA has also issued IR A-8, which provides further performance requirements of the project inspector. (Additional information regarding construction phase duties for others involved in the construction process is provided in IR A-24.) For projects in which an assistant inspector is deemed necessary, refer to IR A-7 and IR A-12 for additional information and inspector approval requirements.

Construction projects under DSA jurisdiction require constant inspection of construction. To facilitate proper inspection and documentation for DSA construction projects, the DSA requires the use of the IC, similar in nature to many building department building inspection cards. The definitions provided in PR 13-01 apply to this document.

Broadly speaking, building construction inspection entails: 1) building component verification, and 2) building component installation verification, both in accordance with the DSA approved construction documents. Building component verification ensures that the proper specified component is used in construction. Building component installation verification ensures that the specified component is properly installed. These lead to two categorical elements that are required prior to initialing the sections and blocks on the IC for a given building or site:

I. Receipt of documentation for constructed elements, including:
   I.A. Material/structural tests
   I.B. Special inspections or other observations
II. Inspection of items associated with constructed elements.

This document provides a detailed list of those documentation and inspection items based on the different DSA review disciplines of Structural Safety, Fire/Life Safety, and Accessibility. An additional category, Other Building Systems, is also provided, which captures other necessary inspections to ensure proper building functioning. All of these are broken up further into specific inspection areas frequently associated with construction projects under DSA jurisdiction. Based on the particular applicable elements for a given project, all of the applicable documentation items shall be collected and all applicable inspections listed shall be made by the project inspector.
PREFACE
If construction does not comply with the approved construction documents, DSA may issue a Stop Work Order, or similar type of action, to halt work on the construction (IR A-13).

Improper inspection or inspection related documentation can lead to rescinding of a project inspector’s certification (IR A-7).

Authors
This manual was authored and compiled by Ryan Huxley, Senior Structural Engineer, with contributions from Tom Burke, Fire& Life Safety Officer, for the Fire/Life Safety Inspection Items and James Schaible, Senior Architect, for the Access Compliance Inspection Items.

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1 ADMINISTRATION
1.1 Project Inspection Card (IC) Correlation Matrix

The information that follows in the correlation matrix provides a link between the sign-off blocks in the IC and the documentation and inspection items in this manual. Prior to the project inspector initialing any of the IC blocks, the documentation and inspections associated with the topics listed in the correlation matrix must be received and occur, respectively.

The following provides a summary of typical construction components and systems that are associated with each section/block in the IC. While the listing is not comprehensive, it provides a good foundation for understanding of and consistency in the use of the IC.

Section 1 – Initial Site Work and Foundation Prep

Block 1 – Mass Grading:
- Rough Grading of Overall Site
- Cuts/Fills
- Soil Remediation
- Soil Stabilization
- Soil Nails, Tie Backs, Rock/Soil Anchors
- Horizontal/Vertical Controls

Block 2 – Building Pad:
- Soil Preparation Specific to Support of Structures
- Building Pad
- Soil Remediation
- Soil Densification
- Stone Columns

Block 3 – Drainage Devices:
- Storm Water Collection/Distribution systems
- On-Site Retention Systems
- Foundation Drain systems
- Retaining Wall Drain Systems

Block 4 – Utilities:
- FLS Utilities/Systems
- MEP Utilities/Systems
- MEP Vaults
- Thrust Blocks

Block 5 – Excavations:
- Foundation Systems
- Driven Piles

Block 6 – Forms:
- Formwork
- FLS Systems
- MEP Systems
- Waterproofing/Vapor Barrier

Block 7 – Steel Reinforcing:
- Reinforcing (bars, tendons, etc.)
- Embeds
Section 2 - Vertical and Horizontal Framing

Block 8 – Foundation Concrete:
• Verify Foundation Is Compliant
  (concrete 28 day strength, etc.)

Blocks 9 - 12 – Concrete, Masonry Wood, Steel:
• Walls
• Columns
• Frames

Blocks 13 - 15 – Concrete, Wood, Steel:
• Floors
• Roofs

Section 3 – Appurtenances

Block 16 – Ceilings:
• Ceilings
• Soffits
• Suspended Baffles

Block 17 – Exterior Cladding:
• Storefront/Window Walls
• Veneer
• Precast Concrete Panels
• Wall Finishes
  (stucco/plaster/wood/aluminum/etc.)
• Manufactured Systems (EFIS, GRFC, etc.)

Block 18 – Rated Assemblies:
• Walls
• Shafts
• Floors
• Roofs
• Ceilings
• Doors
• Fire Doors
• Windows
• Penetrations
• Dampers
• Fire-Proofing

Block 19 – Fire Alarms:
• Fire/Smoke Alarm System (includes support, anchorage, bracing, etc.)

Block 20 – Automatic Fire Suppression Systems:
• Sprinklers
• Chemical
• Deluge
• Water Curtains
• Extinguishers
• Support/Bracing/Anchorag of AFSS
Block 21 – MEP (Structural):
Support/Bracing/Anchorage for:
• MEP
• Equipment
• HVAC System
• Ducts
• Electrical
• Pendant Lights
• Transformers
• Switch Gears
• IDF/MDF/etc.
• Pipes
• Tanks

Block 22 – MEP (FLS):
• MEP Fire Suppression Systems (smoke and fire dampers)
• Kitchen Hoods
• Laboratory Hoods
• Dust Collection Systems
• Smoke Control Systems

Section 4 – Finish Site Work and Other Work

Block 23 – Fine Grading:
• Finish Grades
• Grading for Accessible POT System
• Grading for Run-off (drainage)

Block 24 – Flatwork:
Accessible Path of Travel Systems such as:
• Stairs
• Ramps
• Walks
• Gates

Block 25 – Parking:
• Drop-off
• Accessible parking
• Stripping
• Signage
• Truncated Domes

Block 26 – Fire Lane:
• Fire Lane

Block 27 – Other Work Structural:
Support/Bracing/Anchorage for:
• Theater Systems (stage rigging, catwalks, speaker, lighting, curtains, etc...)
• Non-bearing partitions
• Operable partitions
• Casework
• Stairs
• Elevators
• Weather Protection

Block 28 – Other Work Fire Life Safety:
• Egress Components
• Doors
• Gates
• Emergency Lighting
• Building Signage
• Site Signage
• Elevators
• Hazardous Materials
Block 29 – Other Work Accessibility:

- Building Signage
- Site Signage
- Drinking Fountains
- Accessible POT Systems
- Stairs
- Ramps
- Walks
- Doors
- Gates
- Elevator
- Specialty Areas (restrooms, kitchens, casework, etc…)

Note that due to the nature of the items listed in the correlation matrix and extent over which they apply during construction, some items occur in multiple locations in the matrix. For example, in a concrete building, some of the same concrete sections in this manual apply to the foundation as well as the vertical and horizontal framing. In each case, while the type of documentation and inspections are similar, they are particular to the specific stage of construction occurring.

For projects consisting of large buildings with multiple phases, some method of acknowledgement for incremental inspection verification at certain locations within the building may be necessary, even though construction is not yet complete. How this is accomplished is left to the agreements made between individuals involved with the construction, observation, and inspection of the project. One possible method to address this issue is to use a copy of the approved construction documents for identification of specific areas that have been inspected, thereby allowing construction to progress in desired areas. It is important to note that the IC should not be initialed until all construction associated with a particular inspection item is complete.

There are abbreviations used in the correlation matrix, which are described below:

Comp. Cat.: Compliance Category
A: Administration
SS: Structural Safety Inspection Items
FLS: Fire/Life Safety Inspection Items
ACS: Access Compliance Inspection Items
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| 1       | | ACS | - |
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**ADMINISTRATION**

**DIVISION OF THE STATE ARCHITECT**

**DEPARTMENT OF GENERAL SERVICES**

**STATE OF CALIFORNIA**

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Table 1-1: Project Inspection Card Correlation Matrix
1.2 Jobsite Documents

There are many documents that must be present at the jobsite during construction. The next several subsections provide a brief list of those documents that must be on site during the construction process.

1.2.1 Required Prior to Construction

Prior to commencement of construction work, there are several items that the inspector must have in his or her possession at the jobsite. The items below must be present at the jobsite throughout construction.

I. DSA approved construction documents:
   I.A. Drawings/Plans
   I.B. Specifications
   I.C. Addenda/Revisions
   I.D. DSA 103 Statement of Structural Tests and Special Inspections Form (Refer to IR 17-4 for additional clarification of structural testing and special inspection. Refer to APPENDIX A – DSA 103 CORRELATION MATRIX on page 268 for a correlation matrix identifying the different items in the DSA 103 with the corresponding section in this manual.)
   I.E. DSA Documents Required List
   I.F. Product Data Sheets for various equipment and components. There are exceptions for products and components that are installed after primary and/or secondary framing is in place; all product data sheets must be received prior to product installation.

II. DSA 102-IC Construction Start Notice/Inspection Card Request

III. DSA 152 Project Inspection Card

IV. 1.2.4 Codes and Referenced Standards – Refer to page 38 for required referenced standards.

1.2.2 Required During Construction

Once construction has begun, there are documents that must present at the jobsite at all times once they have been issued. “DSA approved construction document” items listed below must be obtained prior to commencing construction for those items.

I. Material/Structural Test Documentation:
   I.A. Verify laboratory of record providing material/structural testing is accepted by DSA to provide such services. (See https://www.apps.dgs.ca.gov/tracker/ApprovedLabs.aspx for a list of DSA approved testing laboratories.)
I.B. Test reports indicate if tests performed show compliance with requirements given in the DSA construction documents. While there is no required format for test reports (suggested formats can be found in the following forms based on the type of material and structural test performed), the information noted in these shall be provided (refer to APPENDIX B – REFERENCED DSA FORMS on page 313 or http://www.dgs.ca.gov/dsa/Forms.aspx for these forms):

I.B.1. DSA 201: Soil Compaction
I.B.2. DSA 202: Sieve Analysis
I.B.3. DSA 203: Tension/Bend
I.B.4. DSA 204: Compression
I.B.5. DSA 205: Concrete Masonry Unit
I.B.6. DSA 206: Anchor Load
I.B.7. DSA 207: Masonry Core Shear/Compression
I.B.8. DSA 208: High Strength Bolt
I.B.9. DSA 209: Fireproofing Density
I.B.10. DSA 210: Ultrasonic (NDT)
I.B.11. DSA 211: Additional Comments

I.C. For additional information on structural testing, refer to the following IRs (additional information related to some of these IRs and others not shown will be provided later in this document at appropriate locations):

I.C.1. IR A-15: Testing and Inspection of Remotely Fabricated Structural Elements
I.C.2. IR 17-1: Sampling and Testing of Structural Materials
I.C.3. IR 17-2: Nondestructive Testing
I.C.4. IR 17-4: Basics of Structural Tests and Special Inspections
I.C.5. IR 17-5: Structural Testing Laboratory Responsibilities
I.C.6. IR 17-7: Soils and Foundations Testing and Inspection
I.C.7. IR 17-8: Sampling and Testing of High Strength Bolts, Nuts, and Washers
I.C.8. IR 17-10: Sampling, Testing and Tagging of Reinforcing Bars

II. Special Inspection Documentation:

II.A. Verify current certification for all special inspectors working on the jobsite prior to commencing construction that requires special inspection.

II.A.1. Concrete:

II.A.1.1. Verify ACI certification for shotcrete. (See https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?id=10 for a list of DSA approved shotcrete special inspectors.)

II.A.2. Masonry:

II.A.2.1. Verify certification for masonry special inspectors. (See https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?id=04 for a list of DSA approved masonry special inspectors.)

II.A.3. Wood:

II.A.3.1. Verify certification for glulam special inspectors. (See https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?id=02 for a list of DSA approved glulam special inspectors.)

II.A.4. Steel:
II.A.4.1. Verify Structural Steel and Bolting ICC certification (S1) (refer to IR 17-9 for additional information).

II.A.4.2. Verify American Welding Society (AWS) certified welding inspector (CWI) or senior certified welding inspector (SCWI) for welding inspectors (welding certification can be verified by going to http://www.aws.org/wa/certification/search.html).

II.A.4.2.1. AWS-CAWI (Certified Associate Welding Inspector) is not acceptable – AWS-CWI is the minimum requirement.

II.A.5. In-Plant constructed items:

II.A.5.1. Verify certification for in-plant inspectors. (See https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?id=03 for a list of DSA approved in-plant inspectors.)

II.B. Verify special inspectors have a copy of the appropriate portion of the DSA approved construction documents. (Note: While shop drawings are often used for fabrication, if any conflicts or uncertainties occur, the DSA approved construction documents govern, not the design professional reviewed shop drawings.)

II.C. Special inspection reports:

II.C.1. While DSA does not have a required format, certain pieces of information are required. Refer to DSA 250: Special Inspection Report for a suggested general format and required content (refer to APPENDIX B – REFERENCED DSA FORMS on page 313 for forms). While special inspections are provided by the special inspectors, oversight and verification of such inspections by the project inspector is required. The project inspector must become familiar with the required testing and special inspection program for the project. For additional information regarding special inspector duties and responsibilities, refer to IR 17-6: Structural Special Inspector Duties and Responsibilities.

III. Project Inspector Documents

III.A. In addition to the items noted above and below, the project inspector must also keep a job file containing various documents at the jobsite. Refer to IR A-8 and PR 13-01 for additional information.

III.B. Project Inspector Notifications (see DSA 151)

III.C. Refer to 1.2.2.3 Notice of Deviations/Resolution of Deviations on page 36 (see DSA 154).

III.D. Completed semi-monthly reports (see DSA 155).

III.E. Additional documents required when the project inspector performs any special inspections or aspects of structural testing:

III.E.1. Special Inspection:

III.E.1.1. The DSA 103 form provides direction for which special inspections shall be performed by the project inspector or special inspector. It is permitted for the project inspector to provide special inspection if they have prior written approval by DSA. (Refer to 1.2.3 Required After Construction Completion below for additional required documentation related to special inspections performed by the project inspector.)
III.E.2. Structural Testing:

III.E.2.1. For a minor scope of work, if the project inspector provides any sampling, protection, handling, transporting, and/or storage of test specimens for the project (note: prior written permission by the DSA Field Engineer is required), such tasks must be specifically identified on the DSA 6-PI form. (See IR 17-1 for additional information.)

IV. Other Documents

IV.A. Contractor submittals (e.g. construction schedules, design professional approved shop drawings, certificates, product labels, concrete trip tickets, etc.).

IV.A.1. Notification to Project Inspector for the completion of construction at appropriate phases of construction consistent with DSA 152 sections and as indicated in PR 13-01 (see DSA 156).

IV.B. Refer to the following for additional information:

IV.B.1. 1.2.2.1 Deferred Submittals on page 35
IV.B.2. 1.2.2.2 Construction Change Documents, Type A on page 35
IV.B.3. 1.2.2.4 Interim Verified Reports on page 36.

IV.C. Proprietary Product Documents

IV.C.1. Refer to 1.3 Proprietary Products on page 40 for additional information.

V. Depending on the nature of the construction work, portions of the work may be complete and documents associated with construction completion may be required even though overall construction is ongoing. Refer to 1.2.3 Required After Construction Completion on page 37 for additional information.

1.2.2.1 Deferred Submittals

A deferred submittal (DS) represents a portion of the construction that cannot be fully detailed on the originally approved drawings because of variations in product design and manufacture. Approval of plans for such a portion may be deferred until the material suppliers are selected. All DS documents are listed on the DSA approved drawings. Any modifications to the approved list of DS documents must be reviewed and approved by DSA prior to commencing construction.

1.2.2.2 Construction Change Documents, Type A

In November 2012, a significant change occurred in the requirements for submitting and approving construction changes to DSA approved projects. (Refer to IR A-6 and bulletin BU 12-03 for additional information.)

After a contract for the work has been let, changes to the approved construction documents shall be made by means of Construction Change Documents (CCD). It is the responsibility of the design professional in general responsible charge to determine if changes affect the Structural, Access or Fire & Life Safety portions of the project. The CCD process replaces the
need to submit change orders. Thus for projects subject to the CCD process, change orders are not required to be submitted to DSA.

Changes to or affecting the Structural, Access or Fire-Life Safety Portions of the Project:

- These changes shall be classified as CCD Category A.
- CCD Category A are required to be submitted to and approved by the DSA prior to commencement of the affected work.
- CCD Category A must be submitted to the DSA using the CCD Category A form, DSA 140.

Changes not affecting the Structural Safety, Access Compliance or Fire & Life Safety portions are classified as CCD Category B. These are not required to be submitted to the DSA unless specifically required, in writing, by DSA.

1.2.2.3 Notice of Deviations/Resolution of Deviations

When the Project Inspector or DSA district field engineer identifies deviations from the DSA approved construction documents the inspector must verbally notify the contractor. (Deviations include both construction deviations and material deficiencies.) If the deviation is not immediately corrected, the inspector is required to promptly issue a written notice of deviation to the contractor, with a copy sent to the responsible design professional(s) and the DSA on form DSA 154. Deviations must be resolved prior to commencement of work that will cover up the deviant work.

When the noticed deviation is corrected, the inspector is required to promptly issue a written notice of resolution to the contractor, with a copy sent to the responsible design professional(s) and the DSA. The notice of resolution of deviations must be made using the original form DSA 154 that reported the deviation.

1.2.2.4 Interim Verified Reports

Prior to the Project Inspector intialing some blocks and any section of the Inspection Card (Form DSA 152), Interim Verified Reports (IVR) are required noted in PR 13-01 and as follows:

I. Interim Verified Reports (IVR)

   I.A. Architect/Engineer IVR (form DSA 6-AE):
       I.A.1. Architect IVR is required for all sections.
       I.A.2. Structural, electrical, mechanical engineers IVR required for any sections containing work for which, in the plans, the engineer has affixed his/her seal (stamped).
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I.B. Geotechnical engineer IVR (form DSA 293):
   I.B.1. Geotechnical engineer IVR is required for any block and/or section relative to geotechnical work.

I.C. In-plant inspector IVR (form DSA 6-PI)
   I.C.1. For relocatable buildings constructed in the plant and being delivered to the job site, the in-plant inspector IVR (or final verified report) is required for each separate building for any sections affected by the siting of the relocatable buildings.

I.D. Special inspectors IVR (form DSA 292 or DSA 291).
   I.D.1. Special inspectors contracting directly and individually with the school board IVR (form DSA 292) is required for any block or section requiring special inspection work.
   I.D.2. Special inspectors provided by the laboratory of record IVR (form DSA 291) is required for any block or section requiring special inspection work.

I.E. Laboratory of record IVR (form DSA 291).
   I.E.1. Laboratory of record IVR is required for any block and/or section containing required testing.

1.2.3 Required After Construction Completion

Once construction is complete, there are several documents that must be provided to the project inspector, as appropriate.

I. Verified Reports (VR)
   I.A. Architect/Engineer VR (form DSA 6-AE)
   I.B. Contractor VR (form DSA 6-C)
   I.C. Project Inspector VR (form DSA 6-PI)
   I.D. Geotechnical engineer VR (form DSA 293)
   I.E. Laboratory Verified Report (form DSA 291)
      I.E.1. If the project inspector has performed any aspect of structural testing (e.g. sampling, protection, handling, transporting, and/or storage of test specimens) for the project it must be indicated in the DSA 291. Refer to IR 17-1 for additional information.
   I.F. Special Inspection Verified Report (form DSA 292)
      I.F.1. If the project inspector performs any special inspections not specifically assigned to them in the DSA 103, a separate DSA 292 (in addition to the typical DSA 6) is required for those inspections. Refer to IR 17-6 for additional information.
   I.G. Geotechnical Verified Report (form DSA 293)
1.2.4 Codes and Referenced Standards

The following is a partial list of applicable codes that the inspector must have available at the jobsite (many are also available online, such as the 2010 versions at http://publicecodes.cyberregs.com/st/ca/st/CA-P-2010-000008.htm) – refer to the approved construction documents for the applicable codes and reference standards:

I. Codes:
   I.A. 2013 Versions:
   I.A.1. 2013 Building Standards Administrative Code, Part 1, Title 24 C.C.R.
   I.B. 2010 Versions:
   I.B.1. 2010 Building Standards Administrative Code, Part 1, Title 24 C.C.R.
   I.B.2. 2010 California Building Code (CBC), Part 2, Title 24 C.C.R.
   I.B.3. 2010 California Electrical Code (CEC), Part 3, Title 24 C.C.R.
   I.B.4. 2010 California Mechanical Code (CMC) Part 4, Title 24 C.C.R.
   I.B.5. 2010 California Plumbing Code (CPC), Part 5, Title 24 C.C.R.
   I.B.6. 2010 California Energy Code (CEC), Part 6, Title 24 C.C.R.

The following is a list of codes and standards that the project inspector should have access to if needed for the project:

I. Codes:
   I.A. 2010 Versions:
   I.A.1. 2010 California Fire Code, Part 9, Title 24 C.C.R.
   I.A.2. 2010 California Green Building Standards Code (CALGreen), Part 11, Title 24 C.C.R.
   I.A.3. 2010 California Referenced Standards, Part 12, Title 24 C.C.R.

II. Standards
   II.A. NFPA (these standards are available online for reading only, but do require a free registration: http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp; frequently the CBC amends portions of the NFPA standards referenced below – for example, refer to 2010 CBC (SFM) Chapter 35 where noted below; additional reference standards will be referenced later in this manual at appropriate locations):
   II.A.1. 2010 Versions:
   II.A.1.1. 2010 NFPA 13 Automatic Sprinkler Systems (CA Amended)
   II.A.1.2. 2007 NFPA 14 Standpipe Systems (CA Amended)
   II.A.1.3. 2002 NFPA 17A Wet Chemical Systems
   II.A.1.4. 2007 NFPA 20 Stationary Pumps
   II.A.1.5. 2010 NFPA 24 Private Fire Mains (CA Amended)
   II.A.1.6. 2010 NFPA 72 National Fire Alarm Code (CA Amended)
   II.A.1.7. 2007 NFPA 80 Fire Door and Other Opening Protectives
II.A.1.8. 2008 NFPA 2001 Clean Agent Fire Extinguishing Systems (CA Amended)
II.B. Structural Standards will be referenced in applicable sections later in this document.

It is important to note that with the publication of the 2010 CBC, unlike kindergarten through twelfth grade projects, Community Colleges now have an option for which chapters of the building code will be the basis of design for a given project. These are primarily related to structural items and, thus, will be discussed further in the Structural Safety Items portion of this manual.
1.3 Proprietary Products

Frequently, proprietary products and assemblies are specified for use on projects. These may have an International Code Council Evaluation Service (ICC ES), Underwriters Laboratory, Factory Mutual (FM) or some other recognized agency report which may provide proper use and installation requirements. (Refer to IRC A-5, section 3 for a listing of DSA recognized agencies beyond those listed here.) Each of these recognized product testing groups provide information on the reports noted, which are listed below:

- **ICC ES**

- **UL**
  - Quick guide on using their searchable listing database: [http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/quickguide.html](http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/quickguide.html)
  - Interactive listing lookup: [http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.html](http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.html)

- **FM**

When such products are used, the following documentation and inspection items apply.

**I. Receipt of documentation for constructed elements**

- **I.A.** When applicable, receipt of design professional approved shop drawings.
- **I.B.** When applicable, receipt of special inspection documentation for product fabrication.
- **I.C.** Products with an ICC ES report:
  - **I.C.1.** ICC ES report for the product.
  - **I.C.2.** Manufacturer’s product installation manual.
  - **I.C.3.** Product identification is per the ICC ES report (refer to Section 3 and 7 of the report).
  - **I.C.4.** The intended end use and any special conditions for the products must comply with the ICC ES report (refer to Section 2 and 5 in the ICC ES report).
- **I.D.** Products or assemblies with an UL listing:
  - **I.D.1.** If information is not contained on the contract documents, obtain information from the supplier or from the online UL directory previously noted.
- **I.E.** Products or assemblies approved by FM:
I.E.1. If information is not contained on the contract documents, obtain information from the supplier or from the online FM Approval Guide previously noted.

I.F. Products or assemblies approved by other DSA recognized agencies

I.F.1. If information is not contained in the contract documents, obtain information from the supplier or from the referenced report.

II. Inspection of the following items:

II.A. Proprietary Products:

II.A.1. Confirm product complies with approved construction documents.

II.A.2. Proper storage and care for product.

II.A.3. Products with an ICC ES report:

II.A.3.1. Product used complies with the manufacturer’s and ICC ES report installation guidelines (refer to Section 4 and 5 of the ICC ES report). Where conflicts occur, the ICC ES report governs (refer to Section 5 in the ICC ES report).

II.A.3.1.1. Surrounding construction complies with requirements (i.e. ICC ES reports frequently indicate minimum member, fastener, and/or material requirements for products attached to the structure).

II.A.4. Products or assemblies with an UL listing:

II.A.4.1. Product used complies with UL listing requirements and be installed as indicated in the listing.

II.A.4.1.1. Surrounding construction complies with requirements (i.e. UL listings frequently indicate minimum member, fastener, and/or material requirements for products attached to the structure).

II.A.5. Products or assemblies approved by FM:

II.A.5.1. Product used complies with FM listing requirements and be installed as indicated in the listing.

II.A.6. Products or assemblies approved by other DSA recognized agencies:

II.A.6.1. Product used complies with referenced report requirements and be installed as indicated in the report.
1.4 DSA Links

Throughout this document will be many links to DSA documents. The list below provides links to the main page for each item.

  - DSA Bulletins: [http://www.dgs.ca.gov/dsa/Resources/pubs.aspx#bulletins](http://www.dgs.ca.gov/dsa/Resources/pubs.aspx#bulletins)
  - DSA Policies: [http://www.dgs.ca.gov/dsa/Resources/pubs.aspx#policies](http://www.dgs.ca.gov/dsa/Resources/pubs.aspx#policies)
- DSA Forms: [http://www.dgs.ca.gov/dsa/Forms.aspx](http://www.dgs.ca.gov/dsa/Forms.aspx)
- DSA Fire / Life Safety page: [http://www.dgs.ca.gov/dsa/Programs/progProject/planreview/fls.aspx](http://www.dgs.ca.gov/dsa/Programs/progProject/planreview/fls.aspx)
- DSA Access Compliance page: [http://www.dgs.ca.gov/dsa/Programs/progAccess.aspx](http://www.dgs.ca.gov/dsa/Programs/progAccess.aspx)
- DSA Certified Inspectors page: [http://www.dgs.ca.gov/dsa/Programs/programCert/inspector.aspx](http://www.dgs.ca.gov/dsa/Programs/programCert/inspector.aspx)
2 STRUCTURAL SAFETY INSPECTION ITEMS
STRUCTURAL SAFETY INSPECTION ITEMS

Since the passage of the Field Act in 1933, structural safety, with a seismic emphasis, has been a primary concern in public school construction. The Division of the State Architect has been charged with providing regulatory authority of public school and other state interest building construction projects. A key component of the Field Act is construction oversight and continuous inspection. Seismic performance of buildings constructed under the Field Act requirements is often markedly better than those buildings not governed by it. One of the reasons cited for this better performance has been the continuous inspection provided for such projects. It is in this particular way that project inspectors play a key role.

Another item noted for better performance was the additional and, frequently, more restrictive building code requirements applicable to projects under DSA jurisdiction. With the development of building codes over time, many of those restrictions have eventually been adopted by model building codes.

As noted in the ADMINISTRATION portion of this manual, Community College projects have an option for which building code chapters apply to a particular project. The approved construction documents will indicate which of the building code options were used. Those options are listed below:

- Compliance with the DSA-SS (regular) provisions of the Field Act per Chapters 16A, 19A, 20, 21A, 22A and 23, or
- Compliance with the DSA-SS/CC provisions specifically developed for Community Colleges per Chapters 16, 19, 21, 22, and 23.

Note that Chapter 17A and 18A and Title 24, Part 1 apply to both DSA-SS and DSA-SS/CC projects. For the DSA-SS/CC adoption, all amendments are grouped in new sections at the end of Chapters 16, 19, 21, and 22. For other chapters, college amendments are identified by the [DSA-SS/CC] banner.
2.1 Soils

In addition to the California Building Code, classification and testing of site soils are generally governed by several referenced standards issued by the American Society for Testing and Materials, International (ASTM; see http://www.astm.org). The primary references for classification and testing requirements are:

- Standard Test Method for Particle Size Analysis of Soils, ASTM D422
- Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft lbf/ft$^3$ (2,700 kN m/m$^3$)), ASTM D1557
- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), ASTM D2487
- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), ASTM D4318
- Standard Test Method for Expansion Index of Soils, ASTM D4829

Depending on the scope of a given project, testing of soils is necessary for various portions of construction associated with the site soils. When such testing is necessary as dictated by the construction documents, certain information must be included, depending on the type of test that is being performed. While there are no format requirements, DSA 201: Soil Compaction and DSA 202: Sieve Analysis provide a suggested format (see APPENDIX B – REFERENCED DSA FORMS on page 313 for forms).

While site soils inspections are generally covered by the geotechnical engineer or their representative, oversight and verification by the project inspector of several broad categorical items are important. As noted previously, the project inspector must become familiar with the required testing and special inspection program for the project site and building soils related work.

2.1.1 Grading

There are many items that must be inspected during the grading phase of a project. Those are listed below based on their applicability to site work and building work.

2.1.1.1 Site

I. Receipt of documentation for constructed elements:
   I.A. Receipt of project soils report, when part of the approved construction documents.
STRUCTURAL SAFETY INSPECTION ITEMS

I.B. Material/Structural Test Documentation:

I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed (by DSA approved laboratory) and/or daily special inspection reports and/or grading report:

I.B.1.1. Approval of qualification testing of fill materials.
I.B.1.2. Acceptance of fill materials used at site.
I.B.1.2.1. Where controlled low strength material (CLSM) is used as controlled fill, refer to IR 18-1.
I.B.1.3. Compaction approval of soil.
I.B.1.4. Materials below footings are adequate to achieve the design bearing capacity. (NOTE: This may not occur until after foundation excavations have occurred.)

I.B.2. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation:

I.C.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report (refer to IR 17-7 for additional information regarding geotechnical engineer responsibilities and progress report requirements):

I.C.1.1. Proper Site Preparation:

I.C.1.1.1. Clearing of all hazardous materials, such as:
  I.C.1.1.1.1 Asbestos
  I.C.1.1.1.2 Lead
  I.C.1.1.1.3 Serpentine Rock
  I.C.1.1.1.4 Gaseous Contaminated Items
I.C.1.1.2. Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations.
  I.C.1.1.2.1 Drainage Devices
  I.C.1.1.2.2 Shoring
I.C.1.1.3. Foundation excavations extend to proper depth and have reached proper material.
I.C.1.1.4. Specified elevations achieved

I.C.1.2. Compaction Report - The geotechnical engineer or their qualified representative shall indicate the following:

I.C.1.2.1. Use of proper:
  I.C.1.2.1.1 Fill Materials
  I.C.1.2.1.2 Lift Thicknesses
  I.C.1.2.1.3 Placement
  I.C.1.2.1.4 Compaction

I.C.1.2.2. Approval of compaction test of fill.

I.C.2. Upon completion of the site grading, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.
STRUCTURAL SAFETY INSPECTION ITEMS

II. Inspection of the following items:

II.A. Note water table elevation, if observable.

II.B. Note condition (photograph, videotape, digital camera recommended) of off-site and on-site improvements to remain, such as paving, curbs, gutters, and walks before work begins.

II.C. Proper site preparation:

II.C.1. Job survey is reviewed.
   II.C.1.1. Monuments and stakes are located.
   II.C.1.2. Limits of work are established.
   II.C.1.3. Job surveyor is on-site as specified.
   II.C.1.3.1. Verify whether owner or contractor supplied surveyor.
   II.C.1.3.2. Verify scope of survey work (building lines, elevations, pad certification, etc.).

II.C.2. Removal of hazardous materials (see subsection I.C.1.1.1 above for further information).

II.C.3. Stripping of site, preservation and depth of removal of topsoil and location of stockpile are established.
   II.C.3.1. Observe that topsoil is not contaminated with subsoil and is free from roots, stones and other deleterious materials per requirements.
   II.C.3.1.1. Check that satisfactory materials are used and unsuitable materials are disposed of in waste areas. Do not allow contamination.

II.C.4. Observe removal of material and note unusual conditions.
   II.C.4.1. Subsoil conditions are observed for irregularities such as soft spots, springs, previous debris, etc.

II.C.5. Existing Items

II.C.5.1. Adjacent Property
   II.C.5.1.1. Adjacent property is protected.
   II.C.5.1.2. Verify whether adjacent property owner is notified as required by work or code.
   II.C.5.1.3. Shoring and underpinning is provided as specified.

II.C.5.2. Removal of any existing buildings and foundations.

II.C.5.3. Existing Vegetation
   II.C.5.3.1. Any existing vegetation identified to remain is protected.
   II.C.5.3.1.1 Spillage of ash, oil, slurry, etc., is prevented in areas to be planted or near existing vegetation to be retained.
   II.C.5.3.2. Extent of grubbing and removal of stumps and matted roots is performed as shown.
   II.C.5.3.2.1 Depressions are properly filled and compacted.

II.C.5.4. Existing utility lines to remain are located, staked, and protected.
   II.C.5.4.1. Observe conditions of uncovered lines.
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.5.4.2. Verify that utility companies and U.S.A. (Underground Service Alert) have been notified.
II.C.5.4.3. All lines to be removed or abandoned are properly capped.
II.C.5.4.4. If unknown lines are encountered, notify architect of the existing lines.

II.C.6. Excavations
II.C.6.1. Excavation does not cause unusual rutting and appears adequate for work to be performed.
II.C.6.1.1. Corrective measures are performed where overexcavation occurs.
II.C.6.1.2. Drainage is provided continuously as excavation progresses.
   II.C.6.1.2.1 Other de-watering methods such as well points are provided.
   II.C.6.1.2.2 Drainage ditches are maintained.
   II.C.6.1.2.3 Ponding does not occur.

II.C.7. Fill materials and placement (any special conditions, such as requirements in flood zones, lime treatment, soil densification, etc.).
II.C.7.1. Verify special inspector or geotechnical representative has either a sand cone (see Figure 2-1) or nuclear density gage (see Figure 2-2) for compaction testing.

II.C.8. Specified elevations and slopes achieved.

![ASTM D1556](image-url)
II.C.9. Best Management Practice
   II.C.9.1. Contractor provides public safety methods such as protective
            comers, fences, barricades, lighting, warning devices, sins, etc.,
            as required.
   II.C.9.2. Verify that erosion control measures are implemented in
            accordance with approved plans.
   II.C.9.3. Dust control is provided as required.
   II.C.9.4. Deleterious material is removed from site and/or otherwise
            disposed of properly.
   II.C.9.5. Spillage of materials or soil on streets and sidewalks is promptly
            removed for public safety.
II.C.10. Preservation of monuments and markers is observed.
   II.C.10.1. Record survey of site is performed if required.

2.1.1.2 Building Pad

I. Receipt of documentation for constructed elements:
   I.A. Receipt of project soils report, when part of the approved construction documents.
   I.B. Material/Structural Test Documentation:
      I.B.1. Refer to 2.1.1.1 Site on page 45 for documentation requirements.
   I.C. Special Inspection Documentation
      I.C.1.1. Refer to to 2.1.1.1 Site on page 45 for documentation requirements.

II. Inspection of the following items:
   II.A. Removal of hazardous materials (see I.C.1.1 Proper Site Preparation: above for
         further information)
   II.B. Proper site preparation
      II.B.1. Building layout is properly established
      II.B.1.1. Set-backs are observed
      II.B.1.2. Batterboards and elevations are established.
      II.B.2. Compacted material extends beyond foundation line as required.
II.B.3. Excavations
   II.B.3.1. Foundation excavation has adequate bracing, form clearances, type of soil, etc.
   II.B.3.1.1. Corrective measures are performed where over-excavation occurs.
   II.B.3.2. Footing beds are not disturbed or softened.
   II.B.3.3. Drainage
   II.B.3.4. Observe methods of de-watering foundation excavations.
   II.B.3.5. Methods for surface drainage are provided.
II.B.4. Fill materials and placement
II.B.5. Soil Poisoning, performed if required, uses approved method and materials.
II.B.6. Presence of specified:
   II.B.6.1. Dampproofing
   II.B.6.2. Waterproofing
   II.B.6.3. Drainage devices
   II.B.6.4. Dampproof/Waterproof membranes are protected against damage during backfilling operations.

2.1.1.3 Underground Utilities

In addition to the items noted below, refer to the following sections for documentation and inspection requirements associated with underground utilities construction work:

- 2.1.1.1 Site on page 45.
- 2.1.1.2 Building Pad on page 49.
- 3.3.2 Automatic Fire Suppression Systems, subsection II.A on page 188.
- 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236.

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed (by DSA approved laboratory) and/or daily special inspection reports and/or grading report:
         I.A.1.1. Approval of qualification testing of fill materials.
         I.A.1.2. Acceptance of fill materials used at site.
            I.A.1.2.1. Where controlled low strength material (CLSM) is used as controlled fill, refer to IR 18-1.
         I.A.1.3. Compaction approval of soil.
   I.B. Special Inspection Documentation:
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.1. Compaction Report - The geotechnical engineer or their qualified representative shall indicate the following:
   I.B.1.1. Use of proper:
      I.B.1.1.1. Fill Materials
      I.B.1.1.2. Lift Thicknesses
      I.B.1.1.3. Placement
      I.B.1.1.4. Compaction
      I.B.1.2. Approval of compaction test of fill.
   I.B.2. Upon completion of backfilling of the utility trenches, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.

II. Inspection of the following items:

II.A. Specified placement restrictions when adjacent to or through a footing for underground utilities (see Figure 2-3 for an example of improper trench placement - it is too close to the column footing and undermines it; refer to Figure 2-4 for an example of commonly specified requirements for pipes and trenches adjacent to and through footings):
   II.A.1. Pipes
   II.A.2. Conduits
   II.A.3. Trenches

II.B. Underground utility systems
STRUCTURAL SAFETY INSPECTION ITEMS

II.B.1. Mechanical
   II.B.1.1. Heating
   II.B.1.2. Air Conditioning
   II.B.1.3. Refrigeration

II.B.2. Plumbing
   II.B.2.1. Thrust blocks per requirements.
   II.B.2.2. Water
   II.B.2.3. Soil/Waste/Sewer
   II.B.2.4. Storm Drain
   II.B.2.5. Methane
   II.B.2.6. Gas

II.B.3. Fire Sprinklers
   II.B.3.1. Thrust blocks per requirements.
   II.B.3.2. Underground Hydro
   II.B.3.3. Underground Flush

II.B.4. Electrical:
   II.B.4.1. Cables
   II.B.4.2. Conduits
   II.B.4.3. Grounding

II.B.5. All underground systems are in place and properly stubbed.
   II.B.5.1. At building locations, stub-outs at grade are at appropriate height above finish floor elevation to ensure proper coupling after foundation and floor placement.
   II.B.5.1.1. Exposed conduit should be installed so that bent portion will not extend above floor level.
   II.B.5.1.2. Future Work
      II.B.5.1.2.1 Stub-Ups
      II.B.5.1.2.2 Sleeves

2.1.2 Soil Remediation

Similar to the Grading section, the majority of the documentation and inspection items frequently defer to the geotechnical engineer. Therefore, refer to 2.1.1 Grading on page 45 for applicable items that may be associated with soil remediation efforts. In addition to those applicable items, for all soil remediation efforts, the following information applies:

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:
STRUCTURAL SAFETY INSPECTION ITEMS

I.A.1.1. Any testing specified in the approved construction documents based on the soil remediation method used.

I.B. Special Inspection Documentation:
   I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:
   I.B.1.1. Any special inspections specified in the approved construction documents based on the soil remediation method used.

II. Inspection of the following items:
   II.A. Observe the required testing and special inspection.

2.1.2.1 Clay

In addition to the above noted items, the following applies specifically to remediation of clay soils:

I. Inspection of the following items:
   I.A. Specified clay remediation must occur per the approved construction documents, which may include one or more of the following (this is not an exhaustive list):
   I.A.1. Chemical treatment (e.g. lime treatment, etc.).
   I.A.2. Overexcavation, replacement fill and compaction.

2.1.2.2 Soil Densification

In addition to the above noted items, the following applies specifically to soil densification:

I. Inspection of the following items:
   I.A. Specified soil densification must occur per the approved construction documents which may include one or more of the following (this is not an exhaustive list):
   I.A.1. Overexcavation, replacement fill and compaction.
   I.A.2. Special compaction or densification methods (e.g. dynamic, pressure grouting, etc.).

2.1.2.3 Stone Columns

2.1.3 Earth Retaining Structures

Depending on the type of earth retaining structure, there are certain inspections or documents that must be obtained prior to backfilling. Following is a list of the items requiring inspection based on the type of earth retaining structure.
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2.1.3.1 Segmental Retaining Walls

In addition to the approved construction documents, refer to IR 16-3 for documentation and inspection requirements.

Prior to placing first unit, the following must occur:

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Tests Documentation:
      I.A.1. Units
         I.A.1.1. Manufacturer’s certification letter must include the following:
            I.A.1.1.1. Manufacturer’s name and address
            I.A.1.1.2. Product name
            I.A.1.1.3. Unit Type
            I.A.1.1.4. Lab test reports for the following:
               I.A.1.1.4.1 Compressive Strength
               I.A.1.1.4.2 Absorption
         I.A.2. Soil reinforcement (geogrid)
            I.A.2.1. Manufacturer’s certification letter includes the following:
               I.A.2.1.1. Manufacturer’s name and address
               I.A.2.1.2. Product name
               I.A.2.1.3. Product designation meeting the requirements of the project’s design
               I.A.2.1.4. Roll number
               I.A.2.1.5. Identification procedures
               I.A.2.1.6. Sampling procedures
               I.A.2.1.7. Lab test results of quality control tests for each batch of resin and each shift’s production used
                  I.A.2.1.7.1 Flexural Rigidity
                  I.A.2.1.7.2 Tensile Strength
                  I.A.2.1.7.3 Modulus
                  I.A.2.1.7.4 Junction Strength
      I.A.3. Fill/Backfill Materials
         I.A.3.1. Reinforced Fill
         I.A.3.2. Retained Fill
         I.A.3.3. Drainage Fill
         I.A.3.4. Foundation Fill
         I.A.3.5. For all fill/backfill, lab reports include the following information at a minimum frequency dictated by the maximum of IR 16-3, part 6.3 or as directed by the geotechnical engineer:
            I.A.3.5.1. Soil Type
            I.A.3.5.2. Soil Classification
            I.A.3.5.3. Moisture Content
            I.A.3.5.4. Density
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I.A.3.5.5. Compaction
I.A.3.5.6. Shear Strength
I.A.3.5.7. Gradation

I.A.4. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.B. Special Inspection Documentation:
I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports:
I.B.1.1. Proper site preparation
I.B.1.1.1. Excavations
I.B.1.1.2. Subgrade
I.B.1.1.3. Leveling pad
I.B.1.1.4. Drainage pipes/devices
I.B.1.1.5. Front & Back Slope conditions
I.B.1.2. Proper units
I.B.1.2.1. Type and Identification
I.B.1.2.2. Manufacturer’s Certification
I.B.1.3. Proper soil reinforcement (geogrid)
I.B.1.3.1. Type and Identification
I.B.1.3.2. Manufacturer’s Certification:

II. Inspection of the following items:
II.A. Proper storage and damage prevention of the following, per approved construction documents:
II.A.1. Units
II.A.2. Geogrid
II.B. Minimum horizontal setback distance from building foundation to the anticipated location of the back of the units.

Prior to backfilling or lift installation for each subsequent run, the following must occur:

I. Receipt of documentation for constructed elements:
I.A. Refer to I.A Material/Structural Tests Documentation: above on page 54 for documentation requirements
I.B. Special Inspection Documentation:
I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports:
I.B.1.1. Units
I.B.1.1.1. First course requirements:
I.B.1.1.1.1 Unit type
I.B.1.1.1.2 Alignment
I.B.1.1.1.3 Inclination
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I.B.1.1.1.4 Leveling of leveling pad for intimate contact with units and aggregate.

I.B.1.1.2. Remaining courses
   I.B.1.1.2.1 (Same as for first course, except for leveling pad)

I.B.1.2. Placement of block fill and wall embedment

I.B.1.3. Soil reinforcement (geogrid)
   I.B.1.3.1. Type
   I.B.1.3.2. Identification
   I.B.1.3.3. Manufacturer’s Certification
   I.B.1.3.4. Placement
      I.B.1.3.4.1 Connection To Block
         I.B.1.3.4.1.1 Mechanical Device
         I.B.1.3.4.1.2 Overlap Length
      I.B.1.3.4.2 Elevation
      I.B.1.3.4.3 Length
      I.B.1.3.4.4 Strong Direction Orientation

I.B.1.4. Proper Fill Materials and Lift Thickness for:
   I.B.1.4.1. Reinforced Fill
   I.B.1.4.2. Retained Fill
   I.B.1.4.3. Drainage Fill
   I.B.1.4.4. Foundation Fill

I.B.1.5. Proper Compaction of:
   I.B.1.5.1. Reinforced Fill
   I.B.1.5.2. Retained Fill
   I.B.1.5.3. Drainage Fill
   I.B.1.5.4. Foundation Fill

I.B.1.6. Overall Wall
   I.B.1.6.1. Wall Elevations
   I.B.1.6.2. Front and Back Slope Conditions

I.C. Upon completion of the segmental retaining wall, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.

II. Inspection of the following items:

II.A. Proper drainage devices.

II.B. Proper units and soil reinforcement.

II.C. Special or unusual conditions associated with wall construction:
   II.C.1. Corners or bends
      II.C.1.1. Staggering of geogrid layers between adjacent walls to avoid overlap and permit planar installation.
      II.C.1.2. Location and size of holes or openings cut into geogrid, along with any additional reinforcing requirements.
      II.C.1.3. Pipes exiting through wall face or at wall base.
   II.C.4. Compliance with restrictions on construction equipment based on:
      II.C.4.1. Proximity to wall.
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II.C.4.2. Lift height required prior to travel over lift/geogrid.
II.C.4.3. Tracked or rubber wheel type of equipment.
II.C.4.4. Travel Speed
II.C.4.5. Braking
II.C.4.6. Turning

II.D. At end of each day of construction, final lift and adjacent grade areas are sloped away from wall to direct run-off away from wall.

2.1.3.2 Masonry Retaining Wall

See 2.3.1.4 Concrete Walls on page 85 and 2.3.2.1 Masonry Walls on page 95 for relevant documentation to be received or items to be in place prior to backfill installation.

I. Receipt of documentation for constructed elements:

I.A. Shop Drawings:

I.A.1. In addition to the shop drawings associated with the masonry wall (when applicable), the following items need to be shown on the design professional reviewed shop drawings:

I.A.1.1. Type and location of drainage devices.
I.A.1.2. Soil reinforcing (when applicable) – refer to 2.1.3.1 Segmental Retaining Walls on page 17 for additional information.

I.B. Material/Structural Tests Documentation

I.B.1. Lab reports include the following information:

I.B.1.1. For all fill/backfill:

I.B.1.1.1. Soil Type
I.B.1.1.2. Soil Classification
I.B.1.1.3. Moisture Content
I.B.1.1.4. Density
I.B.1.1.5. Compaction Requirements
I.B.1.1.6. Compaction tests of backfill during its installation

I.B.1.2. Minimum design strength requirements: For retaining walls that do not have shoring provided during back fill installation:

I.B.1.2.1. Retaining wall has achieved minimum required strength specified prior to back filling.

I.B.2. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation:

I.C.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports:

I.C.1.1. Drainage devices
I.C.1.2. Soil Reinforcement
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I.C.2. Compaction Report - The geotechnical engineer or their qualified representative shall indicate the following:
   I.C.2.1. Use of proper:
      I.C.2.1.1. Fill Materials
      I.C.2.1.2. Lift Thicknesses
      I.C.2.1.3. Placement
      I.C.2.1.4. Compaction
   I.C.2.2. Approval of compaction test of fill
I.C.3. Upon completion of the masonry retaining wall, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.

II. Inspection of the following items:
   II.A. Inspection of back fill of retaining walls is generally covered by the geotechnical engineer or their representative. However, verification of several broad categorical items is important:
      II.A.1. Prior to back filling the retaining wall:
         II.A.1.1. Proper shoring of wall, when applicable.
         II.A.1.2. For walls without shoring, refer to 2.1.3.2 Masonry Retaining Wall, subsection I.B.1.2 Minimum design strength requirements on page 57.
      II.A.1.3. Presence of specified:
         II.A.1.3.1. Dampproofing
         II.A.1.3.2. Waterproofing
         II.A.1.3.3. Drainage devices
      II.A.3. Lift heights comply with requirements.
      II.A.4. Compaction testing occurs.

2.1.3.3 Concrete Retaining Wall

See 2.3.1.2 Concrete Walls items on page 83 for relevant items to be in place prior to backfill installation based on the kind of wall being constructed. For shotcrete walls, refer to 2.3.1.2 Concrete Walls items on page 83 as well as 2.3.1.4.3 Shotcrete items on page 86.

For documentation and inspection requirements refer to 2.1.3.2 Masonry Retaining Walls on page 57.

2.1.4 Anchors

Similar to the Grading section, the majority of the documentation and inspection items frequently defer to the geotechnical engineer. Therefore, refer to 2.1.1 Grading on page 45 for
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applicable items that may be associated with soil remediation efforts. In addition to those applicable items, for all soil anchor efforts, the following information applies:

I. Receipt of documentation for constructed elements:
   I.A. Shop Drawings:
      I.A.1. When applicable, receipt of design professional reviewed anchor shop drawings.
      I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be submitted to DSA for review and approval prior to installation of modified elements.
      I.A.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.
   I.B. Material/Structural Test Documentation:
      I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:
      I.B.1.1. Any anchor testing specified in the approved construction documents.
   I.C. Special Inspection Documentation:
      I.C.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:
      I.C.1.1. Any anchor special inspections specified in the approved construction documents.

II. Inspection of the following items:
   II.A. Proper storage and handling of materials.
   II.B. Observe required testing and special inspection.

2.1.4.1 Soil Nails

There are no additional items for soil nails beyond those noted for anchors in general.

2.1.4.2 Tie Backs

There are no additional items for tie backs beyond those noted for anchors in general.

2.1.4.3 Prestressed Rock and Soil Foundation Anchors

In addition to the California Building Code, projects using prestressed rock and soil foundation anchors are generally governed by a referenced standard issued by the Post-Tensioning
Institute (PTI; see http://www.post-tensioning.org). The primary reference for general design, construction or installation, and testing requirements is:


I. Receipt of documentation for constructed elements:

I.A. Shop Drawings:

I.A.1. When applicable, receipt of design professional reviewed tie back shop drawings.

I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be submitted to DSA for review and approval prior to installation of modified elements.

I.A.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:

I.B.1.1. Tendons are thread-bar anchors conforming to specified requirements.

I.B.1.2. Approval of anchor corrosion protection.

I.B.1.3. Load testing:

I.B.1.3.1. Preproduction Tests

I.B.1.3.2. Performance Tests

I.B.1.3.3. Creep Test

I.B.2. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation

I.C.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports:

I.C.1.1. Approval of drilling methods.

I.C.1.2. Approval of anchor installation.

I.C.2. Upon completion of the building pad grading, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.

II. Inspection of the following items:

II.A. Proper storage and handling of materials.

II.B. Observe required testing of anchors.
2.2 Foundation Systems

Prior to any foundation item being inspected, generally speaking, all soils related items applicable to a given building or portion thereof (refer to 2.1 Soils on page 45 for further information) must be inspected for compliance with the approved construction documents by the project inspector. Refer to form DSA 151 for requirements associated with advance notification to DSA for various foundation related construction items (e.g. trenching complete, foundation forms, concrete placement, etc.).

2.2.1 Shallow Foundations

2.2.1.1 Concrete Foundations

For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all projects using concrete.

In addition to the just noted items, the following applies to all shallow concrete foundations, unless noted otherwise:

I. Inspection of the following items:
   I.A. No foreign material enters the foundation excavation during concrete placement.
   I.B. Foundation must be level within specified tolerances or steps are required per the approved drawings.
   I.C. Bottom of footing extends beyond locally defined frost line.
   I.D. Proximity and location of adjacent footing bottoms meet requirements. See Figure 2-5 for an example of commonly specified location requirements for adjacent footings having different depths.

\[\text{Figure 2-5: Adjacent Footings Having Different Depths}\]

   I.E. Embedded items per requirements.
     I.E.1. Materials
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I.E.1.1. Depending on material, additional material or structural testing documentation and/or special inspections may be required (e.g. steel embeds may have welding and require both material and welding special inspection documentation – see the appropriate subsections in 2.3.4 Steel beginning on page 116 for additional information).

I.E.2. Location
I.E.3. Type
  I.E.3.1. Anchor Bolts
    I.E.3.1.1. Embedment Length
    I.E.3.1.2. Embedded head type.
  I.E.3.2. Embed Plates
I.F. Where underground utilities are adjacent to or through a foundation (see Figure 2-6 for an example of a pipe through or just below a footing), refer to 2.1.1.3 Underground Utilities on page 50 for additional information.

![Figure 2-6: Pipe Through/Below Footing](image)

I.G. When portions of the foundation types below may qualify as ‘deep foundation elements,’ refer to 2.2.2.2 Cast-In-Place Deep Foundations (Piers) subsection I.B.2 on page 69 for additional information.

2.2.1.1.1 Footings

For footings acting as a pile cap, refer to 2.2.1.1.4 Pile Caps on page 64 for information. For other requirements, refer to the general requirements specified in 2.2.1.1 Concrete Foundations.
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2.2.1.1.2 Concrete Grade Beams/Combined Concrete Footings

For grade beams or combined concrete footings acting as a pile cap, refer to 2.2.1.1.4 Pile Caps on page 64 for information. For other requirements, refer to the general requirements specified in 2.2.1.1 Concrete Foundations.

2.2.1.1.3 Concrete Mat

For portions of mats acting as a pile cap, refer to 2.2.1.1.4 Pile Caps on page 64 for information. For other information, refer to the general requirements specified in 2.2.1.1 Concrete Foundations.

2.2.1.1.4 Pile Caps

I. Inspection of the following items:
   I.A. Tops of piles per requirements for the following:
       I.A.1. Embedment into pile cap.
           I.A.1.1. During grading operations after piles have been installed, verify proper protection of tops of piles is provided (see Figure 2-7 on page 71 for an example of the kinds of damage that could occur to tops of piles).
       I.A.2. Pile cap extent beyond edge of pile.
       I.A.3. Pile top roughening.

2.2.2 Deep Foundations

The following applies to all deep foundations.

I. Receipt of documentation for constructed elements:
   I.A. Where adjacent existing structures could be adversely affected by deep foundation installation procedures, receipt of documentation of mitigation procedures, as dictated by DSA approved documents.
   I.B. Placement plan for elements and installation record corresponds to the placement plan identification.
       I.B.1. This plan must be submitted to DSA prior to installing deep foundations.
   I.C. Refer to the individual sections for each type of pier/pile below for a description of the types of documents that must be received.

II. Inspection of the following items:
   II.A. Where adjacent existing structures could be adversely affected by deep foundation installation procedures, mitigation procedures, as dictated by DSA approved documents, are followed.
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II.B. Once deep foundations have been installed, proper protection procedures for those elements must be put in place for any remaining fill placement operations.

II.C. Placement tolerances do not exceed specified limits.

II.D. Embedded items per requirements.
   II.D.1. Materials
      II.D.1.1. Depending on material, additional material or structural testing documentation and/or special inspections may be required (e.g. steel embeds may have welding and require both material and welding special inspection documentation – see the appropriate subsections in 2.3.4 Steel beginning on page 116 for additional information).

II.D.2. Location
II.D.3. Type
   II.D.3.1. Anchor Bolts
      II.D.3.1.1. Embedment Length
      II.D.3.1.2. Embedded head type.
   II.D.3.2. Embed Plates

2.2.2.1 Driven Deep Foundations (Piles)

The following items apply to all driven piles.

I. Receipt of documentation for constructed elements:
   I.A. Shop Drawings:
      I.A.1. When applicable, receipt of design professional reviewed pile shop and erection drawings.
      I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be submitted to DSA for review and approval prior to installation of modified elements.

   I.B. Material/Structural Test Documentation
      I.B.1. For the following items, verification for each pile by both the project inspector and the geotechnical engineer or their qualified representative in the form of daily special inspection reports and/or reports of tests performed:
         I.B.1.1. Pile materials
            I.B.1.1.1. Steel Piles (refer to 2.2.2.1.1 Steel Piles on page 67 for additional information)
            I.B.1.1.2. Concrete Piles (refer to 2.2.2.1.3 Concrete Piles on page 68 for additional information)
         I.B.2. Capacities of test piles and additional load tests as required.
I.B.4. See I.C.1.2 Pile load testing below on page 66 for additional structural tests.

I.C. Special Inspection Documentation:

I.C.1. During installation procedures, the geotechnical engineer or their qualified representative shall provide approval for the following in the form of daily special inspection reports and/or reports of tests performed:

I.C.1.1. Driving operations

I.C.1.1.1. Physical characteristics of the foundation-driving equipment.

I.C.1.1.1.1 Hammer Type

I.C.1.1.1.2 Hammer Size

I.C.1.1.2. Pile identifying marks and location

I.C.1.1.3. Pile Plumbness

I.C.1.1.4. Number of Blows per Foot of Penetration

I.C.1.1.5. Required Penetrations to achieve Design Capacity (see I.C.1.2.1 Dynamic procedure below on page 66 for additional information)

I.C.1.1.6. Tip & Butt Elevations

I.C.1.1.7. Any Pile Damage

I.C.1.1.7.1 The design professional shall dictate any repairs to damaged piles or usage of damaged piles, subject to the review and approval by DSA.

I.C.1.2. Pile load testing

I.C.1.2.1. Dynamic procedure

I.C.1.2.1.1 Dynamic formula used.

I.C.1.2.1.2 Permanent penetration under last 10 blows.

I.C.1.2.2. Where vibratory driving occurs, load testing per requirements.

I.C.1.2.3. Where heaving occurs due to adjacent driving operations, heaved elements are tested per requirements.

I.C.2. Once installation is complete, the geotechnical engineer provides their verified report (DSA 293).

II. Inspection of the following items:

II.A. Prior to pile driving adjacent to cased and uncased concrete piers, sufficient wait time since concrete pier placement must occur (see 2.2.2.2 Cast-In-Place Deep Foundations (Piers) subsection II.F on page 70 for additional information).

II.B. For the following items, verification for each pile by both the project inspector and the geotechnical engineer or their qualified representative in the form of daily special inspection reports and/or reports of tests performed:

II.B.1. Sizes

II.B.2. Lengths

II.B.3. Locations

II.C. Proper storage of piles, including level, equally spaced transverse supports.

II.D. Piles are not damaged during lifting operations or other erection techniques.
II.D.1. The design professional shall dictate any repairs to damaged piles or usage of damaged piles, subject to the review and approval by DSA.

II.D.2. Testing of piles complies with limitations specified in approved construction documents.

II.E. For specialty piles, additional inspections by qualified individuals as determined by the registered design professional in responsible charge and dictated by the DSA approved documents.

2.2.2.1.1 Steel Piles

The following provides additional information specific to steel piles:

For documentation and inspection requirements, refer to 2.3.4.1 Structural Steel on page 116 (however, steel may be required to comply with different ASTM requirements, such as those listed in CBC 1810A.3.2.3 – verify requirements with approved construction documents) and 2.2.2.1 Driven Deep Foundations (Piles) on page 65.

I. Inspection of the following items:

   I.A. Where steel core elements are spliced, milling of contact surfaces and welding is required per the approved construction documents (refer to 2.3.4.1 Structural Steel on page 116 for welding documentation and inspection requirements).

2.2.2.1.1.1 Helical Piles

The following provides additional information specific to helical piles:

I. Receipt of documentation for constructed elements:

   I.A. Special Inspection Documentation:

      I.A.1. Project specific testing occurs to verify allowable loads per pile.
      I.A.2. Special inspection reports include information noted in the requirements. Commonly specified information to be included in such reports is often based on the requirements given in CBC 1704A.10:
         I.A.2.1. Installation equipment used.
         I.A.2.2. Pile Dimensions
         I.A.2.3. Tip Elevations
         I.A.2.4. Final Depth
         I.A.2.5. Final installation torque
         I.A.2.6. Other pertinent installation data as required by the registered design professional in responsible charge.

   II. Inspection of the following items:

      II.A. Installation depth and torque per requirements, including not exceeding specified limits.
2.2.2.1.2 Composite Steel Piles

The following provides additional information specific to composite steel piles:

I. Receipt of documentation for constructed elements:
   I.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for concrete documentation and inspection requirements.
   I.B. For steel, refer to 2.3.4.1 Structural Steel on page 116.

II. Inspection of the following items:
   II.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for applicable concrete documentation and inspection requirements.
   II.B. For steel, refer to 2.3.4.1 Structural Steel on page 116.
   II.C. When concrete is cast in a steel pipe, verify the aggregate size and slump comply with requirements.

2.2.2.1.3 Concrete Piles

Refer to the following subsections for additional information specific to the noted pile:

   2.2.2.1.3.1 Concrete Filled Piles

Refer to 2.2.2.1.2 Composite Steel Piles on page 68 for documentation and inspection requirements.

   2.2.2.1.3.2 Prestressed Piles

The following provides additional information specific to prestressed piles:

I. Receipt of documentation for constructed elements:
   I.A. Refer to 2.3.1.2 Prestressed/Post-tension Concrete on page 83 for concrete requirements (e.g. Shop Drawings; Material/Structural Test Documentation; etc.).
   I.B. Material/Structural Test Documentation:
      I.B.1. Prestressing Tendons

II. Inspection of the following items:
   II.A. Refer to 2.3.1.2 Prestressed/Post-tension Concrete on page 83 for applicable concrete requirements.

   2.2.2.1.3.3 Precast

The following provides additional information specific to precast piles:

I. Receipt of documentation for constructed elements:
I.A. Refer to section 2.3.1.3 Precast Concrete on page 84 for concrete requirements (e.g. Shop Drawings; Material/Structural Test Documentation; etc.).

I.B. For prestressed piles, refer to 2.2.2.1.3.2 Prestressed Piles on page 68 for additional requirements.

I.C. Material/Structural Test Documentation:
   I.C.1. Precast member has achieved required design strength for driving operations.

II. Inspection of the following items:
   II.A.1. Refer to 2.3.1.3 Precast Concrete on page 84 for applicable concrete requirements.

2.2.2.2 Cast-In-Place Deep Foundations (Piers)

The following provides additional information specific to CIP piers:

I. Receipt of documentation for constructed elements:
   I.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for CIP concrete requirements.
   I.B. Material/Structural Test Documentation:
      I.B.1. Adequate end strata bearing capacity at the bottom of excavations/drillings.
      I.B.2. Slump limitations (i.e. maximum/minimum).
      I.B.3. Load testing per requirements.
         I.B.3.1. For elements having an enlarged base that have heaved during construction procedures, verify testing per requirements.
   I.C. Approval from geotechnical engineer or their qualified representative is required for the following in the form of reports of tests performed and/or daily special inspection reports:
      I.C.1. For each pier excavation:
         I.C.1.1. Drilling Operations
         I.C.1.2. Diameters
         I.C.1.3. Plumbness
         I.C.1.4. Lengths
            I.C.1.4.1. Where uncased pier lengths exceed 30 times the diameter, an installation report must be provided.
         I.C.1.5. Bell Diameters
         I.C.1.6. Embedment into bedrock
      I.C.2. For each pier:
         I.C.2.1. Record of concrete or grout volumes.
            I.C.2.1.1. For hollow-stem augered CIP elements, installation per requirements.

II. Inspection of the following items:
   II.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for CIP concrete requirements.
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II.B. Both the project inspector and the geotechnical engineer or their qualified representative shall verify locations of piers.

II.C. For socketed drilled shafts with steel casing, suitable steel driving shoe is welded to the base per requirements.

II.D. Ends of hoops, ties, spirals have seismic hooks per requirements.

II.E. Placement of concrete
   II.E.1. Reinforcement is properly held in place prior to concrete placement, unless specific exceptions are noted in approved construction documents.
   II.E.2. For hollow stem augered CIP elements, minimum wait times between installation of adjacent elements complies with requirements.
   II.E.3. Measures are taken to ensure exclusion of foreign material during concrete placing per the approved documents.
      II.E.3.1. Piers with diameter less than 30 inches and where free fall of concrete is permitted during placing operations may be more prone to foreign material contamination (e.g. from concrete hitting sides of earth forms).
      II.E.3.2. Where unstable soils exist within any extent of pier depth and foreign material may slough into concrete during placement in those regions, protective casing is provided and concrete is placed in manner to counteract instability of soils as specified in the approved construction documents.
      II.E.3.3. For socketed drilled pier elements, shaft within casing must be free of foreign materials.
   II.E.4. When concrete is compacted to provide an enlarged base:
      II.E.4.1. Confirm aggregate size and slump per requirements.
      II.E.4.2. Load testing per requirements (this also applies for driven precast base).

II.F. Where driven piles are installed adjacent to uncased or cased concrete piers, sufficient wait time since pier concrete placement occurs as indicated in the approved construction documents.
STRUCTURAL SAFETY INSPECTION ITEMS

II.G. Proper protection of exposed reinforcing at top of piers after pier construction complete (see Figure 2-7 for example of damage associated with grading operations occurring after completion of pier construction).

Figure 2-7: Damaged Reinforcement From Grading Operations

2.2.2.3 Micropiles

The following provides additional information specific to micropiles:

I. Receipt of documentation for constructed elements:
   I.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for requirements applicable to grouting.
   I.B. Material/Structural Test Documentation:
       I.B.1. Steel materials meet or exceed requirements.
       I.B.1.1. Where no mill certification is provided, coupon testing must comply with requirements.
       I.B.2. Micropile load capacity testing.

II. Inspection of the following items:
   II.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for requirements applicable to grouting.
   II.B. Grout Installation
Compacted aggregate piers (CAP), rammed aggregate piers (RAP), and vibro stone columns (VSC) are sometimes used for site soil improvement. Because their beneficial effect on the site soil is usually verified in situ, it provides some additional requirements unique to these kinds of soil improvement solutions.

I. Receipt of documentation for constructed elements:

I.A. Material/Structural Test Documentation:

I.A.1. Refer to approved construction documents for required testing, inspection, and observation program for the CAP/RAP/VSC.

I.A.2. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed (by a DSA approved laboratory) and/or daily special inspection reports and/or grading report:

I.A.2.1. Requirements for CAPs/RAPs:

I.A.2.1.1. For each area of uniform subsoil conditions, preconstruction testing per requirements.

I.A.2.1.2. When specified, full lateral load test with concrete footing per requirements to verify increased sliding friction values.

I.A.2.1.3. Specialized testing per requirements

I.A.2.1.3.1 Bottom Stabilization Verification Tests

I.A.2.1.3.2 Dynamic Cone Penetrometer Tests

I.A.2.2. Requirements for VSCs:

I.A.2.2.1. Soil compaction meets additional requirements specified in California Geological Survey (CGS) Special Publication 117A (SP-117A).

I.A.2.2.2. Cone Penetration Test (CPT) per requirements.

I.A.2.2.3. Standard Penetration Test (SPT) per requirements, when specified.

I.B. Special Inspection Documentation:

I.B.1. Approval from geotechnical engineer or their qualified representative for the following in the form of reports of tests performed and/or daily special inspection reports and/or grading report:

I.B.1.1. Proper testing, including any acceptance criteria for testing, as noted above.

I.B.1.2. Confirmation that the ground improvement acceptance criteria has been met.

I.B.1.3. Upon completion of the ground improvement system, provided there are no other soils related items of construction, receipt of the DSA 293 Geotechnical Verified Report is required.

I.C. CGS final approval based on ground improvement data.
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I.D. If during the course of testing, modifications are required affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, the changes must be submitted to DSA for review and approval.

II. Inspection of the following items:
   II.A. Observe required testing.
   II.B. No foundation concrete construction may occur prior to:
       II.B.1. CGS final approval.
       II.B.2. DSA review and approval of any construction change directives affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved documents associated with required ground improvement modifications resulting from field testing.
2.3 Gravity Framing Systems

Prior to any gravity framing system item being inspected, generally speaking, all foundation system related items applicable to a given building or portion thereof (refer to 2.2 Foundation Systems on page 62 for further information) must be inspected for compliance with the approved construction documents by the project inspector. Refer to form DSA 151 for requirements associated with advance notification to DSA for various foundation related construction items (e.g. concrete placement, etc.).

2.3.1 Concrete

In addition to the California Building Code, projects using concrete are generally governed by a referenced standard issued by the American Concrete Institute (ACI; see http://www.concrete.org). The primary reference for general design and construction requirements is:

- Building Code Requirements for Structural Concrete, ACI 318

ACI 318 has both gravity and seismic requirements; unlike some other material reference standards (e.g. steel or wood), no additional reference is necessary for the seismic lateral resisting systems (SLRS).

Frequently, testing of concrete or steel reinforcement is necessary for various portions of concrete construction associated with the project. When such testing is necessary as dictated by the construction documents, certain information must be included, depending on the type of test that is being performed. While there are no format requirements, DSA 203: Tension/Bend and DSA 204: Compression provide a suggested format. For some projects, post-installed anchors may also be used and require testing; DSA 206: Anchor Load provides a suggested format for such tests (refer to APPENDIX B – REFERENCED DSA FORMS on page 313 for these forms).

Refer to form DSA 151 for requirements associated with advance notification to DSA for various concrete related construction items.

2.3.1.1 Cast In Place (CIP) Concrete

For all CIP concrete work, the following items apply (note: CBC Chapter 19A applies to K-12 and Community College projects and Chapter 19 applies to Community College projects in...
I. Receipt of documentation for constructed elements:

I.A. Shop Drawings:

I.A.1. When applicable, receipt of design professional reviewed anchorage, embed, and steel reinforcing shop drawings.

I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be approved by the design professional in responsible charge and submitted to and approved by DSA.

I.A.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.B.1. Both the project inspector and special inspector (e.g. batch-plant special inspector) shall verify the use of the required design mix.

I.B.1.1. For concrete mixes using more than 15% of fly ash or other natural pozzolans, refer to IR 19-3 for additional information (NOT APPLICABLE to DSA-SS/CC projects).

I.B.1.2. For concrete mixes using recycled concrete aggregates, refer to IR 19-4 for additional information.

I.B.2. Materials comply with requirements for the following:

I.B.2.1. Reinforcing steel

I.B.2.1.1. Tags of reinforcing steel meet requirements noted in IR 17-10. Where no tags exist, additional testing is required as noted in IR 17-10.

I.B.2.2. Concrete

I.B.2.2.1. Slump (see Figure 2-8)
I.B.2.2.2. Temperature
I.B.2.2.3. Air Content (where applicable)
I.B.2.2.4. Concrete compression tests (periodically throughout construction).

I.B.2.2.4.1 Based on ASTM test specified in approved documents, ensure sampling occurs within specified time period.

Figure 2-8: Slump Test
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.2.2.4.2 Proper storage techniques for concrete samples, including ability to maintain required temperature ranges (e.g. through use of heaters or ice packs) for required time period after casting. See Figure 2-10 and Figure 2-9 for examples of improper and proper concrete cylinder storage techniques, respectively.

I.B.2.3. Sampling frequency for concrete tests (recall "test" is average of two cylinders) per requirements.

I.B.2.4. Based on ASTM test specified in approved documents, ensure testing complies with requirements.

I.B.3. Post-installed anchors:

I.B.3.1. Testing per requirements. See Figure 2-11 for an example of a common type of pull test apparatus.
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.3.1.1. EXCEPTION: Not all post-installed anchors require testing – refer to approved construction documents for requirements.

I.B.4. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation:

I.C.1. Approval from the concrete special inspector for the following in the form of reports of tests performed and/or daily special inspection reports:

I.C.1.1.1. While there are exceptions to the required inspection of batching of concrete given in CBC 1704A.4.3, the information in the approved construction documents dictates the requirements for the project. If the exception is specified, additional documents and inspections by the project inspector are required, as indicated in the approved construction documents.

I.C.2. Upon completion of the concrete work, the concrete special inspector provides a verified report (DSA 292).

II. Inspection of the following items:

II.A. Proper storage and handling for reinforcing, embedded items, and other components part of the concrete elements.

II.B. The items provided below may be performed by a special inspector when specifically approved by DSA.

II.C. Prior to concrete placement, the following must be secured in proper location:

II.C.1. Formwork for the following based on the member being formed:

II.C.1.1. Shape

II.C.1.1.1. At footings, steps comply with requirements.

II.C.1.2. Location

II.C.1.3. Dimensions

II.C.1.4. Adequate bracing

II.C.1.5. Tight joints to prevent concrete leakage.
II.C.1.6. No wood stakes allowed where concrete will be poured. (See Figure 2-12 for an example problems with both wood stakes in the concrete and formwork that is not tight enough to keep the concrete within the formwork.)

II.C.1.7. Proper coordinate between trades to avoid conflicts and formwork provides accommodations for all required trades.

II.C.2. Reinforcing steel
   II.C.2.1. For welding of reinforcing steel, refer to I.C.1.2.2 Slewing on page 119 for additional documentation and inspection requirements.
   II.C.2.2. Prestressing tendons
      II.C.2.2.1. Placing tolerances (NOTE: there are code requirement differences between a DSA-SS versus DSA-SS/CC projects – verify with approved construction documents).
   II.C.2.3. Spacing and clearances:
      II.C.2.3.1. Clearance and spacing applies at splices and mechanical connections per requirements (NOTE: there are code requirement differences between a DSA-SS versus DSA-SS/CC projects – verify with approved construction documents).
      II.C.2.3.2. If spacing and clearances do not comply, additional steel, increased splice lengths, or other items may be required – design professional and DSA approval is required for modifications affecting the Structural, Fire/Life Safety or Accessibility portions of the project.
II.C.2.3.3. Field bending of reinforcing not permitted, unless specifically detailed on the approved drawings or authorized by the design professional and DSA prior to bending.

II.C.3. Embedded items
   II.C.3.1. Prior to placing steel embedded items, project inspector must receive documentation for any material/structural tests or special inspections (e.g. welding of embed plates, headed studs, etc.). Refer to I.C.1.2.2 Welding on page 119 for additional documentation and inspection requirements.
   II.C.3.2. Accurate and secure placement prior to concrete placement.
   II.C.3.3. Types and sizes of anchor bolts connecting steel to concrete (e.g. cut thread vs. rolled thread), including specified tolerances (see IR 22-2).
   II.C.3.3.1. Proper anchor bolt embedment and thread projection beyond anticipated concrete surface.
   II.C.3.4. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159 and 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).
   II.C.3.5. Conduits and pipes
      II.C.3.5.1. Openings larger than a certain size must be per approved plans.
      II.C.3.5.2. Proper spacing between conduit/pipes.
      II.C.3.5.3. Aluminum pipes/conduits/etc. have protection to prevent galvanic reaction as indicated.
      II.C.3.5.4. Verify conduits and pipes in concrete do not exceed specified limits for displacing concrete or size relative to member:
         II.C.3.5.4.1 Columns
         II.C.3.5.4.2 Beams
         II.C.3.5.4.3 Slabs
         II.C.3.5.4.4 Walls
      II.C.3.5.5. No liquid, gas, or vapor is allowed to flow through pipes until concrete has reached its specified design strength, unless specifically noted otherwise in approved construction documents.
      II.C.3.5.6. Concrete cover over pipes and conduits.
      II.C.3.5.7. Reinforcing normal to pipes/conduits per requirements.
      II.C.3.5.8. No reinforcing shall be bent, cut, or displaced by pipes or conduits, unless specifically detailed on the approved drawings.
II.C.3.5.9. Conduit/pipe stub-ups/outs do not conflict or cause congestion with anchor bolts (anchor bolt design usually does not include loss of concrete associated with conduits/pipes adjacent to anchor bolts – if minimum distance for conduits/pipes from anchors is not provided in the approved construction documents, contact the design professional for guidance on what is permissible). See Figure 2-13 for an example of common problems associated with conduit and anchor bolt placement.

II.D. Concrete mixing, placement and curing (note: ACI 309R is a helpful resource):

II.D.1. Hot and cold weather special requirements. (Refer to form DSA 151 for requirements associated with advance notification to DSA for various concrete related construction items.)

II.D.1.1. Based on ASTM referenced in approved construction documents (e.g. ASTM C94 or C685), mix times and revolutions are not exceeded during mixing operations (e.g. C94 limits mixing to 90 minutes and 300 revolutions).

II.D.2. Proper concrete placement at large or deep elements (e.g. additional placement tools, such as a pipe, hose, snout, etc. may be necessary to ensure concrete is placed as close to final position as possible).
STRUCTURAL SAFETY INSPECTION ITEMS

II.D.3. At congested reinforcing locations, design professional and DSA approved mix design with smaller aggregates is used (see Figure 2-14 for an example of severe reinforcing congestion in which a smaller aggregate mix would be very beneficial and is likely required). (NOTE: DSA-SS aggregate requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)

II.D.4. Consolidation per requirements. See Figure 2-15 and Figure 2-16 for an example of poor consolidation and resulting “honeycomb” problems.
II.D.5. Water added at site to facilitate consolidation is not excessive.
II.D.6. Proper sample testing frequency. (NOTE: DSA-SS testing requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)
II.D.7. Construction joint requirements.
   II.D.7.1. For slabs-on-grade (SOG), only if it is identified as a structural slab, must construction joints be as shown in approved plans; most SOG do not require construction joints be shown on the approved drawings.
II.E. After concrete placement:
   II.E.1. Concrete curing, including any special cold or hot weather requirements. (NOTE: DSA-SS curing requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)
   II.E.2. Form removal
      II.E.2.1. **Prior to form or shoring removal**, project inspector shall **verify concrete strength** complies with requirements based on test reports and minimum time passage.
II.F. Post-installed anchors and connections:
   II.F.1. Installation of post-installed anchors.
      II.F.1.1. For projects approved under the 2001 CBC, refer to **IR 19-1** (this also applies to projects approved under the 2007 CBC when specifically referencing those requirements).
   II.F.2. Testing per requirements. See Figure 2-11 on page 76 for an example of a common type of pull test apparatus.
      II.F.2.1. **EXCEPTION**: Not all post-installed anchors require testing – refer to approved construction documents for requirements.
STRUCTURAL SAFETY INSPECTION ITEMS

II.F.3. There are code limitations on the use of power actuated fasteners. Therefore, verify power actuated fasteners (e.g. shotpins) are used only where specifically shown on the approved construction documents.

2.3.1.2 Prestressed/Post-tension Concrete

I. Receipt of documentation for constructed elements:
   I.A. Refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for concrete documentation and inspection requirements.
   I.B. Shop Drawings
      I.B.1. When applicable, receipt of design professional reviewed placement/erection shop drawings.
      I.B.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be approved by the design professional in responsible charge and submitted to and approved by DSA.
      I.B.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.
   I.C. Material/Structural Test Documentation:
      I.C.1. Prestressing/Post-Tensioning Tendons
      I.C.2. Prestressing/Post-Tensioning Tendon Anchorages
      I.C.3. Prestressing/Post-Tensioning Tendon Couplers
      I.C.4. In-situ concrete strength prior to stressing of tendons.
   I.D. Special Inspection Documentation:
      I.D.1. Receipt of special inspection reports for the following:
         I.D.1.1. Placement and tolerances of prestressing/post-tensioning tendons (placement of ducts for post-tension conditions).
            I.D.1.2.1. Special inspector shall verify concrete strength test reports prior to stressing of tendons.
      I.D.2. Upon completion of the prestressed/post-tensioning concrete work, the prestressed/post-tensioning concrete special inspector provides a verified report (DSA 292).

II. Inspection of the following items:
   II.A. Refer to section 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for applicable documentation and inspection concrete requirements.
   II.B. Proper storage and handling of members.
   II.C. Placement of members and/or post-tensioning ducts with placement/erection drawings.
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.1. For post-tensioning duct placement, verify proper coordination amongst trades.
   II.C.1.1. No “kinks” or shifts in duct profile beyond the tolerances noted in the
   approved construction documents.
   II.C.1.2. Specified tolerances for tendon locations are maintained.

II.D. Connections with placement/erection drawings:
   II.D.1.1. For welded and bolted connections, see applicable subsections of
   2.3.4.1 Structural Steel on page 116.
   II.D.1.2. For CIP connections, see 2.3.1.1 Cast In Place (CIP) Concrete on
   page 74.

2.3.1.3 Precast Concrete

I. Receipt of documentation for constructed elements:
   I.A. Refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 for concrete
documentation and inspection requirements.
   I.B. Shop Drawings
      I.B.1. When applicable, receipt of design professional reviewed precast shop
drawings.
      I.B.1.1. If the reviewed shop drawings cause any changes affecting the
Structural, Fire/Life Safety or Accessibility portions of the DSA
approved construction documents must be approved by the
design professional in responsible charge and submitted to and
approved by DSA.
      I.B.2. If conflicts arise between the DSA approved construction documents and
the shop drawings, the DSA approved construction documents shall
govern.
   I.C. Material/Structural Test Documentation:
      I.C.1. Precast member has achieved required design strength.
      I.C.2. When noted on the approved construction documents, certification for
members fabricated in a Precast Concrete Institute certified plant (for a list
of certified plants, see http://www.pci.org/find/manufacturer/index.cfm).
   I.D. Special Inspection Documentation:
      I.D.1. Fabrication of Precast Members
      I.D.2. Erection of Precast Members – ONLY if special inspector is approved by
DSA first.
      I.D.3. Upon completion of the prestressed concrete work, the prestressed
concrete special inspector provides a verified report (DSA 292).

II. Inspection of the following items:
   II.A. Refer 2.3.1.2 Prestressed/Post-tension Concrete, subsection II Inspection of the
following items: on page 83 for applicable concrete requirements (but replace
“Prestressed” with “Precast”).
STRUCTURAL SAFETY INSPECTION ITEMS

2.3.1.4 Concrete Walls

I. Inspection of the following items:
   I.A. Anchoring of walls to intersecting elements per the approved drawings.
      I.A.1. Where dowels occur, field bending is not permitted, unless specifically shown on the approved drawings.

   2.3.1.4.1 CIP

For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all CIP concrete walls. For walls forming part of the lateral system, refer to 2.4.1.1 Special Reinforced Shear Wall on page 140 and 2.4.1.2 Intermediate Precast Shear Wall on page 141, as applicable.

   2.3.1.4.2 Tilt-up

For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all CIP concrete walls and 2.3.1.3 Precast Concrete on page 84. For walls forming part of the lateral system, refer to 2.4.1.1 Special Reinforced Shear Wall on page 140 and 2.4.1.2 Intermediate Precast Shear Wall on page 141, as applicable.

In addition, the following apply to tilt-up walls:

I. Inspection of the following items:
   I.A. Prior to concrete placement, block-out locations, including, but not limited to:
      I.A.1. Hold-downs
      I.A.2. Chord steel connections (See Figure 2-17 for an example of problems associated with poor layout of chord reinforcing steel.)
      I.A.3. Supports
   I.B. Welded connections including, but not limited to:

Figure 2-17: Poor Layout for Chord Steel

Figure 2-18: Verify Weld Lengths Per Requirements
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.1. Weld size and lengths for hold-downs, chord steel (see Figure 2-18).
I.B.2. Chord steel connections.
I.B.3. Supports

2.3.1.4.3 Shotcrete

Shotcrete entails use of a unique method for concrete placement pneumatically. Based on that method, there are additional requirements to ensure proper construction. Unlike many aspects of concrete construction, special inspection is required by a qualified individual (refer to 1 ADMINISTRATION subsection 1.2.2 Required During Construction, II.A.1.1 on page 33 for a list of DSA approved shotcrete special inspectors). In addition to the concrete references noted in 2.3.1 Concrete, there are two primary references associated with shotcrete, listed below:

- CBC 1913A for K-12 projects; CBC 1913 for DSA-SS/CC projects.
- Guide to Shotcrete, ACI 506-05

I. Receipt of documentation for constructed elements:

I.A. Refer to 2.3.1.1 Cast In Place (CIP) Concrete, I Receipt of documentation for constructed elements: on page 75 for documentation requirements.

I.B. Material/Structural Test Documentation:

I.B.1. For concrete shear walls, special requirements for concrete aggregate based on reinforcing. (NOTE: DSA-SS aggregate requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)


I.C. Special Inspection Documentation:

I.C.1. Preconstruction sample panel requirements.
I.C.2. “Test panel method” of testing shotcrete, when applicable.
I.C.3. Any additional shotcrete placement special inspection requirements.
I.C.4. Upon completion of the shotcrete work, the shotcrete special inspector provides a verified report (DSA 292).

II. Inspection of the following items:

II.A. Refer to 2.3.1 Concrete, II Inspection of the following items: on page 77 for inspection requirements.

II.B. Prior to applying shotcrete:

II.B.1. Concrete or masonry surface receiving concrete.
II.B.2. Formwork.

II.C. Construction joints.
2.3.1.5 Concrete Columns

2.3.1.5.1 CIP
For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all CIP concrete columns.

2.3.1.5.2 Prestressed/Post-tension
For documentation and inspection requirements, refer to 2.3.1.2 Prestressed/Post-tension Concrete on page 83 applicable to all prestressed/post-tension concrete columns.

2.3.1.5.3 Precast
For documentation and inspection requirements, refer to 2.3.1.3 Precast Concrete on page 84 applicable to all precast concrete columns.

2.3.1.6 Concrete Beams

2.3.1.6.1 CIP
For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all CIP concrete beams.

2.3.1.6.2 Prestressed/Post-tension
For documentation and inspection requirements, refer to 2.3.1.2 Prestressed/Post-tension Concrete on page 83 applicable to all prestressed/post-tension concrete beams.

2.3.1.6.3 Precast
For documentation and inspection requirements, refer to 2.3.1.3 Precast Concrete on page 84 applicable to all precast concrete beams.
STRUCTURAL SAFETY INSPECTION ITEMS
2.3.1.7 Concrete Floor/Roof

2.3.1.7.1 CIP

For documentation and inspection requirements, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74 applicable to all CIP concrete floors/roofs.

I. Inspection of the following items:
   I.A. For ‘flat plate’ or flat slab (i.e. no beam supports) construction, prior to placing concrete, no through penetrations occur adjacent to columns unless specifically shown on approved drawings.
      I.A.1. Any penetrations not shown on the approved documents must be approved by the design professional and DSA prior to placing concrete.
      I.A.2. Proper supplementary reinforcing, including any proprietary products, where indicated in slabs adjacent to column supports.
   I.B. Reinforcing clear cover at collector and boundary reinforcing at topping slabs over precast elements.
   I.C. Roofs
      I.C.1. Where clay tile is installed over concrete roofs, if wire ties are specified for tile anchorage, confirm secured placement per requirements prior to placing concrete. Refer to 2.5.2.4.1 Roof Tile on page 167 for additional information.

2.3.1.7.2 Prestressed/Post-tension

For documentation and inspection requirements, refer to 2.3.1.2 Prestressed/Post-tension Concrete on page 83 applicable to all prestressed/post-tension concrete floors/roofs.

I. Inspection of the following items:
   I.A. Tendon/duct placement, banding, and supports.
   I.B. Refer to 2.3.1.7.1 CIP on page 88 for additional documentation and inspection requirements.

2.3.1.7.3 Precast

For documentation and inspection requirements, refer to 2.3.1.3 Precast Concrete on page 84 applicable to all precast concrete floors/roofs.

I. Inspection of the following items:
   I.A. Reinforcing clear cover at collector and boundary reinforcing for topping slabs over precast elements.
2.3.2 Masonry

In addition to the California Building Code, projects using masonry are generally governed by a referenced standard issued by the Masonry Standards Joint Committee (MSJC; see http://masonrystandards.org), which consists of committee groups in The Masonry Society (TMS; see http://www.masonrysociety.org), American Concrete Institute (ACI; see http://www.concrete.org), and the Structural Engineering Institute (SEI; see http://content.seinstitute.org) of the American Society of Civil Engineers (ASCE; see http://www.asce.org). The primary reference for general design and construction requirements is:

- Building Code Requirements for Masonry Structures, TMS 402/ACI 530/ASCE 5 (note: TMS 402 will be the primary acronym used in this document when referenced)
- Specification for Masonry Structures, TMS 602/ACI 530.1/ASCE 6 (note: TMS 602 will be the primary acronym used in this document when referenced)

Special inspection by qualified individuals is required for masonry construction (refer to 1 ADMINISTRATION subsection 1.2.2 Required During Construction, II.A.2 on page 33 for a list of DSA qualified masonry special inspectors). Frequently, testing of masonry units, its components, its composite structure, or steel reinforcement is necessary for various portions of masonry construction associated with the project. When such testing is necessary as dictated by the construction documents, certain information must be included, depending on the type of test that is being performed. While there are no format requirements, DSA 203: Tension/Bend, DSA 204: Compression, and DSA 205: Concrete Masonry Unit provide a suggested format.

For some projects, post-installed anchors may also be used and require testing; DSA 206: Anchor Load provides a suggested format for such tests (refer to APPENDIX B – REFERENCED DSA FORMS on page 313 for these forms).

For all masonry work, the following apply:

I. Receipt of documentation for constructed elements:
   I.A. Shop Drawings:
      I.A.1. When applicable, receipt of design professional reviewed anchorage, embed, and steel reinforcing shop drawings.
      I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be approved by the design professional in responsible charge and submitted to and approved by DSA prior to installation of modified elements.
STRUCTURAL SAFETY INSPECTION ITEMS

I.A.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.B.1. Materials comply with requirements for the following:

I.B.1.1. Reinforcing steel
I.B.1.2. For concrete masonry units, refer to IR 21-4 for mandatory tests.

I.B.1.3. Unit strength method tests:

I.B.1.3.1. Masonry units
I.B.1.3.2. Mortar
I.B.1.3.3. Grout

I.B.1.3.3.1. NOTE: DSA-SS grout requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

I.B.1.4. Prism test method tests:

I.B.1.4.1. Masonry prisms

I.B.1.4.1.1. NOTE: DSA-SS prism test requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

I.B.1.5. Core-drill sample tests (see DSA 207 for a suggested test report format – NOTE: The content items in the form must be included in the test report, regardless of the format used.).

I.B.1.5.1. Do not allow core-drilling through:

I.B.1.5.1.1. Reinforcing
I.B.1.5.1.2. At CMU block cross webs.

I.B.2. Post-installed anchors:

I.B.2.1. Refer to 2.3.1.1 Cast In Place (CIP) Concrete subsection

I.B.3. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation

I.C.1. Masonry special inspector to provide documentation for the following in the form of reports of tests performed and/or daily special inspection reports.

I.C.1.1. Unit cell size, including any special limitations.

I.C.1.1.1. If high-lift grouting method is used, bond beam units have additional requirements given in IR 21-2.10 (IR 21-2 for 2001 and 2007 CBC projects).

I.C.1.1.2. NOTE: DSA-SS cell size requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

I.C.1.2. Proportions of site-prepared, premixed or preblended:

I.C.1.2.1. Mortar
I.C.1.2.2. Grout
STRUCTURAL SAFETY INSPECTION ITEMS

I.C.1.2.2.1 NOTE: DSA-SS grout requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

I.C.1.3. Preparation of prisms.
I.C.1.4. Size, location and condition of all dowels, construction supporting masonry, etc.
I.C.1.5. Steel reinforcing:
  I.C.1.5.1. Size
  I.C.1.5.2. Grade
  I.C.1.5.3. Type of reinforcement
  I.C.1.6.1. For welding of reinforcing steel, refer to I.C.1.2.2 Welding on page 119 for additional documentation and inspection requirements.
I.C.1.7. Placement of:
  I.C.1.7.1. Steel reinforcement
    I.C.1.7.1.1 Spacing
    I.C.1.7.1.2 Clearance
    I.C.1.7.1.3 NOTE: DSA-SS spacing and clearance requirements are different than those in DSA-SS/CC projects in some conditions – verify with approved construction documents.
  I.C.1.7.2. Connectors
  I.C.1.7.3. Masonry units
I.C.1.9. Protection of masonry during cold weather (i.e. less than 40° F) or hot weather (i.e. greater than 100° F or 90° F with wind greater than 8 mph).
I.C.1.10. Anchors and embedded items, including but not limited to those connecting masonry to other portions or elements of the structure:
  I.C.1.10.1. Type
  I.C.1.10.2. Size
  I.C.1.10.3. Location
I.C.1.11. Grout space prior to grouting and placement of grout.

I.C.2. Upon completion of the masonry work, the masonry special inspector provides a verified report (DSA 292).

II. Inspection of the following items:

II.A. Proper storage and handling of materials.
II.B. While special inspection is required for masonry construction, the project inspector provides oversight of the masonry special inspector.
  II.B.1. Level of special inspection per requirements.
II.B.2. Materials:
  II.B.2.1. Testing Program
STRUCTURAL SAFETY INSPECTION ITEMS

II.B.2.1.1. NOTE: DSA-SS prism test requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

II.B.2.2. Grout
II.B.2.2.1. NOTE: DSA-SS grout requirements are different than those in DSA-SS/CC projects – verify with approved construction documents.

II.B.2.3. Water
II.B.2.4. Aggregate
II.B.2.5. Proportions of constituent materials.
II.B.2.6. Admixtures

II.B.3. Installation
II.B.3.1. Tolerances
II.B.3.1.1. Element layout
II.B.3.1.2. Reinforcing
II.B.3.1.2.1 Size
II.B.3.1.2.2 Placement.
II.B.3.1.2.2.1 NOTE: DSA-SS spacing and clearance requirements are different than those in DSA-SS/CC projects in some conditions – verify with approved construction documents.

II.B.3.1.3. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159 and 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

II.B.3.1.4. Conduit and pipe locations per approved plans. See Figure 2-19 for coordination problems associated with conduits and pipes.
II.B.3.2. Any special construction requirements:
   II.B.3.2.1. During hot (i.e. greater than 100° F or 90° F with wind greater than 8 mph) and cold (i.e. less than 40° F) weather.
   II.B.3.2.2. High- and low-lift grouting methods. Also see IR 21-2.10 (applicable for both DSA-SS and DSA-SS/CC projects) (IR 21-2 for 2001 and 2007 CBC projects).
   II.B.3.2.2.1 NOTE: DSA-SS high- and low-lift requirements are different than those in DSA-SS/CC projects in some conditions – verify with approved construction documents.
   II.B.3.2.2.2 Additional requirements for bond beam units if high-lift grouting occurs (see IR 21-2.10 section 4.4 and 4.9.2; IR 21-2 for 2001 and 2007 CBC projects).

II.B.3.3. Bolts:
   II.B.3.3.1 Type
   II.B.3.3.2 Size
   II.B.3.3.3 Clearances. See Figure 2-20.

II.B.3.3.3. Post-installed anchors and connections:
   II.B.3.3.1. Refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection II.F Post-installed anchors and connections: on page 82.
   II.B.3.4. Clean top of footing at first masonry course (concrete starter wall helps alleviate cleaning problems).
II.B.3.5. Clean-outs at bottom of each pour (sand layer frequently used to facilitate clean-out procedures). See Figure 2-21.

II.B.3.6. Maximum mortar fin projection per requirements.
II.B.3.7. Full mortar head/bed joints. See Figure 2-22 for an example showing mortar not providing a full head joint and excessive mortar fins.

Figure 2-21: Cleanouts at Bottoms of Cells

Figure 2-22: Lacking Full Head Joint; Mortar Fins Excessive
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II.B.3.8. No wet setting of bolts/headed studs/embeds.
II.B.3.9. Out-of-plane wall ties/anchorage – proper location vertically and horizontally (see Figure 2-23).

II.B.3.10. Congested reinforcing areas (e.g. piers, columns, boundary members in shear walls, wall corners and intersections, etc. – see Figure 2-24).
II.B.3.11. Grout consolidation, reconsolidation, and curing.

2.3.2.1 Masonry Walls

Refer to 2.3.2 Masonry on page 89 for documentation and inspection requirements.

2.3.2.2 Masonry Columns/Pilasters

Refer to 2.3.2 Masonry on page 89 for documentation and inspection requirements.

2.3.2.3 Masonry Piers

Refer to 2.3.2 Masonry on page 89 for documentation and inspection requirements.
2.3.3 Wood

In addition to the California Building Code, projects using wood products are generally governed by several referenced standards issued by the American Forest and Paper Association (AF&PA; see http://www.afandpa.org) through their wood products division, the American Wood Council (AWC; http://www.awc.org). The primary reference for general design and construction requirements is:

- National Design Specification (NDS) for Wood Construction, ANSI/AF&PA NDS

Additional standards apply for buildings using wood structural panel based SLRS, which are discussed in further detail in the section 2.4.3.1 Wood Structural Panel on page 142.

The following items apply to all light wood frame construction.

I. Receipt of documentation for constructed elements: While the items noted below are included as documentation items, the material/structural test documentation for wood materials are frequently on the actual wood member or panel. Documentation or markings is/are required for each type of wood product.

I.A. Pressure preservative-treated (PT) wood: PT wood (lumber and wood structural panel) is marked/labeled by an approved inspection agency per requirements (see Figure 2-25 for an example, taken from Figure 15-6 of General Technical Report FPL-GTR-190. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory: 15-1 - 15-28. Chapter 15.).

I.B. Fire-retardant-treated (FRT) wood: FRT wood (lumber and wood structural panel) is marked/labeled by an approved agency with documentation per requirements. (Refer to CBC 2303.2 for commonly specified required markings and documentation):

I.C. Framing

I.C.1. Sawn Lumber

I.C.1.1. Framing is marked/labeled by a grade mark of an approved agency per requirements (see Figure 2-27 for an example of Machine Stress Rated (MSR) and Machine Evaluated Lumber
STRUCTURAL SAFETY INSPECTION ITEMS

(MEL) and Figure 2-26 for an example of visually graded lumber). Commonly specified minimum information includes:

I.C.1.1.1. Grade
I.C.1.1.2. Species

I.C.2. I-Joists
I.C.2.1. Identified per requirements. (Refer to IR 23-9.10 for additional information and IR 23-9 for 2001 and 2007 CBC projects.)
I.C.2.1.1. Manufacturer’s Name
I.C.2.1.2. Quality Assurance Agency’s Name
I.C.2.1.3. Where in-service moisture content exceeds specified limits, manufacturer provides additional documentation indicating allowance for such conditions.
I.C.2.1.4. Commonly specified required markings often include the following (taken from ASTM D5055-05):
I.C.2.1.4.1 Product
I.C.2.1.4.2 Company Name
I.C.2.1.4.3 Plant Location or Number
I.C.2.1.4.4 Qualified Agency Name or Logo
I.C.2.1.4.5 Date of Manufacture
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I.C.3. Structural Composite Lumber (SCL)
I.C.3.1. Identified by a quality assurance agency per requirements. (See Figure 2-28 for an example).

![Figure 2-28: SCL Markings Example](image)

I.C.3.1.1. Manufacturer’s Name
I.C.3.1.2. Quality Assurance Agency’s Name

I.C.3.2. The SCL must comply with all requirements, including (but not limited to) (NOTE: Design values for both the member and fasteners could be reduced if the noted requirements are not provided.):

I.C.3.2.1. Type of Member (e.g. PSL, LVL, ML, etc.)
I.C.3.2.2. Wood Species (e.g. DF, SP, YP, etc.)
I.C.3.2.3. Grade (e.g. 2.1E, 2.0E, 1.9E, etc.)
I.C.3.2.4. Design values for both the member and fasteners could be reduced if the noted requirements are not provided.

I.C.3.3. Where in-service moisture content exceeds specified limits, manufacturer provides additional documentation indicating allowance for such conditions.

I.C.4. Glulams
I.C.4.1. Certificate of conformance issued by an accredited inspection agency.
I.C.4.2. Markings on glulam per requirements (for custom and non-custom members; refer to ANSI/AITC 190.1-07 for commonly specified required markings).
I.C.4.3. Special Inspection Documentation:

I.C.4.3.1. **Special inspector’s stamp on each glulam** (see Figure 2-29 for an example; special inspector’s stamp is usually specified to be required for fabrication of non-custom members exceeding 5 1/6”x18” with span larger than 32’-0” and custom members of any size and span). (Refer to https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?id=10 for a list of DSA approved Glulam inspectors.)
I.C.4.3.2. The special inspection report provides the following:

![Figure 2-29: Glulam Special Inspection Stamp Example](image)
STRUCTURAL SAFETY INSPECTION ITEMS

I.C.4.3.2.1 Verification of proper quality control procedures and tests on materials and during manufacturing process.

I.C.4.3.2.2 Indication of visual inspection of finished product.

I.C.4.3.3. Special inspector provides verified report for glulam fabrication [DSA 292].

I.C.5. Certified Glued Lumber (CGL)

I.C.5.1. Grade stamped by an American Lumber Standard Committee (ALSC) approved agency. (Refer to IR 23-10 for additional information.)

I.C.5.2. NOTE: CGL does not qualify as structural glued-laminated timber (glulam) but can be used as an alternative to sawn lumber or timber. When used, CGL is designated as “Certified Glued Lumber.”

I.D. Trusses

I.D.1. Receipt of design professional reviewed and DSA approved shop or design drawings and placement/erection drawings. (NOTE: Information commonly found in truss design drawings is given in CBC 2303.4.1 and 2303.4.3.1.)

I.D.1.1. Statement of General Conformance by design professional in general responsible charge is on the truss drawings per IR A-18.

I.D.1.2. Seal and signature by the truss designer.

I.D.1.2.1. Truss placement diagrams that serve only as a guide for installation and do not deviate from the approved submittal drawings are not required to bear the seal or signature of the truss designer.

I.D.1.3. When the truss span is 60 feet or more, verify the design of temporary installation restraint/bracing is provided by a licensed design professional. (See I.D.2.1.2 below for special inspection requirements.)

I.D.1.4. Metal Plate Connected Wood Trusses:

I.D.1.4.1. Unless specifically noted otherwise in the approved construction documents, when the clear span exceeds 60 feet, a registered design professional provides a special inspection report indicating that the temporary and permanent restraint/bracing are installed properly.

I.D.1.5. Manufactured Wood-Chord-Metal-Web Trusses (refer to IR 23-8 for additional information):

I.D.1.5.1. Special inspection report must indicate whether the truss was fabricated in accordance with the ICC ES report.

I.D.1.5.2. For each truss, project inspector to verify special inspection mark, which must include at least the special inspector’s initials and date.

I.D.2. Special Inspection Documentation:
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I.D.2.1. Special inspector’s stamp on each truss inspected for proper fabrication.
I.D.2.1.1. Report includes following items:
   I.D.2.1.1.1 List all inspected trusses
   I.D.2.1.1.2 Indicate where inspected trusses comply with requirements
   I.D.2.1.1.3 Any non-conforming items are noted
I.D.2.1.2. Metal-plate-connected wood trusses:
   I.D.2.1.2.1 For trusses spanning 60 feet or more, indication that the temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.
I.D.2.1.3. Special inspector’s verified report for open-web wood truss fabrication (DSA 292).

I.E. Wood structural panels
   I.E.1. Panels have panel markings by an approved testing and grading agency (refer to IR 23-6 for a list of qualified testing and inspection agencies) per requirements (see Figure 2-30 for an example and p. 6 of APA’s Engineered Wood Construction Guide for explanations of common panel markings).

I.F. Fasteners
   I.F.1. Supplier or producer certificate for compliance with requirements for nails, spikes, and staples.
      I.F.1.1. When ASTM F1667 is specified, verify with requirements whether the minimum bending yield strengths indicated in the Supplementary Requirements to ASTM F1667 are also required to be included with the certificate.
   I.F.2. Supplier or producer certificate for threaded, hardened-steel nails, and spikes consisting of high carbon steel wire, headed, pointed, annularly or helically threaded.
      I.F.2.1. Verify with approved construction documents whether the certificate must indicate that these items are heat treated and tempered to provide greater yield strength than for common wire nails of corresponding size.

II. Inspection of the following items:
   II.A. Proper site storage procedures for all lumber to prevent decay, moisture accumulation, and insect/pest attack per requirements.
II.B. Framing

II.B.1. Lumber

II.B.1.1. Species

II.B.1.2. Grade

II.B.1.2.1. **Both** the species **and** grade must comply with the requirements. For example, Douglas Fir/Larch #2, or Construction Grade is commonly specified, but Hem Fir “#1 and Better” is not an acceptable substitute since its density is less which reduces connection capacities.

II.B.1.2.2. Periodically re-verify wood products comply with requirements. Reject any material that may no longer comply with requirements (e.g. split ends) even though it may have initially complied when first received at the site.

II.B.1.2.3. **Do not allow substitution** of one grade ‘better’ than another without design professional and DSA approval. There are some situations in which the next grade ‘better’ is actually worse, depending on the loading direction on the member.

II.B.1.3. Moisture content (see Figure 2-31 for an example of a moisture meter that can be used to verify moisture content of wood products).

II.B.2. Glulam


II.B.3. Framing Installation

II.B.3.1. Moisture content during framing and fastener installation.

II.B.3.2. Cuts, notches, countersinking, and holes

II.B.3.2.1. All cuts, notches, countersinking, and holes are shown on the DSA approved drawings; no cuts, notches, tapers, shaving, countersinking, holes or other alterations may be made in any wood products (e.g. lumber, trusses, glulams, structural composite lumber, I-joists, etc.) if not shown on the DSA approved drawings without prior written approval by the design professionals and DSA.

II.B.3.2.2. Limits provided in CBC 2308 are **NOT** to be used on the project unless specifically indicated in the approved construction documents.

II.B.3.2.3. Framing members at areas with multiple pipes and/or electrical conduits - multiple holes/notches (e.g.

---

**Recommendation:** When the wood looks wet, especially at or near connections, use a moisture meter to determine if the wood meets requirements.
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minimum spacing between holes/notches, etc. – see Figure 2-32).

II.B.3.3. Pressure-preservative treated (PT) wood

II.B.3.3.1. PT wood is provided where indicated on approved construction documents. (Refer to Table 2-1 and http://www.awpa.com/references/official.asp for commonly specified PT lumber use categories and corresponding descriptions.)

Table 2-1: AWPA Use Categories and Brief Description

<table>
<thead>
<tr>
<th>Use Category</th>
<th>Brief Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC1</td>
<td>Interior Dry</td>
</tr>
<tr>
<td>UC2</td>
<td>Interior Damp</td>
</tr>
<tr>
<td>UC3A</td>
<td>Exterior Above Ground, Coated with Rapid Water Runoff</td>
</tr>
<tr>
<td>UC3B</td>
<td>Exterior Above Ground, Uncoated or Poor Water Runoff</td>
</tr>
<tr>
<td>UC4A</td>
<td>Ground Contact, General Use</td>
</tr>
<tr>
<td>UC4B</td>
<td>Ground Contact, Heavy Duty</td>
</tr>
<tr>
<td>UC4C</td>
<td>Ground Contact, Extreme Duty</td>
</tr>
<tr>
<td>UC5A</td>
<td>Marine Use, Northern Waters (Salt or Brackish Water)</td>
</tr>
<tr>
<td>UC5B</td>
<td>Marine Use, Central Waters (Salt or Brackish Water)</td>
</tr>
<tr>
<td>UC5C</td>
<td>Marine Use, Southern Waters (Salt or Brackish Water)</td>
</tr>
<tr>
<td>UCFA</td>
<td>Interior Above Ground Fire Protection</td>
</tr>
<tr>
<td>UCFB</td>
<td>Exterior Above Ground Fire Protection</td>
</tr>
</tbody>
</table>

II.B.3.3.2. Maximum incision parameters for pressure treated dimension lumber.

II.B.3.3.3. Proper treatment of any newly exposed PT lumber surfaces from any cut or notching.

II.B.3.3.4. Clearances to untreated wood meet requirements.

II.B.3.3.4.1 NOTE: DSA-SS untreated wood clearance requirements are more or less restrictive than those in DSA-SS/CC – verify with approved construction documents.

II.B.4. Beams

II.B.4.1. During construction, where members defined as Beams and Stringers (i.e. ≥5 inch nominal) are cut to length after being
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graded and the grading provisions are different for the middle third than the outer third, they are re-graded by an approved agency.

II.B.4.2. Where Beams and Stringers (i.e. ≥5 inch nominal) are continuous or cantilever, the grading provisions applicable to the middle 1/3 span apply to the entire beam length. Verify such grading procedures provide a member that complies with requirements.

II.B.5. I-Joists

II.B.5.1. Proper installation based on the more stringent of the manufacturer or ICC ES report. Refer to IR 23-9.10 for additional information.

II.B.5.2. Bridging per requirements.

II.B.5.3. No splitting at connections (refer to ICC ES report for minimum permitted nail spacing based on size of nail and type of I-Joist).

Common locations for splitting are:

II.B.5.3.1. Solid sawn lumber flange connections at bearing locations (e.g. wall top plates).

II.B.5.3.2. Tie strap or other connector hardware (end distance and spacing of nails).

II.B.5.3.3. Web stiffeners (comply with the manufacturer’s requirements).

II.B.5.3.4. I Joist chord, or web filler, that is a part of a wall anchorage system.

II.B.5.3.5. I-Joist flange receiving diaphragm sheathing nails

  II.B.5.3.5.1 Minimum thickness and width of the flange per requirements.

II.B.5.3.6. Shear transfer nailing at I-Joist blocking panels.

II.B.6. Structural Composite Lumber (SCL)

II.B.6.1. Proper installation based on the more stringent of the manufacturer’s and ICC ES report requirements.

II.B.6.2. No splitting at connections occurs (refer to ICC ES report for minimum nail spacing based on size of nail and type of member).

Common locations for splitting are:

II.B.6.2.1. Solid sawn lumber flange connections at bearing locations (e.g. wall top plates).

II.B.6.2.2. Tie strap or other connector hardware (end distance and spacing of nails).

II.B.6.2.3. When member is a part of a wall anchorage system.

II.B.6.2.4. Members receiving diaphragm sheathing.

II.B.6.2.5. Shear transfer nailing at SCL blocking panels.

II.B.6.2.6. At laminated veneer lumber (LVL) members with nails installed on member edges between plies.

II.B.7. Trusses

II.B.7.1. Pre-Installation Check
II.B.7.1.1. Refer to I.C.5.1 on page 99 above for required documentation.

II.B.7.1.2. Truss Size
   II.B.7.1.2.1 Verify members and connections are within fabrication tolerances specified by section 6.4.10 of ANSI/TPI 1-2007.

II.B.7.1.3. Cracked, dislodged, bent, or broken members.

II.B.7.1.4. Any other damage that could affect the structural integrity of the truss.
   II.B.7.1.4.1 For Metal-Plate-Connected-Wood Trusses, check for dislodged or missing connectors.

II.B.7.2. Installation
   II.B.7.2.1. Placement complies with DSA approved documents and truss placement diagram, including all details (e.g. bridging, bracing, connections, etc.).
   II.B.7.2.1.1 Moisture content during truss and fastener installation.
   II.B.7.2.1.2 Field placement for manufactured wood-chord-metal web trusses (see IR 23-8), including all details (e.g. bridging, bracing, connections, etc.).

II.B.7.3. Post-Installation Check
   II.B.7.3.1. Cracked, dislodged, bent, or broken members.
   II.B.7.3.2. Any other damage that could affect the structural integrity of the truss.
   II.B.7.3.2.1 For Metal-Plate-Connected-Wood Trusses, check for dislodged or missing connectors.

II.C. Wood structural panels
   II.C.1. Span rating
   II.C.2. Nominal thickness
   II.C.3. Exposure rating
   II.C.4. Grade
   II.C.5. Moisture content during wood structural panel and nailing installation.
   II.C.6. Gaps between installed panels comply with the more restrictive of the manufacturer’s and approved construction document documentation and inspection requirements.
   II.C.7. Staggering of panel joints.
   II.C.8. Where plaster is applied over wood-based sheathing, refer to 2.6.1.1 Roofing on page 169 for additional requirements.
   II.C.9. Fasteners
      II.C.9.1. Refer to 2.4.3.1 Wood Structural Panel on page 142 for additional documentation and inspection requirements at diaphragms and shear walls using wood structural panels.
      II.C.9.1.1. Fastener Type
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.9.1.1.1 Staples are **not permitted** at diaphragms and shear walls.

II.C.9.1.2. Shank dimension
II.C.9.1.3. Head size
II.C.9.1.4. Penetration
II.C.9.1.5. Spacing
II.C.9.1.6. Edge dimensions

II.C.9.2. Sheathing nails or other approved sheathing connectors are driven so that their head or crown is flush with the surface of the sheathing.

II.C.9.2.1. Approval of machine nailing requires both satisfactory jobsite demonstration and continual satisfactory performance.

II.C.9.3. Nail-to-panel edge distance. **NOTE:** In high-wind regions, ¾ inch may be required at wood shear walls where shown on DSA approved plans. Refer to section 2.4.3.1 Wood Structural Panel subsection **II.B.4.8 Special requirements at high-wind regions** on page 146 for additional information.

II.C.9.4. View sheathing from ‘open framing’ side to verify nailing engages framing (i.e. no ‘shiners’).

II.D. Connections

II.D.1. Connection Geometry:

II.D.1.1. Heavy or moderate loads are not supported by bolts/lags below the neutral axis without reinforcement to resist tension stresses perpendicular to grain.

II.D.1.2. Connections that cause tension stress perpendicular to grain have mechanical reinforcement to resist all such stresses.

II.D.1.3. Wood screws, nails, and spikes are not used in end grain withdrawal.

II.D.1.4. Where multiple fasteners occur:

II.D.1.4.1. Spacing is staggered whenever feasible.

II.D.1.4.1.1 **NOTE:** There may be some locations where it is required – refer to other sections (e.g. 2.4.3.1.1 Light Wood Framing on page 142) and DSA approved drawings for information.

II.D.1.4.2. Centroid of fastener group lines up with centroid of member, unless specifically detailed otherwise on DSA approved drawings.

II.D.1.5. Connection configuration does not cause bending in nails.

II.D.2. Fasteners

II.D.2.1. **NOTE:** ‘Sinker’ and ‘box’ nails are **not equivalent** to common nails with the same penny weight (i.e. 10d, 16d, etc.); such nails have lower capacities when compared to common nails.
STRUCTURAL SAFETY INSPECTION ITEMS

II.D.2.2. Moisture content of wood products during fastener installation (see II.B.3.1 on page 101 - significant reductions to fastener design values are required if the moisture content exceeds code limits).

II.D.2.3. In preservative-treated or exterior/wet/damp fire-retardant-treated wood applications, fasteners have specified corrosion protection.

II.D.2.4. Fasteners used for attachment of exterior wall coverings have corrosion protection in compliance with requirements. (NOTE: DSA-SS corrosion requirements are different than those in DSA-SS/CC – verify with approved construction documents.)

II.D.2.5. Proprietary Connections

II.D.2.5.1. Proper installation procedures for connections (see Figure 2-33 for an example of improper installation).

II.D.2.5.2. Any special requirements (often dictated by manufacturers' recommendations) associated with fasteners used in proprietary connection components (see IR 23-1 for additional requirements):

II.D.2.5.2.1 Nail gauge and length.

II.D.2.5.2.2 All nail holes filled.

II.D.2.5.2.3 Corrosion resistant coatings

II.D.2.5.2.3.1 Corrosion protection for exterior exposed fasteners.

II.D.2.5.2.3.2 Compatibility of such coatings with preservative treatment chemicals in the wood when in contact with them per manufacturer's recommendations.

II.D.2.6. Bolts, Nuts, Washers

II.D.2.6.1. Dimensional requirements. Frequently specified requirements for bolts include reference to ANSI/ASME Standard B18.2.1 or B18.2.6 (refer to Table 2-2, taken from Table L1 in AF&PA 2005 NDS).
II.D.2.6.2. Reduced body diameter bolts are not permitted; full body diameter bolts are required (refer to IR 23-5 for additional information).

II.D.2.6.3. Installation Requirements

II.D.2.6.3.1 Bolt hole tolerance.

II.D.2.6.3.1.1 All ‘fixes’ to oversized holes shall be approved by design professional and DSA.

II.D.2.6.3.2 Specified metal plate, strap, or washer (a commonly specified minimum is not less than a standard cut washer – see Table 2-6 on page 144 for standard cut washer dimensions) between wood and bolt heads.

II.D.2.6.3.2.1 Plate washers at sill plate anchor bolts. See 2.3.3.1 Walls subsection II.C.4 on page 104 and 2.4.3.1.1 Light Wood Framing subsection II.B.4.5.4.2 Anchor bolt requirements on page 143 for additional information.

II.D.2.6.3.3 Placement of bolt (see Figure 2-34 for commonly specified dimensions, though dimensions shown are not absolute minimums allowed based on code allowances with engineering analysis).

II.D.2.6.3.3.1 Edge Distance

II.D.2.6.3.3.2 End Distance
II.D.2.6.3.3.3 Fastener Spacing

II.D.2.6.3.4 Bolt thread length in bearing on wood member does not exceed specified limits.

II.D.2.6.3.5 Bolts are re-tightened prior to closing in.

II.D.2.7 Lag screws

II.D.2.7.1 Dimensional requirements. Frequently specified requirements include reference to ANSI/ASME Standard B18.2.1 (refer to Table 2-3 taken from Table L2 in AF&PA 2005 NDS.)
### Table L2 - Standard Hex Lag Screws

<table>
<thead>
<tr>
<th>Length, L</th>
<th>1/4&quot;</th>
<th>5/16&quot;</th>
<th>3/8&quot;</th>
<th>7/16&quot;</th>
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<td>0.227&quot;</td>
<td>0.265&quot;</td>
<td>0.326&quot;</td>
<td>0.371&quot;</td>
<td>0.471&quot;</td>
<td>0.579&quot;</td>
<td>0.683&quot;</td>
<td>0.780&quot;</td>
<td>0.887&quot;</td>
<td>1.012&quot;</td>
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<tr>
<td>E</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>5/32&quot;</td>
<td>9/32&quot;</td>
<td>5/16&quot;</td>
<td>13/32&quot;</td>
<td>1/2&quot;</td>
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<td>4&quot;</td>
<td>3-1/2&quot;</td>
<td>3-1/4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

### Notes:
1. Tolerances specified in ANSI B18.2.1. Full body diameter and reduced body diameter lag screws are shown. For reduced body diameter lag screws, the unthreaded shank diameter may be reduced to approximately the root diameter, D.<br>2. Minimum thread length (T) for lag screw lengths (L) is 6" or 1/2 the lag screw length plus 0.5", whichever is less. Thread lengths may exceed these minimums up to the full lag screw length (L).
II.D.2.7.2. Installation Requirements
   II.D.2.7.2.1 Predrilling for lead holes and thread length (see Figure 2-35 for commonly specified requirements).

II.D.2.7.2.2 Specified lubricant is used to facilitate lag screw installation.

II.D.2.7.2.3 Specified penetration into main member.

II.D.2.7.2.4 Placement of lag screw:
   II.D.2.7.2.4.1 Edge Distance
   II.D.2.7.2.4.2 End Distance
   II.D.2.7.2.4.3 Fastener Spacing

II.D.2.8. Wood screws
   II.D.2.8.1. Dimensional requirements. Frequently specified requirements include reference to ANSI/ASME Standard B18.6.1 (refer to Table 2-4 taken from Table L3 in AF&PA 2005 NDS) for further information.
II.D.2.8.2. Installation Requirements
II.D.2.8.2.1 Lead holes per requirements.
II.D.2.8.2.2 Specified lubricant is used to facilitate lag screw installation.
II.D.2.8.2.3 Specified penetration into main member.
II.D.2.8.2.4 Placement of lag screw per requirements and does not cause splitting:
   II.D.2.8.2.4.1 Edge Distance
   II.D.2.8.2.4.2 End Distance
   II.D.2.8.2.4.3 Fastener Spacing
II.D.2.9. Staples are not permitted for use in diaphragms nor shear walls.
II.D.2.10. Nails/Spikes
II.D.2.10.1. Dimensional requirements. Minimum specified nail dimensions often reference to those limits provided in ASTM F1667 (refer to Table 2-5, from Appendix A of AF&PA’s SDPWS).

Table 2-4: Dimensions for Standard Wood Screws

<table>
<thead>
<tr>
<th>Wood Screw Number</th>
<th>D</th>
<th>D₁</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>0.138&quot;</td>
<td>0.113&quot;</td>
</tr>
<tr>
<td>7</td>
<td>0.151&quot;</td>
<td>0.122&quot;</td>
</tr>
<tr>
<td>8</td>
<td>0.164&quot;</td>
<td>0.131&quot;</td>
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<tr>
<td>9</td>
<td>0.177&quot;</td>
<td>0.142&quot;</td>
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<tr>
<td>10</td>
<td>0.19&quot;</td>
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<tr>
<td>12</td>
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<tr>
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<tr>
<td>18</td>
<td>0.294&quot;</td>
<td>0.232&quot;</td>
</tr>
<tr>
<td>20</td>
<td>0.32&quot;</td>
<td>0.255&quot;</td>
</tr>
<tr>
<td>24</td>
<td>0.372&quot;</td>
<td>0.298&quot;</td>
</tr>
</tbody>
</table>

1. Tolerances specified in ANSI B18.6.1
2. Thread length on cut thread wood screws is approximately 2/3 of the screw length.
3. Single lead thread shown. Thread length is at least four times the screw diameter or 2/3 of the screw length, whichever is greater. Screws which are too short to accommodate the minimum thread length, have threads extending as close to the underside of the head as practicable.
4. Takes as the average of the specified maximum and minimum limits for body diameter of rolled thread wood screws.
II.D.2.10.2. Installation Requirements

II.D.2.10.2.1 Toenails (see Figure 2-36 for commonly specified installation requirements)

II.D.2.10.2.2 Placement of nail and member splitting:
   II.D.2.10.2.2.1 Edge Distance
   II.D.2.10.2.2.2 End Distance
   II.D.2.10.2.2.3 Fastener Spacing
   II.D.2.10.2.2.4 Where splitting occurs, pre-drilling may be required per the approved construction documents.

2.3.3.1 Walls

I. Receipt of documentation for constructed elements: Refer to section 2.3.3 Wood on page 96 for documentation and inspection requirements.

II. Inspection of the following items:
   II.A. Refer to relevant sections in 2.2 Foundation Systems starting on page 62 for items to be inspected prior to wall framing inspections (e.g. concrete foundations, embeds, anchor bolt placement, etc.).
   II.B. Walls are plumb and true within specified tolerances.
   II.C. Wall sill plate
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.1. Size

II.C.2. Refer to 2.3.3 Wood subsection II.B.3.3 Pressure-preservative treated (PT) wood on page 102 for PT inspection information.

II.C.2.1. PT may not be needed if specified clear distances or other provisions between wood and slab on grade or exterior grade are provided. (NOTE: DSA-SS/CC requirements are more or less restrictive than DSA-SS requirements – verify with approved construction documents.)

II.C.3. Notching and holes per requirements. Refer to 2.3.3 Wood subsection II.B.3.2 on page 101 and II.C.4.2 below on page 113 for additional requirements.

II.C.4. Anchor bolts

II.C.4.1. Refer to 2.3.3 Wood subsection II.D.2.6 Bolts on page 106 for dimensional and installation inspection requirements, (see Figure 2-37).

II.C.4.1.1. Where wood structural panels are part of light frame shear wall construction, refer to 2.4.3.1 Wood Structural Panel subsection II.B.4.5.4.2 Anchor bolt requirements on page 143 for anchor bolt inspection requirements.

II.C.4.2. Check that conduits, pipes, etc. passing through sill plate are at the specified distance from anchor bolts (see Figure 2-38).

II.C.4.2.1. Pipes through bottom plates have straps as indicated in approved drawings.

II.C.5. Where post-installed anchors or shotpins/power-actuated pins are used, placement requirements are met (especially edge distances at curbs and edge of slab conditions). For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and subsection II.F Post-installed anchors and connections: on page 82 for additional information.
II.D. Wall studs/posts
   II.D.1. Stud/post
      II.D.1.1. Size
      II.D.1.2. Placement/Spacing
   II.D.2. Wall corners and intersections.
   II.D.3. Nailing of stud to sill plate and top plate (e.g. per typical nailing schedule provided in approved construction documents).
      II.D.3.1. NOTE: 20d may need to be used at 3x sill plates to achieve required minimum penetration – verify with approved construction documents.
      II.D.3.2. Special connections and framing requirements at openings and other special conditions (e.g. multiple trimmer/king studs; additional clips at top and bottom of king studs for large openings; etc.).
   II.D.4. Cuts, holes, notches, and countersinking. See 2.3.3 Wood subsection II.B.3.2 on page 101 for additional information.
   II.D.5. Blocking Requirements

II.E. Top Plate
   II.E.1. Size
   II.E.2. Overlap at corners and intersections.
   II.E.3. Minimum lap splice per requirements.
      II.E.3.1. Special conditions which may indicate different sizes of double top plates.
      II.E.3.2. At top plate splice, refer to 2.4.3.1 Wood Structural Panel subsection II.B.4.5.5 Top plate on page 145 for inspection requirements.
   II.E.4. Check that conduits, pipes, etc. passing through top plate are at the specified distance from top plate splice.
      II.E.4.1. Confirm specified straps at top plates where interrupted by pipes/conduit.

II.F. Walls are plumb and true within specified tolerances.

II.G. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159 and 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

II.H. Wall Sheathing
   II.H.1. See 2.3.3 Wood subsection II.C Wood structural panels on page 104 for requirements.
   II.H.2. At wood structural panel shear walls, refer to 2.4.3.1 Wood Structural Panel on page 142 for additional documentation and inspection requirements.
STRUCTURAL SAFETY INSPECTION ITEMS

2.3.3.2 Floor/Roof

I. Receipt of documentation for constructed elements: Refer to section 2.3.3 Wood on page 96 for documentation and inspection requirements.

II. Inspection of the following items:

II.A. Framing

II.A.1. Refer to section 2.3.3 Wood, subsections II.B.2 Glulams on page 101, II.B.4 Beams on page 102, II.B.5 I-Joists on page 103, II.B.6 Structural Composite Lumber (SCL) on page 103, and II.B.7 Trusses on page 103, for inspection requirements.

II.A.2. Size

II.A.3. Framing Installation

II.A.3.1. Location and spacing.

II.A.3.2. Installation per ICC ES (or DSA recognized equivalent) report requirements for specified proprietary engineered framing (e.g. I-Joists, SCL, etc.).

II.A.3.3. Blocking/rotational restraint at bearing points (e.g. at platform framing conditions).

II.A.3.4. Bridging

II.A.3.5. Any special framing of joists below partitions with piping (e.g. often specified to be doubled and bridged).

II.A.3.6. Connections

II.A.3.6.1. Joist/beam/rafter connection to top plate/beam/wall.

II.A.3.6.2. Connection Hardware

II.A.3.6.3. Straps/ties/lap (sheathing is not permitted to act as a tie) connecting joists/beams when spliced over support.

II.A.3.6.4. For connections, refer to 2.3.3 Wood subsection II.D Connections on page 105 for additional inspection requirements.

II.B. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

II.C. Floor/Roof Sheathing

II.C.1. See 2.3.3 Wood subsection II.C Wood structural panels on page 104 for inspection requirements.

II.C.2. For wood structural panel diaphragms, refer to 2.4.3.1 Wood Structural Panel on page 142 for additional documentation and inspection requirements.

II.C.3. Where overhang or cantilever conditions occur, diaphragm boundary nailing occurs at exterior wall – verify with approved construction documents.

II.C.3.1. Where overhang/cantilever is larger than a few feet, boundary nailing may be required at the edge framing/blocking beyond the exterior wall – verify with approved construction documents.
STRUCTURAL SAFETY INSPECTION ITEMS

2.3.4 Steel

2.3.4.1 Structural Steel

In addition to the California Building Code, projects using structural steel are generally governed by several referenced standards issued by the American Institute of Steel Construction (AISC; see http://www.aisc.org). Specifically, those are as listed below:

- Specification for Structural Steel Buildings, ANSI/AISC 360
- Code of Standard Practice for Steel Buildings and Bridges, ANSI/AISC 303

Additional standards apply for buildings using structural steel seismic force resisting systems, which are discussed in further detail in the 2.4.4.1 Structural Steel on page 148.

The Research Council on Structural Connections (RCSC; see http://www.boltcouncil.org) provides standards for high-strength fasteners in their reference standard, listed below:

- Specification for Structural Joints Using ASTM A325 or A490 Bolts

The American Welding Society (AWS; see http://www.aws.org) provides standards for welding in several referenced standards, listed below:

- Structural Welding Code – Steel, AWS D1.1
- Structural Welding Code – Sheet Steel, AWS D1.3
- Structural Welding Code – Reinforcing Steel, AWS D1.4

Additional standards apply for buildings using structural steel seismic force resisting systems, which are discussed in further detail in the section 2.4.4.1 Structural Steel on page 148.

Frequently, testing of structural steel connections is necessary for various portions of structural steel construction associated with the project. When such testing is necessary as dictated by the construction documents, certain information must be included, depending on the type of test that is being performed. While there are no format requirements, DSA 208: High Strength Bolt, DSA 209: Fireproofing Density, and DSA 210: Ultrasonic (NDT) provide a suggested format (refer to APPENDIX B – REFERENCED DSA FORMS on page 313 for these forms).

The following information applies to all structural steel items on a given project.

I. Receipt of documentation for constructed elements:
   I.A. Shop Drawings:
      I.A.1. Where applicable, receipt of design professional reviewed structural steel shop drawings (usually broken up into: 1. embedment drawings [often
STRUCTURAL SAFETY INSPECTION ITEMS

referred to as “anchor bolt layout drawings”] and 2. remaining structural steel shop and erection related [i.e. erection bracing and erection] drawings).

I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be submitted to DSA for review and approval prior to installation of modified elements.

I.A.1.1. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.B.1. Framing Members

I.B.1.1. For steel shipped directly to the site without welding or fabrication, the project inspector shall check the following for compliance with requirements - otherwise, the special inspector shall check and report on the following in the form of reports of tests performed and/or daily special inspection reports:

I.B.1.1.1. All materials are appropriately marked.

I.B.1.1.2. Traceability of “chain of custody” from mill to fabricator to jobsite (e.g. mill identification mark or heat numbers on material).

I.B.1.1.3. Mill certificates provided for all materials.

I.B.1.1.3.1 Mill analysis or test report with chemical/mechanical test and material specification designation with heat numbers.

I.B.1.1.4. Material/member sizes

I.B.1.1.5. Material types

I.B.1.1.6. Material grades

I.B.1.1.6.1 For $F_y$ greater than 36 ksi, ASTM or other specification designation is indicated near the erection mark on each piece (over shop paint, if occurs).

I.B.1.2. Lab tests for unidentified materials.

I.B.2. Connections

I.B.2.1. Test high-strength fasteners (IR 17-8):

I.B.2.1.1. Bolts

I.B.2.1.2. Nuts

I.B.2.1.3. Washers

I.B.2.1.4. Identification of fastener components as noted in IR 17-8.

I.B.2.1.4.1 Manufacturer’s certification frequently includes:

I.B.2.1.4.1.1 Heat analysis and heat number.

I.B.2.1.4.1.2 Hardness test, tensile test, wedge test, and proof load test results.
I.B.2.1.4.1.3 Visual inspection for head burst.
I.B.2.1.4.1.4 Statement of compliance with dimensional and thread fit requirements.
I.B.2.1.4.1.5 Production lot number.
I.B.2.1.4.1.6 Title and signature of person assigned certification responsibility.

I.B.2.2. Welding:
I.B.2.2.1. Weld fill material
I.B.2.2.1.1 Identification markings per AWS designation listed on the DSA approved documents and the Welding Procedure Specifications (WPS).
I.B.2.2.1.2 Manufacturer’s certificate of compliance.

I.B.2.2.2. WPS
I.B.2.2.3. Welder qualifications
I.B.2.2.4. Equipment
I.B.2.2.5. For Non-Destructive Testing (NDT) requirements (which are usually associated with structural steel seismic lateral force resisting systems), refer to 2.4.4.1 Structural Steel subsection I.A.2.1 Welding: on page 149.

I.B.3. Spray Applied Fire-Proofing
I.B.3.1. Tests of bond strength
I.B.3.2. Tests of density

I.B.4. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation:
I.C.1. Special inspector to provide documentation for the following in the form of reports of tests performed and/or daily special inspection reports.
I.C.1.1. Framing Members
I.C.1.1.1. Examine seam welds of structural tubes and pipes (refer to IR 17-3 and Bulletin BU 07-03 for additional information).
I.C.1.1.2. Stiffener locations
I.C.1.1.3. Connection tab locations
I.C.1.1.4. All construction details fabricated in the shop.
I.C.1.2. Connections
I.C.1.2.1. High-Strength Bolts (HSB), nuts and washers.
I.C.1.2.1.1 Refer to IR 17-9 for HSB special inspection requirements.
I.C.1.2.1.2 Identification Markings.
I.C.1.2.1.3 Manufacturer’s certificates of compliance conform to ASTM standards specified in the DSA approved documents.
I.C.1.2.1.3.1 Reuse of ASTM A490 and galvanized A325 is not permitted.
STRUCTURAL SAFETY INSPECTION ITEMS

I.C.1.2.1.4 Bearing-type ("snug tight") connections.
I.C.1.2.1.5 Slip-critical connections.
I.C.1.2.1.6 Upon completion of high-strength bolt installation, the special inspector provides a verified report (DSA 292).

I.C.1.2.2. Welding
I.C.1.2.2.1 Refer to IR 17-3 for welding special inspection requirements.
I.C.1.2.2.2 Welding special inspectors have the following:
   I.C.1.2.2.2.1 DSA Approved Documents
   I.C.1.2.2.2.2 Applicable Welding Codes/Standards.
   I.C.1.2.2.2.3 Welder Qualification Records
   I.C.1.2.2.2.4 Temperature Sticks
   I.C.1.2.2.2.5 Calibrated hand-held volt/amp meter
   I.C.1.2.2.2.6 Fillet Weld Test Gages
   I.C.1.2.2.2.7 Approved WPS
   I.C.1.2.2.2.8 Report forms conforming to regulations.

I.C.1.2.2.3 Shop and Field Welding
I.C.1.2.2.3.1 Groove, multi-pass, and fillet welds greater than 5/16".
I.C.1.2.2.3.2 Single-pass fillet welds ≤ 5/16".
I.C.1.2.2.3.3 Stairs and railing systems.
I.C.1.2.2.3.4 Verification of reinforcing steel weldability.
I.C.1.2.2.3.5 Welding of reinforcing steel
   I.C.1.2.2.3.5.1 If no mill rest reports are available, chemical analysis is required as specified in the approved construction documents. (NOTE: DSA-SS testing requirements are different than those in DSA-SS/CC projects – verify with approved construction document.)

I.C.1.2.2.4 Field Welding
I.C.1.2.2.4.1 Installation of end-welded studs.
   I.C.1.2.2.4.1.1 Bend Test
I.C.1.2.2.4.2 For field welding of steel floor and roof deck, see 2.3.4.2.2 Steel Deck, subsection I.C.1.1.1 Welding: on page 137.
I.C.1.2.2.4.3 For field welding of structural cold formed steel, see 2.3.4.2 Cold Formed
STRUCTURAL SAFETY INSPECTION ITEMS

Steel, subsection I.C.1.1.1 Welding on page 127.

I.C.1.2.2.5 For NDT requirements (usually associated with structural steel seismic lateral resisting systems), refer to 2.4.4.1 Structural Steel subsection I.B.1.2 Welding: on page 149.

I.C.1.2.2.6 Completed welds, parts, and joints have special inspector distinguishing mark, tag, or dye stamp as indicated in IR 17-3.

I.C.1.2.2.7 Upon completion of shop and/or field welding work, special inspector provides verified report (DSA 292).

I.C.1.3. Spray Applied Fire-Proofing

I.C.1.3.1. Examine structural steel surface conditions.
I.C.1.3.2. Inspect application of fire-proofing.
I.C.1.3.2.1 Take samples of applied fire-proofing.
I.C.1.3.2.2 Measure thickness

I.C.1.3.3. All aspects of ICC ES (or equivalent DSA approved agency) report and DSA approved documents.

I.C.1.3.4. Upon completion of spray applied fire-proofing installation, the special inspector provides a verified report (DSA 292).

II. Inspection of the following items:

II.A. Proper storage and handling of materials.

II.B. Framing

II.B.1. Dimensional Requirements (e.g. size)
II.B.2. Installation Requirements
II.B.2.1. Bracing
II.B.2.2. Where corrosion protective coverings have been damaged (e.g. shop paint, etc.), repair of protective coverings as indicated in approved construction documents.

II.C. Connections

II.C.1. All details constructed in the field.
II.C.2. Bolts, Nuts, Washers
II.C.2.1. Dimensional Requirements
II.C.2.1.1. For anchor bolts connecting steel to concrete, types and sizes per requirements, including tolerances indicated in IR 22-2.
II.C.2.1.2. Bolt length is sufficient for proper thread stick-out.
II.C.2.2. Installation requirements
II.C.2.2.1. Hole sizes per requirements.
II.C.2.2.1.1 For anchor bolts connecting steel to concrete, common oversized holes may not be allowed for some base connections of certain lateral force
resisting systems, such as braced frames and moment frames. Verify requirements with approved construction documents.

II.C.2.2.2. Bolt type, such as HSB vs. machine bolts (e.g. ASTM A307).

II.C.2.2.2.1 HSB

II.C.2.2.2.1.1 Refer to RCSC 2004, Section 9 for background information on inspections associated with HSB.

II.C.2.2.2.1.2 Proper storage of bolts, nuts, and washers (marked sealed containers; kept clean; etc. – see Figure 2-39 for an example of improper storage).

II.C.2.2.2.1.3 For fully tensioned bolts, testing device is appropriate when used (e.g. Skidmore-Wilhelm Model M or L typically used; Model MS for short bolts – see Figure 2-40)

II.C.2.2.2.1.3.1 Alternative methods include direct tension indicators or twist-off bolts – see Figure 2-41.

II.C.2.2.2.1.4 Cleanliness of faying surfaces, especially at slip critical connections or other connections identified to meet certain faying surface requirements (i.e. no dirt, paint overspray, heavy mill scale, oil, etc.).

II.C.2.2.2.1.5 Slip-critical bolts:

II.C.2.2.2.1.5.1 Proper installation method (e.g. turn-of-the-nut method must be calibrated and often requires
II.C.2.2.1.6 No field modifications of holes (e.g. no enlarging or torch cutting of holes is permitted).

II.C.3. Welding
II.C.3.1. Before welding occurs:
II.C.3.1.1. Proper coordination between the fabricator’s and welding inspector’s schedules as part of the welding inspection program.
II.C.3.1.2. Understand the QA/QC program for welding and what requires special inspection – understand the scope of welding special inspection.
II.C.3.1.3. While AWS-CWI monitors welders, project inspector monitors AWS-CWI.
II.C.3.1.4. WPS availability for each weld, including at location where welding occurs.
II.C.3.2. At fillet welds, proper fit-up – excessive gap between joined pieces requires increase in leg length of weld.
II.C.3.3. Field Welding
II.C.3.3.1. Special material requirements (which may be different than other common field weld materials) for demand critical welds.
II.C.3.3.2. Steel Deck – refer to 2.3.4.2.2.2 Steel Deck on page 136 for additional information.

II.D. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

2.3.4.1.1 Beams

This section covers all types of steel beams.

Refer to 2.3.4.1 Structural Steel on page 116 for documentation and inspection requirements.

2.3.4.1.1.1 Composite

For composite beams, refer to 2.3.1 Concrete on page 74 and 2.3.4.1 Structural Steel on page 116 for documentation and inspection requirements. Additionally, where steel deck occurs, refer to 2.3.4.2.2.2 Steel Deck on page 136.
STRUCTURAL SAFETY INSPECTION ITEMS
2.3.4.1.1.2 Steel Joists/Joist Girders/Trusses

For structural steel joists, several referenced standards are issued by the Steel Joist Institute (SJI; see http://steeljoist.org/):

- 2006 Standard Specifications for Composite Steel Joists, CJ-Series, SJI CJ-01–06
- 2005 Standard Specifications for Open Web Steel Joists, K Series, SJI K-1.1–05
- 2005 Standard Specifications for Longspan Steel Joists, LH-Series and Deep Longspan Steel Joists, DLH-Series, SJI LH/DLH-1.1–05
- 2005 Standard Specifications for Joist Girders, SJI JG-1.1–05

The following information applies to all structural steel beams on a given project.

I. Receipt of documentation for constructed elements:
   I.A. Shop Drawings:
      I.A.1. Where applicable for projects having steel joists/joist girders, receipt of design professional reviewed and DSA approved structural steel joist drawings and placement/erection drawings.
      I.A.1.1. Statement of General Conformance by design professional in general responsible charge is on the steel joist drawings per IR A-18.
   I.B. Material/Structural Test Documentation (for steel joists, see IR 22-3.10):
      I.B.1. Receipt of certificate of compliance by joist manufacturer indicating joists fabricated in accordance with DSA approved construction documents and SJI standard specifications.
      I.B.2. For both chord and web members:
         I.B.2.1. Material size
         I.B.2.2. Material type
         I.B.2.3. Material grade
         I.B.2.4. Connections
            I.B.2.4.1. Fasteners per requirements.
            I.B.2.4.2. Weld filler material.
   I.C. Special Inspection Documentation:
      I.C.1. For each joist/joist girder/truss, verification of the following:
         I.C.1.1. Joist/truss profile
         I.C.1.2. Dimensions
         I.C.1.3. Camber
         I.C.1.4. Mark or tag on joist/truss by special inspector. This is to remain intact throughout construction, up to and including erection.
         I.C.1.5. Connections
            I.C.1.5.1. Connections comply with requirements.
            I.C.1.5.2. Welding
               I.C.1.5.2.1 Locations
STRUCTURAL SAFETY INSPECTION ITEMS

I.C.1.5.2.2 Lengths
I.C.1.5.2.3 Profiles

I.C.1.6. Upon completion of steel joist fabrication, the special inspector provides a verified report (DSA 292).

II. Inspection of the following items:

II.A. For steel joists/Joist girders (IR 22-3.10):
   II.A.1. Joist Size
   II.A.2. Special inspector tag or mark is visible throughout erection process.
   II.A.3. Member Placement
   II.A.4. Chord bracing:
      II.A.4.1. Size
      II.A.4.2. Location
      II.A.4.3. Connections
   II.A.5. Bridging (see Figure 2-43)
      II.A.5.1. Size
      II.A.5.2. Location

II.A.5.3. Connections
II.A.5.4. Bridging termination connections to structure.

II.A.5.4.1. Where no terminus connection is possible due to construction phasing, temporary bracing is provided.
STRUCTURAL SAFETY INSPECTION ITEMS

II.A.5.5. For bottom chord bearing joists, bridging at supports is in place prior to hoisting cable release.

II.A.5.6. Where approved building design professional drawings indicate wind uplift design loads for joists, bottom chord bridging per requirements.

II.A.6. Field Splices (see Figure 2-44)

II.A.7. Seating Connections
   II.A.7.1. Bearing Length
   II.A.7.2. Anchorage Connection

2.3.4.1.2 Columns

Refer to 2.3.4.1 Structural Steel on page 116 for documentation and inspection requirements.

2.3.4.1.2.1 Composite

2.3.4.2 Cold Formed Steel

In addition to the California Building Code, projects using cold formed steel are generally governed by referenced standards issued by various groups, based on the type of product. The primary reference applicable to all cold formed steel is based on a standard produced by the American Iron and Steel Institute (AISI; see http://www.steel.org/). Specifically, the applicable reference for all cold formed steel is listed below:
STRUCTURAL SAFETY INSPECTION ITEMS

- 2007 North American Specification for the Design of Cold-Formed Steel Structural Members, with Supplement No. 2, AISI S100-07-S2-10

The American Welding Society (AWS; see http://www.aws.org) provides the welding standard applicable to cold formed steel:

- 2008 Structural Welding Code – Sheet Steel, AWS D1.3

The following information applies to all cold formed steel items on given project.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   I.B. Material/Structural Test Documentation:
      I.B.1. Framing Members
         I.B.1.1. All materials are appropriately marked.
            I.B.1.1.1. For light frame construction members, see 2.3.4.2.1 Cold Formed Steel Light Frame Construction on page 130 for additional information.
            I.B.1.1.2. For steel deck, see 2.3.4.2.2.2 Steel Deck on page 136 for additional information.
      I.B.1.2. Traceability of “chain of custody” from mill to fabricator to jobsite.
      I.B.1.3. Mill certificates provided for all materials.
         I.B.1.3.1. Mill analysis or test report with chemical/mechanical test and material specification designation with heat numbers.
      I.B.1.4. Material/member sizes and thicknesses.
      I.B.1.5. Material types
      I.B.1.6. Material grades
   I.B.2. Lab tests for unidentified materials per requirements.
   I.B.3. Connections
      I.B.3.1. Screws
      I.B.3.2. Bolts
         I.B.3.2.1. Where specified bolts do not comply with one of the noted ASTM’s provided in AISI S100-07-S2-10 Section E3, testing documentation indicates bolts provided comply with specified nominal strength indicated on the approved construction documents.
      I.B.3.3. Nuts
      I.B.3.4. Washers
      I.B.3.5. Welding:
         I.B.3.5.1. Weld filler material
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.3.5.1.1 Identification markings per AWS designation listed on the DSA approved documents applicable to cold formed steel (e.g. AWS D1.3) and the Welding Procedure Specifications (WPS).

I.B.3.5.1.2 Manufacturer’s certificate of compliance.

I.B.3.5.2. WPS in accordance with AWS D1.3.

I.B.3.5.3. Welder qualifications in accordance with AWS D1.3.

I.B.3.5.4. Equipment

I.B.4. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation:

I.C.1. Special inspector to provide documentation for the following in the form of reports of tests performed and/or daily special inspection reports.

I.C.1.1. Connections

I.C.1.1.1. Welding

I.C.1.1.1.1 Refer to IR 17-3 for welding special inspection requirements.

I.C.1.1.1.2 Verify welding special inspectors have the following:

I.C.1.1.1.2.1 DSA Approved Documents

I.C.1.1.1.2.2 Applicable Welding Codes/Standards.

I.C.1.1.1.2.3 Welder Qualification Records

I.C.1.1.1.2.4 Temperature Sticks

I.C.1.1.1.2.5 Calibrated hand-held volt/amp meter

I.C.1.1.1.2.6 Fillet Weld Test Gages

I.C.1.1.1.2.7 Approved WPS

I.C.1.1.1.2.8 Report forms conforming to regulations.

I.C.1.1.1.3 Shop and Field Welding

I.C.1.1.1.3.1 Arc spot welds.

I.C.1.1.1.3.1.1 Maximum / minimum steel thicknesses for connected parts.

I.C.1.1.1.3.1.2 Weld washer requirements.

I.C.1.1.1.3.1.3 Minimum edge and clear distance.

I.C.1.1.1.3.2 Arc seam welds.

I.C.1.1.1.3.2.1 Minimum edge and clear distance.

I.C.1.1.1.4 Field Welding

I.C.1.1.1.5 Completed welds, parts, and joints have special inspector distinguishing mark, tag, or dye stamp as indicated in IR 17-3.

I.C.1.1.1.6 Upon completion of shop and/or field welding work, special inspector provides verified report (DSA 292).
STRUCTURAL SAFETY INSPECTION ITEMS

II. Inspection of the following items:

II.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.

II.B. Proper storage and handling of materials.

II.C. Framing Members
   II.C.1. Dimensional requirements within the specified tolerances:
      II.C.1.1. Member sizes
      II.C.1.2. Thicknesses
      II.C.1.2.1. Delivered minimum of 95% of specified design thickness (for members with corrosion protective coatings, see below for additional information on thickness requirements).

II.C.2. Installation Requirements
   II.C.2.1. Member locations and spacing.
   II.C.2.2. Corrosion protective coverings
      II.C.2.2.1. Based on the corrosion coating specified, verify sufficient thickness beyond minimum delivered base metal thickness. (Refer to AISI's Design Guide 4: Durability Of Cold-Formed Steel Framing Members and the American Galvanizer’s Association publication The Inspection of Hot-Dip Galvanized Steel Products for additional information based on commonly specified corrosion coatings.)
      II.C.2.2.2. For light frame construction members, see 2.3.4.2.1 Cold Formed Steel Light Frame Construction on page 130 for additional information.
      II.C.2.2.3. For steel deck, see 2.3.4.2.2.2 Steel Deck on page 136 for additional information.
      II.C.2.2.4. Where corrosion protective coverings have been damaged (e.g. galvanizing, galvannealing, shop paint, etc.), proper repair of protective coverings as indicated in approved construction documents. (NOTE: Repairs may not be required for small scratches for some coating treatments – verify with approved construction documents.)
      II.C.2.2.5. Where dissimilar metals are in contact, specified separation method is provided (e.g. paint, grommet, etc.).

II.D. Connections
   II.D.1. All details constructed in the field.
   II.D.2. Bolts, Nuts, Washers
      II.D.2.1. Dimensional Requirements
II.D.2.1.1. For anchor bolts connecting steel to concrete, types and sizes per requirements, including tolerances indicated in IR 22-2.

II.D.2.2. Installation Requirements
   II.D.2.2.1. Bolt locations
   II.D.2.2.2. Hole size limitations (see Figure 2-45)

II.D.3. Screws
   II.D.3.1. Dimensional Requirements
   II.D.3.2. Installation Requirements
      II.D.3.2.1. Screws are installed and tightened per manufacturers recommendations.
      II.D.3.2.2. Placement (e.g. spacing, edge, and end distances).
         II.D.3.2.2.1 Where a larger than specified screws size is used, placement meets requirements for larger size.
      II.D.3.2.3. Where screws carry tension, head and/or washers per requirements.

II.D.4. Welding
   II.D.4.1. Before welding occurs:
      II.D.4.1.1. Proper coordination between the fabricator’s and welding inspector’s schedules as part of the welding inspection program.
STRUCTURAL SAFETY INSPECTION ITEMS

II.D.4.1.2. Understand QA/QC program for welding and what requires special inspection – understand scope of welding special inspection.

II.D.4.1.3. While AWS-CWI monitors welders, project inspector monitors AWS-CWI.

II.D.4.1.4. WPS availability for each weld, including at location where welding occurs.

II.D.4.2. Field Welding

2.3.4.2.1 Cold Formed Steel Light Frame Construction

In addition to the information noted for 2.3.4.2 Cold Formed Steel on page 125, projects using cold formed steel light frame construction are generally governed by several referenced standards issued by the American Iron and Steel Institute (AISI; see http://www.steel.org/). Specifically, those are listed below:

- 2007 North American Standard for Cold-Formed Steel Framing - General Provisions, AISI-S200-07
- 2007 North American Standard for Cold-Formed Steel Framing - Floor and Roof System Design, AISI-S210-07
- 2007 North American Standard for Cold-Formed Steel Framing - Wall Stud Design, AISI-S211-07
- 2007 AISI North American Standard for Cold-Formed Steel Framing - Header Design, AISI-S212-07
- 2007 AISI North American Standard for Cold-Formed Steel Framing - Truss Design, AISI S214-07

In addition to the information noted for 2.3.4.2 Cold Formed Steel on page 125, the following information applies to all cold formed steel light frame construction items on given project.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   I.B. Material/Structural Test Documentation:
      I.B.1. Framing Members
      I.B.1.1. All materials are appropriately marked per requirements.

II. Inspection of the following items:
   II.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   II.B. Framing Members
      II.B.1. Dimensional requirements within specified tolerances.
      II.B.2. Installation Requirements
II.B.2.1. Framing is not embedded within concrete unless specifically shown in the approved drawings and corresponding additional corrosion protection is provided.

II.B.2.2. No field cutting, notching, boring, or patching of members is permitted, unless specifically shown on approved construction documents.

II.B.2.3. Framing placement and spacing.

II.B.2.4. Coordination with other trades:

II.B.2.4.1. Plumbing piping is provided with the specified isolative non-corrosive system to prevent galvanic reaction or abrasion between piping and framing.

II.B.2.4.2. Electrical wiring is in conduit or separated from framing with specified non-corrosive non-conductive materials or methods.

II.B.2.4.3. Where mineral fiber insulation is installed within framing depth, installation complies with requirements.

II.C. Connections:

II.C.1. Fasteners’ rust inhibitive coating per requirements.

II.C.2. Screws

II.C.2.1. Dimensional Requirements

II.C.2.1.1. Size

II.C.2.1.2. Head (type and size)

II.C.2.1.3. Length

II.C.2.2. Installation Requirements

II.C.2.2.1. Placement

II.C.2.2.1.1 Screw extension through fastened pieces provides specified thread projection beyond joined piece surface (usually specified as a minimum of three (3) exposed threads), without causing separation between joined pieces.

II.C.2.3. Where stripped screws occur:

II.C.2.3.1. When in tension, they are not permitted.

II.C.2.3.2. When in shear, refer to approved construction documents for permitted usage of such fasteners.

II.C.2.4. Where gypsum board is applied to steel framing, bugle head style complies with requirements.

II.C.3. Welding
II.C.3.1. Welded areas are treated as specified to provide specified corrosion resistance for original components (see Figure 2-46).

2.3.4.2.1.1 Walls

For documentation requirements, refer to 2.3.4.2 Cold Formed Steel on page 125.

I. Inspection of the following items:

I.A. Bottom Track
   I.A.1. Where walls occur, foundation at base track is level within specified tolerances.
   I.A.2. Anchor bolts
      I.A.2.1. Size
      I.A.2.2. Embedment
      I.A.2.3. Spacing
      I.A.2.4. Placement
   I.A.3. Work of other trades (e.g. mechanical/electrical/plumbing) does not alter (e.g. install notches, holes, etc.) bottom track unless specifically shown on approved drawings.

I.B. Studs
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.1. Framing size and placement.
   I.B.1.1. Header and jamb per requirements (see Figure 2-47 for an example of incorrect placement of multi-stud jamb leading to incorrect header support).

I.B.2. End bearing/gap of studs per requirements, which may be different at curtain walls compared to other walls. Figure 2-48 shows an excessive gap for end bearing studs.

Figure 2-47: Single Jamb Supporting Header Insufficient - Multi-Stud Jamb Incorrect Location
I.C. Top Track
   I.C.1. Top track connection to stud and structure per requirements (e.g. at non-bearing walls, there is frequently an air gap specified to allow the floor/roof above to vertically deflect independent of the wall below).
   I.C.2. Work of other trades (e.g. mechanical/electrical/plumbing) does not alter (e.g. install notches, holes, etc.) top track unless specifically shown on approved drawings.

I.D. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159 and 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

I.E. Wall Sheathing
   I.E.1. Wood Structural Panels
      I.E.1.1. See 2.3.3 Wood subsection II.C Wood structural panels on page 104 for requirements.
      I.E.1.2. At wood structural panel shear walls, refer to 2.4.3.1 Wood Structural Panel on page 142 for additional documentation and inspection requirements.
   I.E.2. Steel Sheet
      I.E.2.1. At steel sheet shear walls, see 2.4.4.2.1 Steel Sheet on page 157 for additional requirements.
2.3.4.2.2 Floor/Roof

2.3.4.2.2.1 Studs, Joists, Rafters, Trusses

For documentation and inspection requirements, refer to 2.3.4.2 Cold Formed Steel on page 125 and 2.3.4.2.1 Cold Formed Steel Light Frame Construction on page 130.

I. Inspection of the following items:
   I.A. Framing
      I.A.1. Placement
      I.A.2. Bearing per requirements.
      I.A.3. Floor joist webs are not in direct contact with rim track webs unless specifically indicated as such in approved construction documents.

I.B. Trusses
   I.B.1. Orientation for parallel chord members is per requirements indicated on the truss or approved drawings.
   I.B.2. For trusses not bearing at the ends, bearing locations are marked on truss and visible during and after installation.
   I.B.3. Where noted, truss bracing during and after installation is provided per approved drawings.
   I.B.4. Locations of members within the truss assembly, including ends of adjacent members within the truss assembly, are within the specified limits per the requirements.
      I.B.4.1. Where specified tolerances are exceeded or shop modification or repairs occurred, approval documentation is provided by the truss designer and reviewed and approved by DSA prior to truss installation.
   I.B.5. Installation tolerances per approved construction documents.
      I.B.5.1. Straightness
      I.B.5.2. Plumbness
      I.B.5.3. Top chord bearing trusses having a gap between the inside of the bearing and first diagonal or vertical within specified limits.
   I.B.6. Field assembly per requirements.
   I.B.7. Required repairs due to damage to trusses during shipping, storage, or installation procedures must be approved by the truss designer and reviewed and approved by DSA prior to repairing damaged trusses.
   I.B.8. Where trusses, members, or connections were tested to determine their capability to support anticipated loads, test reports, stamped and signed by a licensed design professional, are provided and submitted to DSA for review and approval prior to truss installation.

I.C. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159
2.3.4.2.2.2 Steel Deck

In addition to the information noted for 2.3.4.2 Cold Formed Steel on page 125, projects using steel deck are generally governed by the following referenced standards:

Referenced standards issued by the Steel Deck Institute (SDI; see http://www.sdi.org):

- 2006 Standard for Non-Composite Steel Floor Deck, ANSI/SDI NC1.0-06
- 2006 Standard for Steel Roof Deck, ANSI/SDI RD1.0-06

Referenced standard issued by ASCE:


A suggested reference for the inspection of composite slabs is issued by ASCE:


The following information applies to all structural steel deck items on a given project.

I. Receipt of documentation for constructed elements:

I.A. Shop Drawings:
   I.A.1. When applicable, receipt of design professional reviewed structural steel deck shop drawings.
   I.A.1.1. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be submitted to DSA for review and approval prior to installation of modified elements.
   I.A.1.2. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.C. Special Inspection Documentation:
   I.C.1. Special inspector to provide documentation for the following in the form of reports of tests performed and/or daily special inspection reports.
I.C.1.1. Connections
   I.C.1.1.1. Welding:
      I.C.1.1.1.1 Field Welding
         I.C.1.1.1.1.1 End-welded stud installation (including bend test).
         I.C.1.1.1.1.2 Floor and roof deck welds. See Figure 2-49.

Figure 2-49: Additional Top Seam Weld Due To Burn-Through

Figure 2-50: Good Deck Button Punch
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2-49 showing burn-through problems sometimes associated with deck welds top seam welds.

I.C.1.2. Upon completion of shop and/or field welding work, special inspector provides verified report (DSA 292).

II. Inspection of the following items:

II.A. Connections:

II.A.1. Deck puddle weld patterns per requirements.

II.A.2. Where button punch occurs, verify it engages both sides of seam – check indent and protrusion. See Figure 2-50.

II.A.3. Frequently, perimeter and corner connections are more tightly spaced at the perimeter and corners of the roof compared to the interior. Refer to approved construction documents for requirements.

II.B. Proper layout:

II.B.1. Proper welding at deck seam welds, especially where beams are parallel, based on requirements.

II.B.2. At skewed/non-parallel/non-perpendicular deck conditions, puddle welds per flute must be modified to match equivalent spacing along supporting member for non-skewed case (see Figure 2-51).

II.B.3. Placement of welded studs, which can be affected by width of flute and location within flute, based on requirements.

II.B.4. If high flute occurs at welded studs where no detail is provided in the approved construction documents, a custom detail by the design
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professional will be required, which must be approved by DSA prior to installation.

II.C. Proper fit-up with support framing: check for weld burn-through where poor fit-up conditions occur (e.g. deck not flush on beam flange, etc.).

II.D. Proper coordination amongst trades:

II.D.1. All mechanical, electrical, and plumbing work is in place (see appropriate sections in 2.5 Non-Structural Component Support/Bracing/Anchorage starting on page 159 and 5 OTHER BUILDING COMPONENTS AND SYSTEMS starting on page 236 for additional information).

II.D.2. Conduit location in slab – if adjacent to studs reduces effective composite action (it negatively impacts ability to make a ‘T’ beam between steel beam and concrete slab – see Figure 2-53). Verify acceptability with design professional and DSA field engineer.

II.D.3. Proper locations for concrete inserts to avoid post-installed anchors into underside of deck. See Figure 2-52.

Figure 2-53: Conduit Causes Problems for Composite Action

Figure 2-52: Concrete Deck Insert
2.4 Lateral Force Resisting Systems

While the lateral force resisting system has been separated from the gravity framing system in this manual, it is usually constructed simultaneously with it. Therefore, inspections for the lateral system must occur simultaneously with the gravity system. Prior to any lateral framing system item being inspected, generally speaking, all foundation system related items applicable to a given building or portion thereof (refer to 2.2 Foundation Systems on page 62 for further information) must be inspected for compliance with the approved construction documents by the project inspector. Refer to form DSA 151 for requirements associated with advance notification to DSA for various foundation related construction items (e.g. concrete placement, etc.).

2.4.1 Concrete

For all concrete elements listed below, refer to appropriate section in 2.3.1 Concrete, starting on page 74 for documentation and inspection requirements.

2.4.1.1 Special Reinforced Shear Wall

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Reinforcing steel per requirements.
      I.A.2. Mechanical splices per requirements.

II. Inspection of the following items:
   II.A. Proper installation of mechanical splices (see Figure 2-54).
II.A.1. Reinforcing clear cover is maintained at splices. (NOTE: DSA-SS clear cover requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)

II.B. At congested reinforcing areas (e.g. boundary elements), approved mix design with smaller aggregates is used. (NOTE: DSA-SS aggregate requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)

2.4.1.2 Intermediate Precast Shear Wall

There are no additional requirements beyond those noted in other applicable sections.

2.4.1.3 Special Reinforced Moment Frame

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Reinforcing steel per requirements.
      I.A.2. Mechanical splices per requirements.
   I.B. Inspect the following items:
      I.B.1. Reinforcing clear cover is maintained at splices. (NOTE: DSA-SS clear cover requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)
      I.B.2. At congested reinforcing areas (e.g. boundary elements), approved mix design with smaller aggregates is used. (NOTE: DSA-SS aggregate requirements may not be mirrored in DSA-SS/CC projects – verify with approved construction documents.)
      I.B.3. Reinforcing layout adjacent to moment frame members per requirements. “The more the better” does not necessarily apply to reinforcing in and nearby moment frame beams.
      I.B.3.1. If approved drawings indicate non-moment frame beams framing into moment frame columns with hooked bars into the column, verify non-moment frame reinforcing does not extend into moment frame beam.
      I.B.3.2. Slab reinforcing adjacent to moment frame beam complies with specified spacing and clearances.

2.4.2 Masonry

2.4.2.1 Special Reinforced Shear Wall

Refer to 2.3.2 Masonry on page 89 for documentation and inspection requirements.
2.4.3 Wood

2.4.3.1 Wood Structural Panel

In addition to the California Building Code, projects using wood structural panel based seismic force resisting systems are also governed by the seismic design reference standard issued by the AF&PA through the AWC:

- Special Design Provisions for Wind and Seismic (SDPWS), ANSI/AF&PA SDPWS

2.4.3.1.1 Light Wood Framing

I. Receipt of documentation for constructed elements: Refer to section 2.3.3 Wood on page 96 for documentation and inspection requirements.

II. Inspection of the following items:

   II.A. Framing
       II.A.1. Refer to section 2.3.3 Wood subsection II Inspection of the following items: on page 100 for wood framing inspection requirements.

   II.B. Wood Structural Panel
       II.B.1. Refer to section 2.3.3 Wood subsection II.C Wood structural panels on page 104 for inspection requirements.
       II.B.2. Wood structural panels used for diaphragms or shear walls are attached directly to framing.
           II.B.2.1. EXCEPTION: Panels can be applied over solid planking or laminated decking provided the panel joints do not coincide with the planking/decking joints.

   II.B.3. Diaphragms
       II.B.3.1. Framing and straps at openings per requirements.
       II.B.3.2. Where drag lines or concrete/masonry wall out-of-plane anchorage occurs, framing and straps/connections comply with requirements.
           II.B.3.2.1. At I-joists and SCL drag-line framing, verify nail spacing is not less than allowed in ICC ES report.
       II.B.3.3. At diaphragm interior drag lines, two lines of boundary nailing may be required based on approved drawings.
       II.B.3.4. Blocked diaphragms
           II.B.3.4.1. Framing
               II.B.3.4.1.1 Blocking/framing at all panel edges.
               II.B.3.4.1.2 Minimum blocking/framing size at boundaries and adjoining panel edges where specified.
           II.B.3.4.2. Nailing
               II.B.3.4.2.1 Field nail spacing.
II.B.3.4.2.2 Staggered nailing at all panel edges when indicated in approved construction documents.

II.B.3.5. Unblocked diaphragms
II.B.3.5.1. Minimum panel dimension per requirements.
II.B.3.5.2. All other requirements as for blocked diaphragms, except for blocking at panel edges.

II.B.3.6. High Load Blocked Multi-Row Fastener Diaphragms
II.B.3.6.1. Framing
II.B.3.6.1.1 Blocking/framing at all panel edges.
II.B.3.6.1.2 Minimum blocking/framing size at boundary members and adjoining panel edges.

II.B.3.6.2. Nailing
II.B.3.6.2.1 Field Nail Spacing
II.B.3.6.2.2 Staggered nailing at all panel edges when indicated in approved construction documents.
II.B.3.6.2.3 Nail spacing and edge distances at multi-row fastener lines per requirements.

II.B.4. Shear Walls
II.B.4.1. Length
II.B.4.2. Type
II.B.4.3. Panel orientation (panels may need to be oriented perpendicular to the stud framing to achieve necessary load capacities).
II.B.4.4. All openings or penetrations (e.g. electrical panel, fire extinguisher, ducts, windows, etc.) in shear wall are explicitly shown on DSA approved drawings. Any opening not shown must be approved by the design professional and DSA prior to installation.
II.B.4.5. Framing
II.B.4.5.1. Blocking/framing is required at all panel edges; unblocked shear walls are not permitted.
II.B.4.5.2. End studs/posts have full end bearing.
II.B.4.5.3. Minimum blocking/framing size at chord members and adjoining panel edges.
II.B.4.5.4. Sill plate
II.B.4.5.4.1 Refer to shear wall schedule for shear transfer information at bottom of wall. Verify fastener/connector:
II.B.4.5.4.1.1 Type
II.B.4.5.4.1.2 Size
II.B.4.5.4.1.3 Spacing
II.B.4.5.4.2 Anchor bolt requirements
II.B.4.5.4.2.1 Refer to 2.3.3.1 Walls subsection II.C.4 on page 104 for inspection requirements.
II.B.4.5.4.2.2 Dimensional Requirements
II.B.4.5.4.2.3 Installation Requirements

II.B.4.5.4.2.3.1 Bolt hole tolerance

II.B.4.5.4.2.3.2 Plate washer dimensions per requirements.

II.B.4.5.4.2.3.2.1 The exception noted in section 4.3.6.4.3 of 2008 SDPWS (i.e. allowance for standard cut washers in lieu of plate washers - see Table 2-6 taken from Table A2 on p. 42 of 2008 SDPWS) is **not permitted** (CBC 2305.1.2 #3).

II.B.4.5.4.2.3.3 The anchor bolt plate washer edge is within specified limits of the sill edge having wall sheathing attachment when specifically noted (see Figure 2-55 for commonly specified requirements).

II.B.4.5.4.2.3.4 Anchor bolt placement with respect to concrete edge dimensions.
II.B.4.5.4.2.4 If sill plate is split, repair must be provided by design professional and reviewed and approved by DSA.

II.B.4.5.4.3 At elevated floor levels, sill fasteners must penetrate framing/blocking below to meet requirements (e.g. if 3x sill is used with nails, 20d rather than 16d may be required to ensure proper penetration – pre-drilling may be required to avoid splits).

II.B.4.5.4.4 Other shear transfer connections.

II.B.4.5.5. Top plate

II.B.4.5.5.1 Refer to shear wall schedule in the approved construction documents for top-of-wall shear transfer connection requirements.

II.B.4.5.5.2 Top plate splice (see Figure 2-56 for example of improper splice causing load path problems).

II.B.4.5.5.2.1 Where proprietary connections are shown, installation complies with requirements (e.g. steel strap size, location with respect to splice, nail type and size, etc.).

II.B.4.5.5.2.2 Splice connections occur wherever top plate is interrupted by beams, perpendicular walls, etc. – these can occur away from shear wall locations along drag lines.

II.B.4.5.5.3 At floor/roof attic space, shear wall extends to underside of floor/roof sheathing above. Refer to approved plans for special shear transfer details at such conditions, for both framing parallel and perpendicular to wall.

II.B.4.5.5.4 Other shear transfer connections.

II.B.4.6. Nailing

II.B.4.6.1.1 Field nail spacing.

II.B.4.6.1.2 Placement of edge nailing around perimeter of each panel piece.

II.B.4.6.1.3 Edge nailing location at perimeter of wall.

II.B.4.6.1.3.1 Nailing to rim joist/blocking or upper top plate, unless double top plates nailed throughout length to transfer shear loads.

II.B.4.6.1.3.2 Top of wall shear transfer connections/nailing per requirements. Where proprietary clips occur, nailing and installation per requirements.
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II.B.4.6.1.3.3 Full height edge nailing to posts/studs with hold-down devices.
II.B.4.6.1.3.4 Non-typical/special locations identified in the DSA approved structural drawings (e.g. drag strap and blocking conditions, etc.).

II.B.4.7. Hold-downs
II.B.4.7.1. Type
II.B.4.7.2. Location
II.B.4.7.3. Fastener type and size
II.B.4.7.4. Hold-off distance to sill plates
II.B.4.7.5. Installation complies with ICC ES report.
   II.B.4.7.5.1 All nuts tightened (but not over-torqued based on ICC ES report) prior to closing in.
   II.B.4.7.5.2 Surrounding framing has not been negatively impacted or altered to accommodate hold-down device (see Figure 2-57).
II.B.4.7.6. At floor-to-floor conditions with steel straps, strap location ensures equal distribution of nailing into top and bottom wall framing.
II.B.4.7.7. Anchor rod
   II.B.4.7.7.1 Hold-down anchor rod does not replace anchor bolt.
   II.B.4.7.7.2 Anchor rod is not bent.
   II.B.4.7.7.3 Length of rod complies with maximum limits shown in drawings or specified in ICC ES (or other DSA recognized agency) report.
II.B.4.7.8. Where through-bolt hold-down devices are used:
   II.B.4.7.8.1 No countersinking occurs unless specifically detailed on DSA approved drawings.
   II.B.4.7.8.2 Hole tolerance
   II.B.4.7.8.3 Washer between nut and wood on opposite side of hold-down.
II.B.4.7.9. Post/stud size and grade, which may be different than typical framing.
II.B.4.7.10. Panel edge nailing full height on post/studs with hold-down.

II.B.4.8. Special requirements at high-wind regions
II.B.4.8.1. Nailing spacing
II.B.4.8.2. Panel thickness
II.B.4.8.3. Panel strength orientation parallel to studs (rather than perpendicular).
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II.B.4.8.4. When openings interrupt wall sheathing, framing connections comply with requirements to transfer uplift around opening.

II.B.4.8.5. Sheathing extends to upper top plate and bottom sill with nailing at specified dimensions (see Figure 2-58 taken from Figure 4G of 2008 SDPWS for commonly specified nailing dimensions).

II.B.4.8.6. Roof/upper floor uplift connections occur on the sheathed side unless approved details address twisting caused by eccentric load path.

II.B.4.8.7. Anchorage of sill plate per requirements.
   II.B.4.8.7.1 Where anchor bolts are used, washer plates per subsection II.B.4.5.4.2.3.2 and II.B.4.5.4.2.3.3 on page 144 above are provided, regardless of wall loading or capacity.

Figure 4G Panel Attachment

Figure 2-58: Wind Uplift – Commonly Specified Nail Edge Distances at Wood Structural Panel
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II.B.4.8.7.2 Where other anchorage devices are used, they occur on the sheathed side.

2.4.3.1.2 Cold Formed Steel Light Frame Construction

The majority of requirements specific to light wood framing given in 2.4.3.1.1 Light Wood Framing on page 142 also apply to cold formed steel light frame construction. In addition, refer to relevant portions contained in 2.4.4.2 Cold Formed Steel Light Frame Construction on page 156. There are no additional requirements beyond those noted.

2.4.4 Steel

2.4.4.1 Structural Steel

In addition to the California Building Code, projects using structural steel as part of the seismic load resisting system are generally governed by the following referenced standard issued by the AISC:

- Seismic Provisions for Structural Steel Buildings, ANSI/AISC 341. When published, supplements to the Provisions become part of that recognized standard (e.g. there was Supplement No. 1 issued for ANSI/AISC 341-05: ANSI/AISC 341s1-05).

Another referenced standard for projects using a particular kind of seismic load resisting system, steel moment frames, is used. Refer to 2.4.4.1.1 Moment Frame on page 149 for further information if the project has such systems.

For welding of components in seismic lateral force resisting systems, the following reference standard issued by AWS also applies:

- D1.8 – Structural Welding Code – Seismic Supplement

For all structural steel lateral force resisting systems, the following applies:

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Weld filler metal for connections that are part of the SLRS comply with requirements.
      I.A.1.1. At demand critical welds, weld filler metal complies with additional requirements.
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I.A.2. Connections:
   I.A.2.1. Welding:
      I.A.2.1.1. Non-Destructive Testing (NDT)
         I.A.2.1.1.1 Refer to [IR 17-2] for NDT requirements.
         I.A.2.1.1.2 Ultrasonic
         I.A.2.1.1.3 Magnetic Particle

I.B. Special Inspection Documentation:
   I.B.1. Connections:
      I.B.1.1. HSB
         I.B.1.1.1. Documentation as prescribed in the Quality Control (QC) and Quality Assurance (QA) plan.

   I.B.1.2. Welding:
      I.B.1.2.1. Documentation as prescribed in the Quality Control (QC) and Quality Assurance (QA) plan.
      I.B.1.2.2. Where Non-Destructive Testing (NDT) occurs, documentation as prescribed in the Quality Control (QC) and Quality Assurance (QA) plan. See Figure 2-59 for an example of a welding special inspector mark associated with NDT.
         I.B.1.2.2.1 Testing personnel certification that meets or exceeds American Society for Non-destructive Testing SNT-TC-1A or CP-189.
         I.B.1.2.2.2 Ultrasonic Testing (UT)
            I.B.1.2.2.2.1 Verify certification of NDT level II or better for inspectors and of NDT level III for LEA Lab administrator (see [IR 17-2] for additional information).
            I.B.1.2.2.2.2 Verify UT technicians have flaw detection certification.

II. Inspection of the following items:
   I.A. Where specifically noted, maintenance of protected zones throughout all phases of construction, including for work occurring after lateral frame installation, as shown on approved drawings.
   I.B. Where continuity plates and stiffeners occur, geometry and fit-up per requirements.

2.4.4.1.1 Moment Frame

In addition to the California Building Code, projects using structural steel moment frames as part of the seismic load resisting system are generally governed by the following referenced standards issued by the AISC:

- 2005 Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications, ANSI/AISC 358-05
Some background to the fabrication and seismic performance of structural steel moment frames is worth noting. In the mid-1960s, the construction industry moved to the use of the semi-automatic, self-shielded, flux-cored arc welding process (FCAW-S) for making the joints of these connections. The welding consumables that building erectors most commonly used inherently produced welds with very low toughness. The toughness of this material could be further compromised by excessive deposition rates, which unfortunately were commonly employed by welders. As a result, brittle fractures could initiate in welds with large defects, at stresses approximating the yield strength of the beam steel, precluding the development of ductile behavior.

Early steel moment frames tended to be highly redundant and nearly every beam-column joint was constructed to behave as part of the lateral-force-resisting system. As a result, member sizes in these early frames were small and much of the early acceptance testing of this typical detail was conducted with specimens constructed of small framing members. As the cost of construction labor increased, the industry found that it was more economical to construct steel moment-frame buildings by moment-connecting a relatively small percentage of the beams and columns and by using larger members for these few moment-connected elements. The amount of strain demand placed on the connection elements of a steel moment frame is related to the span-to-depth ratio of the member. Therefore, as member sizes increased, strain demands on the welded connections also increased, making the connections more susceptible to brittle behavior.

In the 1960s and 1970s, when much of the initial research on steel moment-frame construction was performed, beams were commonly fabricated using A36 material. In the 1980s, many steel mills adopted more modern production processes, including the use of scrap-based production. Steels produced by these more modern processes tended to include micro-alloying elements that increased the strength of the materials so that despite the common specification of A36 material for beams, many beams actually had yield strengths that approximated or exceeded that required for grade 50 material. As a result of this increase in base metal yield strength, the weld metal in the beam-flange-to-column-flange joints became under-matched, potentially contributing to its vulnerability.
I. Receipt of documentation for constructed elements:
   I.A. Proprietary Products
      I.A.1. For proprietary connections not recognized by AISC 358-05 or AISC 358-10, but do have approval by a recognized agency, refer to 1.3 Proprietary Products on page 40.
   I.B. Shop Drawings
      I.B.1. Proprietary Connections: Some proprietary connections will include shop drawings from a fabricator other than the primary structural steel supplier. Receipt of all design professional reviewed shop drawings is required. The following is a list of some proprietary products that may have shop drawings for the moment frame connections that are separate from the primary structural steel supplier:
         I.B.1.1.1. CONXL
         I.B.1.1.2. Kaiser Bolted Bracket
         I.B.1.1.3. SlottedWeb
         I.B.1.1.4. SidePlate
      I.B.2. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be approved by the design professional in responsible charge and submitted to and approved by DSA.
      I.B.3. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.
   I.C. Material/Structural Testing Documentation:
      I.C.1. Proprietary Connections
         I.C.1.1. CONXL
            I.C.1.1.1. Collar assembly component forging certification per AISC 358-10 Appendix B, Section B7.
            I.C.1.1.2. Collar connection HSB per requirements.
   I.D. Special Inspection Documentation:
      I.D.1. Welder Qualifications:
         I.D.1.1. Applicable to the following types of prequalified moment connections
            I.D.1.1.1. Reduced Beam Section (RBS)
            I.D.1.1.2. Welded Unreinforced Flange-Welded Web (WUF-W)
         I.D.1.2. Supplemental welder qualification certification for Restricted Access Welding.
      I.D.2. Prequalified Moment Connections:
         I.D.2.1. Reduced Beam Section (RBS)
            I.D.2.1.1. Flange cut smoothness
            I.D.2.1.2. Proper repair of any gouges or notches in beam.
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I.D.2.2. Bolted Unstiffened and Stiffened Extended End-Plate (BUEEP, BSEEP)
I.D.2.2.1. Demand critical weld inspection of beam flange to end-plate.
I.D.2.2.2. End plate stiffener welds comply with requirements (e.g. either complete joint penetration (CJP) or fillet based on approved construction documents).

I.D.2.3. CONXL
I.D.2.3.1. HSB installation.

II. Inspection of the following items:

II.A. Maintenance of protected zone.
II.B. Testing and inspection of demand critical welds as specified in approved construction documents (e.g. column base, beam-to-column, etc.).
II.C. Where specified on approved construction documents, verify the following complies with requirements:
   II.C.1. Beam top and bottom flange lateral bracing along beam length.
   II.C.2. Continuity plate size, thickness, and welding to column.
   II.C.3. Column web doubler plate size, thickness, and welding to column.

II.D. Prequalified Moment Connections:

II.D.1. Reduced Beam Section (RBS)
II.D.1.1. Reduced section dimensions (e.g. commonly specified in the drawings as dimensions “a,” “b,” and “c”).
II.D.1.2. Weld access hole geometry.
II.D.1.3. CJP welds are special inspected according to demand critical requirements.
II.D.1.4. Steel Backing
   II.D.1.4.1. Attached to column only.
   II.D.1.4.2. Bottom flange steel backing is removed.
II.D.1.5. Weld tabs and end dams.
   II.D.1.5.1. Weld tabs used for end dams during welding.
   II.D.1.5.2. Upon welding completion, weld tabs and end dams removed.

II.D.2. Bolted Unstiffened and Stiffened Extended End-Plate (BUEEP, BSEEP)
II.D.2.1. No weld access hole is permitted in the beam web.
II.D.2.2. No backing is present for beam flange CJP welds to end plate.
II.D.2.3. High-strength bolts (HSB) at the connection (e.g. A325 or A490). Refer to 2.3.4.1 Structural Steel on page 116 for documentation and special inspection requirements for HSB.
II.D.2.3.1. Where used, verify finger shims between end plate and column flange comply with requirements.
II.D.2.4. At composite slab construction:
   II.D.2.4.1. No headed shear stud connections within 1 ½ times the beam depth.
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II.D.2.4.2. Verify specified gap between concrete slab and both sides of column flanges is present.
II.D.2.4.2.1 EXCEPTION: This gap may be filled with a compressible material in compliance with requirements.

II.D.3. Bolted Flange Plate (BFP)
II.D.3.1. A490 bolts at the connection. Refer to 2.3.4.1 Structural Steel on page 116 for documentation and special inspection requirements for HSB.

II.D.4.1. Weld access hole geometry.
II.D.4.2. Where weld tabs are used, they are removed after welding.
II.D.4.3. Complete joint penetration (CJP) welds are special inspected according to demand critical requirements.

II.D.5. Kaiser Bolted Bracket (KBB)
II.D.5.1. A490 bolts at the connection. Refer to 2.3.4.1 Structural Steel on page 116 for documentation and special inspection requirements for HSB.
II.D.5.2. At concrete slab construction:
II.D.5.2.1. Specified gap between concrete slab and both sides of column flanges is present.
II.D.5.2.1.1 EXCEPTION: This gap may be filled with a compressible material in compliance with requirements.
II.D.5.2.2. No reinforcing may pass through the specified gap.

II.D.6. CONXL.
II.D.6.1. Though the CONXL connection is not listed as one of the connections in AISC 358-05, it is in AISC 358-10 and is accepted by DSA currently.
II.D.6.2. For concrete filled columns, refer to 2.3.1.1 Cast In Place (CIP) Concrete on page 74.
II.D.6.2.1. The approved construction documents may allow an exception for the concrete to free fall the full height of the column.
II.D.6.2.2. Confirm concrete fill per requirements:
II.D.6.2.2.1 Weight
II.D.6.2.2.2 Strength
II.D.6.3. Collar Connection
II.D.6.3.1. HSB installation per requirements
II.D.6.4. Beam does not have any web weld access holes.
II.D.6.5. At concrete slab construction:
II.D.6.5.1. Specified gap between concrete slab and both sides of column flanges is present.
II.D.6.5.1.1 EXCEPTIOn: This gap may be filled with a compressible material in compliance with requirements.
II.D.6.5.2. No reinforcing may pass through the specified gap.

2.4.4.1.1.2 Intermediate Moment Frame (IMF)

I. Inspection of the following items:
   I.A. Maintenance of protected zone.
   I.B. Testing and inspection of demand critical welds.
   I.C. Where specified on the approved construction documents, verify the following complies with requirements:
      I.C.1. Beam top and bottom flange lateral bracing along beam length.
      I.C.2. Continuity plate size, thickness, and welding to column.
      I.C.3. Column web doubler plate size, thickness, and welding to column.
   I.D. Prequalified Moment Connections:
      I.D.1. Refer to requirements in SMF.

2.4.4.1.1.3 Ordinary Moment Frame (OMF)

I. Inspection of the following items
   I.A. Geometry of beam web weld access hole at beam-column connection.
   I.B. Testing and inspection of demand critical welds.
   I.C. Where specified on the approved construction documents, verify the following complies with requirements:
      I.C.1. Beam top and bottom flange lateral bracing along beam length.
      I.C.2. Continuity plate size, thickness, and welding to column.
      I.C.3. Column web doubler plate size, thickness, and welding to column.

2.4.4.1.1.4 Special Truss Moment Frame (STMF)

I. Inspection of the following items:
   I.A. Maintenance of protected zone.

2.4.4.1.2 Braced Frame

For all braced frames, the following applies:

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Gusset material matches requirements (e.g. frequently gusset plate material strengths exceed typical steel plate requirements).
STRUCTURAL SAFETY INSPECTION ITEMS

II. Inspection of the following items:
   II.A. For HSS braces:
      II.A.1. Erection bolt does not “clamp” closed the slot at the gusset (see Figure 2-60).

   2.4.4.1.2.1 Special Concentric Braced Frame (SCBF)

I. Inspection of the following items:
   I.A. For HSS braces:
      I.A.1. Dimensions and location of brace slot and cover plate with respect to gusset.
   I.B. Where gusset plates interact with concrete construction, gap between gusset plate (and brace, where applicable) and concrete construction complies with requirements. See Figure 2-61.
STRUCTURAL SAFETY INSPECTION ITEMS

I.C. Maintenance of protected zone.

2.4.4.1.2.2 Ordinary Concentric Braced Frame (OCBF)

There are no additional requirements beyond that noted applicable to all braced frames.

2.4.4.1.2.3 Eccentric Braced Frame (EBF)

I. Inspection of the following items:
   I.A. Maintenance of protected zone.
   I.B. Testing and inspection of demand critical welds.

2.4.4.1.2.4 Buckling Restrained Braced Frame (BRBF)

I. Inspection of the following items:
   I.A. Maintenance of protected zone.

2.4.4.1.3 Special Plate Shear Wall (SPSW)

I. Inspection of the following items:
   I.A. Testing and inspection of demand critical welds.

2.4.4.1.4 Cantilever Column Systems

Based on the design methodology used (e.g. cantilever column system detailed to conform to the requirements for: special, intermediate, or ordinary steel moment frames; special reinforced concrete moment frames) for the cantilever columns system will dictate what requirements apply. Refer to the approved drawings for which system is applicable and then to the appropriate sections in this document.

2.4.4.2 Cold Formed Steel Light Frame Construction

In addition to the information noted for 2.3.4.2 Cold Formed Steel on page 125, projects using cold formed steel light frame construction are generally governed by several referenced standards issued by the American Iron and Steel Institute (AISI; see http://www.steel.org/). Specifically, those are listed below:
In addition to the information noted for 2.3.4.2 Cold Formed Steel on page 125 and the relevant subsections, the following information applies to all lateral force resisting cold formed steel light frame construction items on given project.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   I.B. Material/Structural Test Documentation:
       I.B.1. Framing Members
           I.B.1.1. Framing members comply with additional material requirements associated with lateral force resisting systems.

II. Inspection of the following items:
   II.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   II.B. Panels
       II.B.1. Minimum panel width per requirements.
       II.B.2. Wood structural panels
           II.B.2.1. Refer to 2.4.3.1 Wood Structural Panel on page 142 for documentation and inspection requirements.
   II.C. Fasteners
       II.C.1. Screws
           II.C.1.1. Dimensional Requirements
               II.C.1.1.1. Size
               II.C.1.1.2. Head type and size
                   II.C.1.1.2.1 At exterior walls exposed to wind suction additional screw head requirements may apply per approved construction documents.

   2.4.4.2.1 Steel Sheet

I. Receipt of documentation for constructed elements:
   I.C. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   I.D. Material/Structural Test Documentation:
       I.D.1. Sheet Steel

II. Inspection of the following items:
   II.A. For proprietary cold formed steel products, refer to 1.3 Proprietary Products on page 40 for documentation and inspection requirements.
   II.B. Fasteners
STRUCTURAL SAFETY INSPECTION ITEMS

II.B.1. Type
II.B.2. Size
II.B.3. Placement

2.4.4.2.2 Steel Flat Strap Bracing

Refer to 2.3.4.2 Cold Formed Steel on page 125 and other appropriate sections above for documentation and inspection requirements.
STRUCTURAL SAFETY INSPECTION ITEMS

2.5 Non-Structural Component Support/Bracing/Anchorage

For all non-structural components, proper support/bracing/anchorage to the primary or secondary structural framing is crucial. The approved construction documents provide the relevant details showing this information.

Prior to any non-structural component support/bracing/anchorage item being inspected, generally speaking, the gravity and lateral system related items applicable to a given building or portion thereof (refer to 2.3 Gravity Framing Systems on page 74 and 2.4 Lateral Force Resisting Systems on page 140 for further information) must be inspected for compliance with the approved construction documents by the project inspector.

2.5.1 Mechanical/Electrical/Plumbing Equipment

For mechanical, plumbing, and kitchen and food service equipment, a standard often used for support and bracing for the ductwork, piping, and equipment for DSA projects is issued by the Sheet Metal And Air Conditioning Contractor’s National Association (SMACNA, see http://www.smacna.org). Specifically, those are listed below:

- Seismic Restraint Manual: Guidelines for Mechanical Systems
- Kitchen Ventilation Systems and Food Service Equipment Guidelines

The following information applies to all mechanical/electrical/plumbing equipment.

I. Receipt of documentation for constructed elements:
   I.A. Product “cut sheets” showing delivered equipment complies with requirements.
   I.B. Post-installed anchors:
       I.B.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76.

II. Inspection of the following items:
   II.A. Proper storage and handling of equipment.
   II.B. Fasteners
       II.B.1. Size, type, and placement of connections/fasteners of equipment to structure.
   II.C. Post-installed anchors and connections.
       II.C.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection II.F Post-installed anchors and connections: on page 82.
STRUCTURAL SAFETY INSPECTION ITEMS

2.5.1.1 Floor/Roof Mounted

For composite base HVAC units, refer to IR 16-6 for additional anchorage documentation and inspection requirements and restrictions.

2.5.1.2 Wall Mounted

There are no additional documentation or inspection requirements beyond the information given in other sections in this manual.

2.5.1.3 Suspended/Hung

Pendant light fixtures and similar types of equipment provide a potential hazard for occupants during a seismic event if they are not properly braced (see Figure 2-62). Such hung equipment can sway and contact other adjacent equipment or structure, which could lead to falling hazards. IR 16-9 has general design requirements for pendant lights. There are no additional documentation or inspection requirements beyond the information given in other sections in this manual.
2.5.2 Architectural Items

2.5.2.1 Walls

Refer to other sections above and below (e.g. 3.3.5.1 Walls on page 197) for documentation and inspection requirements depending on the wall type. For all walls, verify that the top and bottom connection of the wall, and at each floor level if the wall runs past the floor/roof, comply with requirements.

2.5.2.1.1 Interior

I. Receipt of documentation for constructed elements:
   I.A. For documentation requirements, refer to the applicable sections above and below based on applicable construction materials.
   I.B. Finish Material Documentation
       I.B.1. Receipt of bill of material or equivalent information for finish materials.

II. Inspection of the following items:
   II.A. For framing inspection requirements, refer to respective sections above and below.
   II.B. Finish Material
       II.B.1. Placement
       II.B.2. Installation
           II.B.2.1. Fasteners
               II.B.2.1.1. Type
               II.B.2.1.2. Size
               II.B.2.1.3. Spacing
       II.B.2.2. Taping
       II.B.2.3. Caulking
       II.B.2.4. Accessories

2.5.2.1.1.1 Casework/Lockers

I. Inspection of the following items:
   I.A. Support and anchorage of casework.
       I.A.1. Verify separate fasteners attach casework backing to casework.
           I.A.1.1. Fasteners used for attaching casework through backing should have only one faying surface.
       I.A.2. Fasteners between casework/lockers to structure.
           I.A.2.1. Size
           I.A.2.2. Type
           I.A.2.3. Placement
   I.B. Post-installed anchors and connections.
STRUCTURAL SAFETY INSPECTION ITEMS

I.B.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.

2.5.2.1.1.2 Glass Panel Railing

Refer to the project approved DSA 103 form to determine whether glass panel railing testing is required. If it is, refer to the approved construction documents and IR 24-1 for testing documentation requirements which must be received by the project inspector prior to railing installation.

2.5.2.1.2 Exterior

In addition to the information in this section, see 2.6.1.2 Exterior Walls on page 171 for additional information.

2.5.2.1.2.1 Veneer OR Glass Block

I. Receipt of documentation for constructed elements:

I.A. Shop Drawings:

I.A.1. When applicable, receipt of design professional reviewed steel reinforcing shop drawings.

I.A.2. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be submitted to DSA for review and approval prior to installation of modified elements.

I.A.3. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.B. Material/Structural Test Documentation:

I.B.1. Test veneer bond strength.

I.B.2. Upon completion of all testing, the DSA approved laboratory provides a verified report (DSA 291).

I.C. Special Inspection Documentation

I.C.1. Masonry special inspector to provide documentation for the following in the form of reports of tests performed and/or daily special inspection reports

I.C.1.1. Proportions of site-prepared, premixed or preblended:

I.C.1.1.1. Mortar

I.C.1.1.2. Grout

I.C.1.2. Inspect placement of:
STRUCTURAL SAFETY INSPECTION ITEMS

I.C.1.2.1. Steel reinforcement
I.C.1.2.2. Connectors
I.C.1.2.3. Anchors
I.C.1.2.4. Masonry units
I.C.1.3. Construction of mortar joints.
I.C.1.4. Verify protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).
I.C.1.5. Inspect anchors and embedded items, including but not limited to those connecting masonry to other portions or elements of the structure, for:
   I.C.1.5.1. Type
   I.C.1.5.2. Size
   I.C.1.5.3. Location

I.C.2. Upon completion of the masonry work, the masonry special inspector provides a verified report (DSA 292).

II. Inspection of the following items:
   II.A. Refer to 2.3.2 Masonry subsection II Inspection of the following items: on page 91 for applicable items.

   2.5.2.1.2.2 Screen Walls

Depending on the construction materials used for the screen wall dictates which of the sections in this manual apply. There are no additional inspection or documentation requirements for screen walls beyond those already noted in other sections of this manual; refer to the appropriate section accordingly for requirements.

   2.5.2.1.2.3 Casework/Lockers

I. Inspection of the following items:
   I.A. Support and anchorage of casework.
      I.A.1. Verify separate fasteners attach casework backing to casework.
         I.A.1.1. Fasteners used for attaching casework through backing should have only one faying surface.
      I.A.2. Fasteners between casework/lockers to structure.
         I.A.2.1. Size
         I.A.2.2. Type
         I.A.2.3. Placement
   I.B. Post-installed anchors and connections.
      I.B.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.
2.5.2.2 Floors

2.5.2.2.1 Computer Access Floors

For projects approved under the 2001 CBC, refer to IR 16-2 for documentation and testing requirements. For projects approved under later editions, there are no additional documentation or testing requirements for computer access floors, except for post-installed anchors, noted below:

For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.

2.5.2.3 Ceilings

2.5.2.3.1 Metal Suspension Systems for Lay-In Panel Ceilings

There are no additional documentation or inspection requirements for metal suspension systems for lay-in panel ceilings, except where re-use of ceiling hanger and bracing wires occurs. In that case, refer to IR 25-2.10 (for 2010 CBC) or IR 25-2.07 (for 2007 CBC) for field testing inspection requirements.

2.5.2.3.2 Soffits
STRUCTURAL SAFETY INSPECTION ITEMS

Due to common construction sequencing or phasing, soffit construction can be challenging given the various obstructions to soffit support framing that may not be apparent in the drawings. Large ducts or primary structural framing can cause interruptions in support framing.
that may not be clear in approved drawings (see Figure 2-63 for examples). One of the key components to proper soffit construction is the bracing noted in the approved drawings (see Figure 2-64 for an example). All support and bracing framing must be as shown in the approved construction documents. Any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents must be approved by the design professional in responsible charge and submitted to and approved by DSA.

I. Receipt of documentation for constructed elements:

   I.A. For documentation requirements, refer to the applicable sections above and below based on applicable construction materials.

II. Inspection of the following items:

   II.A. Framing

   II.A.1. Size

   II.A.2. Type

   II.A.3. Spacing

   II.A.3.1. At showers and similar areas, verify spacing complies with requirements, which may be different than in other areas based on the ceiling finish specified.
STRUCTURAL SAFETY INSPECTION ITEMS

2.5.2.4 Roofs

2.5.2.4.1 Roof Tile

For documentation and inspection requirements, refer to IR 15-1 and IR 15-2 as well as the approved construction documents. Refer to 2.6.1.1 Roofing on page 169 for additional information.

2.5.2.4.2 Standing Seam Roofing

The following information applies to all standing seam roofing on a given project.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for documentation requirements.
   I.B. Shop Drawings:
      I.B.1. When applicable, receipt of design professional reviewed standing seam roof drawings and placement/erection drawings.
      I.B.2. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be submitted to DSA for review and approval prior to installation of modified elements.
      I.B.3. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.
   I.C. Material/Structural Test Documentation:
      I.C.1. For both standing seam roofing and anchorage devices:
         I.C.1.1. Material/member sizes
         I.C.1.2. Material types
         I.C.1.3. Material grades
      I.C.2. Lab tests for unidentified materials.

II. Inspection of the following items:
   II.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for inspection requirements.
   II.B. Standing Seam Roof
      II.B.1. Dimensional requirements within specified tolerances.
      II.B.2. Installation Requirements
         II.B.2.1. Connections
            II.B.2.1.1. Fasteners
            II.B.2.1.1.1 Type
               II.B.2.1.1.1.1 For ferrous fasteners, corrosion protective coatings per requirements.
STRUCTURAL SAFETY INSPECTION ITEMS

II.B.2.1.1.2 Size
II.B.2.1.1.3 Placement
   II.B.2.1.1.3.1 Proper engagement of joined materials.
      II.B.2.1.1.3.1.1 For “blind” connections (i.e. due to the sequence of construction, joined materials cannot be easily seen once connection is complete), proper markings to facilitate placement of fastener to join materials.

   II.B.2.1.1.3.2 Frequently, fasteners are more tightly spaced at the perimeter and corners of the roof compared to the interior. Refer to approved construction documents for requirements.

II.B.2.1.2. Anchorage Devices
   II.B.2.1.2.1 Type
   II.B.2.1.2.2 Size
   II.B.2.1.2.3 Placement
      II.B.2.1.2.3.1 Proper engagement of joined materials.
      II.B.2.1.2.3.2 Frequently, anchorage devices are more tightly spaced at the perimeter and corners of the roof compared to the interior. Refer to approved construction documents for requirements.

2.5.2.4.3 Solar Photovoltaic and Thermal Systems

For documentation and inspection requirements, refer to IR 16-8 as well as the approved construction documents.

Figure 2-65: Thermal System
2.6 Non-Structural Requirements

Prior to any non-structural item being inspected, generally speaking, the gravity and lateral system related items applicable to a given building or portion thereof (refer to 2.3 Gravity Framing Systems on page 74 and 2.4 Lateral Force Resisting Systems on page 140 for further information) must be inspected for compliance with the approved construction documents by the project inspector.

2.6.1 Weather Protection

Proper protection of the structure from the elements is important to ensure that the anticipated life-span for the structure occurs (see Figure 2-66). This section provides documentation and inspection information of weather protection systems in accordance with the approved construction documents.

2.6.1.1 Roofing

Roofs suffering from incorrect weather protection can cause damage to structural and non-structural components. Proper roofing products and installation, along with maintenance, are important to minimize detrimental weathering effects on these elements.

I. Receipt of documentation for constructed elements:
STRUCTURAL SAFETY INSPECTION ITEMS

I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for documentation requirements.

I.B. Shop Drawings:
   I.B.1. When applicable, receipt of design professional reviewed shop drawings.
   I.B.2. If the reviewed shop drawings cause any changes affecting the Structural, Fire/Life Safety or Accessibility portions of the DSA approved construction documents, they must be submitted to DSA for review and approval prior to installation of modified elements.
   I.B.3. If conflicts arise between the DSA approved construction documents and the shop drawings, the DSA approved construction documents shall govern.

I.C. Material/Structural Test Documentation:
   I.C.1. Materials comply with requirements.
      I.C.1.1. Manufacturer’s certification or identifying marks on materials packaging or other approved means.
      I.C.1.1.1. Fire retardant-treated wood shingles and shakes bear specified labels.
      I.C.1.2. Approved testing/quality control agency label.

II. Inspection of the following items:
   II.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for inspection requirements.
   II.B. Proper storage and handling of materials.
   II.C. Installation
      II.C.1. Insulation system, where occurs, per requirements.
      II.C.2. Fasteners
         II.C.2.1. Type
            II.C.2.1.1. Corrosion inhibiting coatings per requirements.
         II.C.2.2. Size
         II.C.2.3. Placement
      II.C.3. Drainage System
         II.C.3.1. Achievement of specified roof slopes.
         II.C.3.2. Type
            II.C.3.2.1. Primary and secondary
         II.C.3.3. Location
            II.C.3.3.1. Drains, piping, gutters
               II.C.3.3.1.1 Connection/anchorage details per requirements.
      II.C.4. Ballasted Systems
         II.C.4.1. Type of ballast.
         II.C.4.2. Thickness of ballasted layer.
      II.C.5. Where roofing tile occurs, see 2.5.2.4.1 Roof Tile on page 167 for additional information.
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.6. Repair procedures and materials where protective weather covering is punctured, torn, cut, or penetrated by various trades.

2.6.1.2 Exterior Walls

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for documentation requirements.
   I.B. Material/Structural Test Documentation:
      I.B.1. Materials comply with requirements.
         I.B.1.1. Special siding requirements:
            I.B.1.1.1. Vinyl siding and fiber-cement siding have labeling by an approved quality control agency per requirements.
            I.B.1.1.2. Metal composite siding is labeled by an approved agency per requirements. Information in labeling frequently contains the following:
               I.B.1.1.2.1 Manufacturer's or distributor's identification.
               I.B.1.1.2.2 Model Number
               I.B.1.1.2.3 Serial number or definitive information describing the product or material's performance characteristics.
               I.B.1.1.2.4 Approved agency's identification.
            I.B.1.2. Refer to appropriate sections above and below for documentation requirements.

II. Inspection of the following items:
   II.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for inspection requirements.
   II.B. Proper storage and handling of materials.
   II.C. Installation
      II.C.1. Sequential installation of flashing and layers per requirements.
         II.C.1.1. Openings
         II.C.1.2. Laps
            II.C.1.2.1. Minimum lap dimensions.
      II.C.2. Thickness of covering per requirements.
      II.C.3. Fasteners
         II.C.3.1. Type
            II.C.3.1.1. Corrosion inhibiting coatings per requirements.
         II.C.3.2. Size
         II.C.3.3. Placement
      II.C.4. Repair procedures and materials where protective weather covering is punctured, torn, cut, or penetrated by various trades.
      II.C.5. Buildings in flood hazard zones
STRUCTURAL SAFETY INSPECTION ITEMS

II.C.5.1. Any special preservative treatment requirements associated with wood framed walls extending below the design flood.

II.C.6. Plastered Wall
II.C.6.1. Where wood structural panel occurs, confirm water resistive barrier per requirements, which may exceed requirements at other locations.
II.C.6.2. Surface preparation of masonry or concrete walls having directly applied plaster per requirements.
II.C.6.3. Lathing
II.C.6.3.1. Self-furring lath per requirements. See IR 25-4 for additional requirements.
II.C.6.3.2. Weep screed placement, including minimum dimensions from earth/hardscape.
II.C.6.4. Layer thicknesses per requirements.
II.C.6.5. Wait times between coating applications per requirements.

2.6.1.3 Ventilation

I. Inspection of the following items:
   I.A. Ventilation openings per requirements.
      I.A.1. Opening Size
      I.A.2. Opening Location

   

   Figure 2-67: Attic Ventilation Holes
   I.A.2.1. Attics (see Figure 2-67).
   I.A.2.2. Enclosed rafter spaces (see Figure 2-68).
   I.A.2.3. Under-floor
I.A.2.3.1. Ventilation opening coverings per requirements.

Figure 2-68: Enclosed Rafter Space Ventilation Holes at Ridge
2.7 Specialty Structures and Items

This section provides documentation and inspection guidance for structures and items that are different from common building structures and components.

However, nearly all specialty structures have foundations of some type. Prior to specialty structure item being inspected, generally speaking, all foundation system related items applicable to a given structure or portion thereof (refer to 2.2 Foundation Systems on page 62 for further information) must be inspected for compliance with the approved construction documents by the project inspector.

2.7.1 Steel Storage Racks

In addition to the California Building Code, projects using steel storage racks are generally governed by a referenced standard issued by the Rack Manufacturers Institute (RMI; see http://www.mhia.org/industrygroups/rmi). The primary reference for general design and construction requirements is:


RMI 2008 has both gravity and seismic requirements; no additional reference is necessary.

For all steel storage racks, the following information applies:

I. Receipt of documentation for constructed elements:
   I.A. Material/Structural Test Documentation:
      I.A.1. Depending on the sections provided and information in the approved construction documents, material identification is based on either:
            I.A.1.1.1. Refer to 2.3.4.1 Structural Steel on page 116 for additional documentation requirements (including special inspections).
         I.A.1.2. North American Specification for the Design of Cold-Formed Steel Structural Members, AISI 2001 (Note: this is an older reference than for typical cold formed steel products).
            I.A.1.2.1. Refer to 2.3.4.2 Cold Formed Steel on page 125 for additional documentation requirements (including special inspections).
      I.A.1.3. Refer to RMI 2008 Section 9 for additional information.
STRUCTURAL SAFETY INSPECTION ITEMS

II. Inspection of the following items:

II.A. Specified loading identification plaque is in place for each rack (RMI 2008 Section 1.4.2).

II.B. For storage racks with moveable shelves, all required stability components are in place (RMI 2008 Section 1.4.6).

II.C. When used, column base plate shims per requirements (RMI 2008 Section 7.2.4).

II.D. Racks adjacent to building structure:
   II.D.1. When connected to building structure, connection and any testing associated with connection.
   II.D.1.1. Post-installed anchors and connections.
   II.D.1.1.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.

II.D.2. When not connected to building structure, gap between rack and building per requirements.

II.E. Out-of-plumb and out-of-straight conditions per requirements (RMI 2008 Section 1.4.11).

2.7.2 Walk-In Freezers and Cold Storage Boxes

Walk-in freezers and cold storage boxes (WIF/CSB) are to be anchored to the floor and structure based on the details shown in the approved drawings. There are no special documentation and inspection requirements for WIF/CSB, except for any post-installed anchors:

For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.

Depending on the type of foundation and structural framing dictates which section above applies; likewise, depending on the fire/life safety and accessibility requirements, various sections below apply. Refer to the respective applicable sections for documentation and inspection requirements.

2.7.3 Remotely Fabricated Structures or Structural Elements

For general requirements associated with testing and inspection of remotely fabricated structures and structural elements, refer to IR A-15.
STRUCTURAL SAFETY INSPECTION ITEMS

2.7.3.1 Elevators

Special requirements and allowances specific to plant fabricated elevators are provided in IR 16-1. The majority of the requirements with respect to testing and inspection apply to in-plant inspectors. Therefore, the list below relies heavily on documents produced by those inspectors.

I. Receipt of documentation for constructed elements:
   I.A. Receipt of the DSA 6-PI form by the in-plant inspector indicated in IR 16-1 for each building module.
   I.B. Receipt of all applicable material/structural testing and special inspection documentation based on the information noted in the DSA 103 form.

II. Inspection of the following items:
   II.A. Refer to the applicable sections above and below for further information.
   II.B. Post-installed anchors and connections.
     II.B.1. For both masonry and concrete construction, refer to the post-installed anchor section in 2.3.1.1 Cast In Place (CIP) Concrete subsection I.B.3 Post-installed anchors: on page 76 and II.F Post-installed anchors and connections: on page 82.

2.7.3.2 Relocatable Buildings

Special requirements and allowances specific to relocatable buildings are provided in IR 16-1. The majority of the requirements with respect to testing and inspection apply to Relocatable Building In-Plant (RBIP) inspectors (for a list of DSA approved RBIP inspectors, see https://www.apps.dgs.ca.gov/Tracker/InspByCategory.aspx?Id=03). Therefore, the list below relies heavily on documents produced by those inspectors.

I. Receipt of documentation for constructed elements:
   I.A. Receipt of the DSA 6-PI form by the RBIP inspector indicated in IR 16-1 for each building module.
   I.B. Receipt of all applicable material/structural testing and special inspection documentation based on the information noted in the DSA 103 form.
   I.C. Grounding tests (see 5 OTHER BUILDING COMPONENTS AND SYSTEMS subsection 5.4 Electrical
   I.D. In addition to the information below, also refer to the CEC. on page 257 for additional information).

II. Inspection of the following items:
   II.A. Refer to each of the cases below for further information.
STRUCTURAL SAFETY INSPECTION ITEMS

2.7.3.2.1 Single Story Buildings

In addition to the noted items applicable to all relocatable buildings, the necessary documentation and inspection items are listed in DSA 121: Checklist for Site Inspection of Relocatable Buildings (refer to APPENDIX B – REFERENCED DSA FORMS starting on page 313 for a copy of the noted form).

2.7.3.2.2 Multi-Level Buildings

Depending on the type of construction materials dictates which section in this manual applies. Based on that information, refer to the applicable sections above and below.

2.7.3.3 Reviews Stands, Grandstands, and Bleachers

For documentation and inspection requirements, refer to the following IRs:

- For projects approved under the 2001 CBC, see IR 16-5.01.
- For projects approved under the 2007 CBC, see IR 16-5.07.

Refer to APPENDIX B – REFERENCED DSA FORMS on page 313 for forms DSA 130 and DSA 131.

2.7.4 Wind Turbines

Wind turbines are usually constructed of structural steel. Refer to 2.3.4.1 Structural Steel on page 116 and, based on the lateral system, the appropriate section in 2.4.4 Steel starting on page 148. Due to the rather unique nature of wind turbines, additional requirements are provided in IR A-29.
3 FIRE/LIFE SAFETY INSPECTION ITEMS
FIRE/LIFE SAFETY INSPECTION ITEMS

3.1 Site Issues

Fire/Life Safety items related to the site typically involve issues important to the Local Fire Authority (LFA) and are generally addressed on a LFA-dedicated site plan sheet. The LFA’s review and approval of site items is confirmed during DSA design review and indicated on the LFA drawing with a checked and signed information box directly on the sheet. Frequent questions generated by both school districts and LFAs have resulted in DSA generating a Fire and Life Safety Frequently Asked Questions document addressing those.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Site issues: (CFC Chapter 5)
      II.A.1. Confirm that all actual site conditions are reflected on the approved documents. Any discrepancies shall be immediately brought to the attention of the Architect of Record for DSA-approved resolution.
      II.A.2. Temporary fire protection is provided during construction as required.
      II.A.3. Location
         II.A.3.1. Fire Hydrants
            II.A.3.1.1. Confirm point-of-connection for fire line. (Note that off-site points of connection will typically require off-site drawings reviewed and approved by the local municipality.)
            II.A.3.1.2. Verify hydrants have proper clear space around and are protected from mechanical damage.
      II.A.3.2. Back flow preventer
      II.A.3.3. Post Indicator Valve
      II.A.3.4. Local fire department verification of locations of items above and the following (this is not an exhaustive list):
         II.A.3.4.1. Siamese Connections
         II.A.3.4.2. Hose and threading connections.
         II.A.3.4.3. Alarm system (see 3.3.1 Fire/Smoke Alarms on page 185 for additional information).
      II.A.4. See 3.3.2 Automatic Fire Suppression Systems, subsection II.A on page 188 for additional related requirements.
      II.A.4.1. Fire Lane:
         II.A.4.1.1. Unobstructed per requirements horizontally and vertically, especially required clearances at fire truck turn-arounds.
         II.A.4.1.2. Knox box location.
FIRE/LIFE SAFETY INSPECTION ITEMS

II.A.4.1.3. “Drop-off/pick-up” zones do not encroach into fire lane.
II.A.4.2. Safe Dispersal Area (SDA)
   II.A.4.2.1. No closer than specified limit to the nearest building
   II.A.4.2.2. Located so that a clear path of egress is provided from
               the building to the SDA.
II.A.4.3. Fences and Gates:
   II.A.4.3.1. Site fences and gates per requirements.
               II.A.4.3.1.1 Panic Hardware
               II.A.4.3.1.2 Swing direction of egress gates.
II.A.4.4. Cargo Containers:
   II.A.4.4.1. Note that most sites use cargo containers for various
               storage purposes and relocate them around campus as
               needed. These containers may not be located
               haphazardly. Verify container location is a specified
               minimum distance away from any building or property
               line unless noted otherwise. See IR A-27
               for additional information.
II.A.4.4.2. 
II.A.5. Check fire lane paving section will support a fully loaded fire truck.
II.A.6. Signage:
   II.A.6.1. Fire lane is properly signed and marked.
   II.A.6.2. Building construction has an address number, building number or
            building identification in a position plainly legible and visible from
            the street.
   II.A.6.3. Exterior doors that have been rendered non-functional yet still
            retain a functional door appearance are labeled with a sign
            indicating “THIS DOOR BLOCKED.”
II.A.7. Stairs and Ramps:
   II.A.7.1. Stairs
       II.A.7.1.1. Rise-to-run ratio for site stairs
        II.A.7.1.1.1 Top or bottom of an exterior stair meeting a
                   sloping public way, walkway or driveway are
                   common problem areas.
       II.A.7.1.2. Verify exterior steps will not accumulate standing rain
                    water.
       II.A.7.1.3. Handrails are provided within specified limit of the
                    required exit width.
II.A.7.2. Confirm handrail and guardrail heights.
II.A.7.3. Handrails do not each encroach more than specified limit into the
          required width.
3.2 General Building Characteristics

Becoming familiar with the overall building layout and its various fire/life safety characteristics is a crucial first step to properly inspect those features. ACTIVE PROTECTION includes fire detectors and alarms, fire sprinklers and smoke control systems; PASSIVE PROTECTION includes fireproofing, rated assemblies, fire-rated through-penetration details, and exiting pathways, to name a few. Note that the California Building Code allows some reductions in requirements for passive systems if the building has a fire sprinkler system. All of these systems are intended to limit the passage and growth of smoke and fire.

The required components are dictated by the relative fire hazard associated with the building occupancy classification, specified room use, type of construction, and distance between adjacent buildings or the property line. The severity of hazard depends on the flammability, combustibility and reactivity of the materials and the quantity of material present. Some of these requirements can impact other types of inspections (e.g. fire walls require independent structural stability on both sides of the wall, which can affect the structural framing support details). The DSA approved construction documents identify all of these features which act as a fire/life safety ‘system’ to protect the building occupants.

3.2.1 Use/Occupancy

I. Inspection of the following items:
   I.A. Review the approved plans to become familiar with the various occupancies and room uses for the building.
   I.A.1. Confirm that the use and occupancy of each room is consistent with the approved documents.
I.A.1.1. For assembly use areas, signage posting is provided per requirements (see BU 11-08).

I.B. Confirm required fire rated separations, horizontal and vertical, between adjacent room uses and occupancies, and fire areas. (refer to Table 3-1 and Table 3-2, taken from CBC 508.2.5 and 508.4, for commonly specified fire rated separations)

<table>
<thead>
<tr>
<th>Room or Area</th>
<th>Separation and/or Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Furnace room where any piece of equipment is over 400,000 Btu per hour input</td>
<td>1 hour or provide automatic fire-extinguishing system³</td>
</tr>
<tr>
<td>Rooms with boilers where the largest piece of equipment is over 15 psi and 10 horsepower</td>
<td>1 hour or provide automatic fire-extinguishing system³</td>
</tr>
<tr>
<td>Refrigerant machinery room</td>
<td>1 hour or provide automatic sprinkler system⁶</td>
</tr>
<tr>
<td>Hydrogen cutoff rooms, not classified as Group H</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.</td>
</tr>
<tr>
<td>Incinerator rooms</td>
<td>2 hours and automatic sprinkler system</td>
</tr>
<tr>
<td>Paint shops, not classified as Group H, located in occupancies other than Group F</td>
<td>2 hours, or 1 hour and provide automatic fire-extinguishing system</td>
</tr>
<tr>
<td>Laboratories and vocational shops, not classified as Group H, located in a Group 1-2 and I-2.1 occupancy</td>
<td>1 hour or provide automatic fire-extinguishing system²</td>
</tr>
<tr>
<td>[SFM] Rooms or areas with special hazards such as laboratories, vocational shops and other such areas not classified as Group H, located in Group E occupancies where hazardous materials in quantities not exceeding the maximum allowable quantity are used or stored.</td>
<td>1 hour</td>
</tr>
<tr>
<td>Laundry rooms over 100 square feet</td>
<td>1 hour or provide automatic fire-extinguishing system⁶</td>
</tr>
<tr>
<td>Storage rooms over 100 square feet</td>
<td>1 hour or provide automatic fire-extinguishing system⁶</td>
</tr>
<tr>
<td>Group 1-2 and I-2.1 waste and linen collection rooms</td>
<td>1 hour⁴</td>
</tr>
<tr>
<td>Waste and linen collection rooms over 100 square feet</td>
<td>1 hour or provide automatic fire-extinguishing system⁶</td>
</tr>
<tr>
<td>Stationary storage battery systems having a liquid electrolyte capacity of more than 50 gallons, or a lithium-ion capacity of 1,000 pounds used for facility standby power, emergency power or uninterrupted power supplies</td>
<td>1 hour in Group B, F, M, S and U occupancies; 2 hours in Group A, E, I and R occupancies.⁶</td>
</tr>
<tr>
<td>Rooms containing fire pumps in nonhigh-rise buildings</td>
<td>2 hours, or 1 hour and provide automatic sprinkler system throughout the building</td>
</tr>
<tr>
<td>Rooms containing fire pumps in high-rise buildings</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

For Si:

1 square foot = 0.0929 m², 1 pound per square inch (psi) = 6.9 kPa, 1 British thermal unit (Btu) per hour = 0.293 watts, 1 horsepower = 746 watts, 1 gallon = 3.785 L.

a. [SFM] Fire barrier protection and automatic sprinkler protection required throughout the fire area in 1-2 and I-2.1 occupancies as indicated.

Table 3-1: CBC Table 508.2.5 - Incidental Accessory Occupancies - Required Separations

I.B.1. Note the difference between fire walls, fire barriers and fire partitions described in CBC 706, 707, and 709.
3.2.2 Type of construction

I. Inspection of the following items:

I.A. Review the approved plans to become familiar with the type of construction for the building.

I.B. Fire rating of the building frame, walls, floors, and roof is per requirements (refer to Table 3-3 on page 184 and Table 3-6 on page 198 taken from CBC Table 601 and 602, respectively, for commonly specified fire ratings for these portions of the building).
3.2.3 Setbacks and Yards

I. Inspection of the following items:

I.A. Review plans to become familiar with the setbacks and yards for the building.
I.B. Fire rating of the building exterior walls.
I.C. Fire rated separations between adjacent room uses or occupancies.
3.3 Fire/Smoke Protection

Fire-resistant-rated construction, typically referred to as PASSIVE PROTECTION, provides fire and smoke safety and is one of two basic forms of fire protection in building design. Passive protection provides defense against the migration of flame, smoke and heat by the use of fire-resistant materials, atmospheric compartmentalization, and – based on typical human response behavior – properly sized and positioned corridors, stairways, exits and other related egress system components.

The other form of safety, ACTIVE PROTECTION, is generally concerned with the design of fire detection, alarm, and suppression systems and is primarily addressed in 3.3.1 Fire/Smoke Alarms on page 185 and 3.3.2 Automatic Fire Suppression Systems on page 187. Note that inspections involving fire/smoke protection issues should be coordinated with structural and access issues since the integration of all three is crucial to the success of the overall design. All the associated passive features are incorporated in the DSA approved construction documents and are usually provided in the Code analysis sheets and related details.

3.3.1 Fire/Smoke Alarms

Detectors and alarm notification devices are an important part of the ACTIVE PROTECTION system for fire-resistant-rated construction. Although CBC section 907 addresses the conditions requiring a fire alarm and detection system, the majority of the design, installation, testing and inspection requirements are found in the following reference standard, previously noted in 1.2.4 Codes and Referenced Standards on page 38:

- 2010 NFPA 72 National Fire Alarm Code (CA Amended)

The typical system is an interconnected series of smoke and/or heat detectors on dedicated power distributed throughout the building so that, when activated, either manually or automatically, a signal is sent triggering visual and audio alarm devices within the threatened fire area and also to an off-site, supervised facility that alerts the local fire authority (LFA). The intent is to detect a fire sufficiently early so that the building occupants are alerted to the danger and have adequate time to evacuate safely and so the LFA can respond in a timely manner to limit casualties and reduce property losses.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
   I.B. Test Documentation
FIRE/LIFE SAFETY INSPECTION ITEMS

I.B.1. For existing buildings, fire alarm testing documentation is required per IR A-28.

I.B.2. For additional testing documentation, refer to II.D Testing on page 187.

II. Inspection of the following items:

II.A. Proper storage and handling of materials and devices.

II.B. Devices

II.B.1. California State Fire Marshal approved:

II.B.1.1. Detectors

II.B.1.2. Alarms

II.B.1.2.1. Fire alarm has approved supervising station per requirements (see PL 11-01).

II.B.1.3. All other associated equipment.

II.B.2. Fire alarm and detection system devices are protected from mechanical damage.

II.B.2.1. Check that devices have not been dropped, painted or otherwise compromised.

II.C. Installation

II.C.1. Location:

II.C.1.1. Verity location of each device.

II.C.1.1.1. Note that due to the diagrammatic nature of mechanical, plumbing and electrical designs, the actual installation of such items may interfere with the intended design of the fire alarm system. The fire alarm detector spacing is extremely important to the correct functioning of the system; deviations from the drawings could be detrimental to the system performance and may require redesign.

II.C.1.1.2. Spacing complies with the device listing.

II.C.1.2. Fire alarm and detection system devices properly attached to the substrate.

II.C.1.3. Check fire alarm and detection system devices are not adjacent to any unusual heat source that might trigger premature notification.

II.C.1.4. Above-ceiling fire alarm and detection system are accessible for repair and maintenance.

II.C.1.5. Obstructions:

II.C.1.5.1. Each detector is not obstructed by structural members, ductwork, cable trays and other similar items. If such obstruction occurs, the PI shall notify the Architect immediately for resolution.

II.C.1.5.2. Ceiling changes during construction that affect the Structural or Fire/Life Safety portions of the project must be reviewed for their impact to the fire alarm and detection system and DSA approved prior to installation.
FIRE/LIFE SAFETY INSPECTION ITEMS

II.C.1.5.3. Walls

II.C.1.5.3.1 Fire alarm and detection system conduit crossing building expansion/seismic joints are properly installed for movement.

II.C.1.5.3.2 Fire alarm and detection system conduit penetrating rated walls are installed to resist the passage of fire, smoke, hot gases and heat per requirements.

II.C.1.5.3.2.1 Fire alarm and detection system lines through rated walls are securely fastened on each side of the wall per requirements.

II.C.2. All required signage is provided.

II.D. Testing

II.D.1. Test both the fire alarm and detection system per requirements. (Note: NFPA 72 Chapter 14 addresses acceptance requirements in detail. See also IR A-21 and GL-2.)

II.E. Verify owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.

3.3.2 Automatic Fire Suppression Systems

Automatic fire suppression systems are another important part of the ACTIVE PROTECTION system for fire-resistant-rated construction. Although CBC section 903 addresses the conditions requiring an automatic sprinkler system, the majority of the design, installation, testing and inspection requirements are found in the following reference standards, previously noted in 1.2.4 Codes and Referenced Standards on page 38:

- 2010 NFPA 13 Automatic Sprinkler Systems (CA Amended)
- 2007 NFPA 14 Standpipe Systems (CA Amended)
- 2007 NFPA 20 Stationary Pumps
- 2010 NFPA 24 Private Fire Mains (CA Amended)

In addition, the following reference standard also applies:

- 2008 NFPA 25, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems
FIRE/LIFE SAFETY INSPECTION ITEMS

As a system, water-based fire suppression is widely used, generally available and relatively inexpensive. Since water is pump-able, nontoxic, relatively noncorrosive and stable, it is a highly effective cooling and extinguishing agent. A fire sprinkler system is also much more effective than a fire hose response since it applies a minimal amount of water at the source before total room fire involvement.

The general effect of the production of a mist of water droplets by a fire sprinkler causes significant cooling, reducing the radiative feedback to the fire below the level which is needed to sustain combustion. In addition, the evaporation of the water produces steam which has a volume 1,700 times greater than that of water thus depriving the fire of needed oxygen and therefore effectively smothering it.

A fire sprinkler system typically includes the following elements:

- A tap-in to the city water main.
- An underground extension from the main to the building in question sized to provide sufficient gallons per minute at sufficient pressure.
- Valves and monitoring devices connected to the fire alarm system.
- A pipe distribution system throughout the building, providing a designed gallons/minute coverage via sprinkler heads of certain capacity and spacing.

Each sprinkler head has a liquid-filled tube designed to respond to a particular preset temperature, depending on its location in the building. When that temperature is reached, the liquid expands, bursting the tube, simultaneously opening the valve for that sprinkler head. This is a self-operating system, needing no power or signal to activate.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
   I.B. Qualifications of individuals planning to install, either above or below ground, fire sprinkler system components per IR A-25.
   I.C. Testing Documentation
      I.C.1. Where electric fire pumps occur, qualifications of individuals providing acceptance or performance testing of such pumps per IR A-25.
      I.C.2. For additional testing documentation, refer to II.F Testing on page 193.

II. Inspection of the following items:
   II.A. Fire protection system serving other occupied buildings is not Interrupted or shut off during construction.
   II.B. Main service, distribution, gong or alarm locations, and space provisions are understood.
   II.C. Proper storage and handling of materials and devices.
II.C.1. Ensure that distribution pipes are not cracked at junctures due to fabrication or storage and handling problems (see Figure 3-1).

II.D. Devices
II.D.1. Fire Hydrants
II.D.2. Fire pumps (see CBC 913 and NFPA 20)
   II.D.2.1. Verify pump. Note that design changes to the building during construction may affect fire pump capacity and must be reviewed and approved by DSA prior to pump installation.
II.D.3. Back Flow Preventers
II.D.4. Fire Department Connections
II.D.5. Post Indicator Valves
II.D.6. Piping (for standpipe, riser, main and distribution systems)
   II.D.6.1. Type
   II.D.6.2. Size
   II.D.6.3. Pressure Capacity
II.D.7. Standpipes (see CBC 905 and NFPA 14)
II.D.8. Distribution system
   II.D.8.1. Sprinkler Type
      II.D.8.1.1. Sprinkler Heads
         II.D.8.1.1.1 Heads as required for spaces are provided and installed in accordance with NFPA and approved plans.
         II.D.8.1.1.1.1 All heads are:
            II.D.8.1.1.1.1.1 New
            II.D.8.1.1.1.1.2 Unpainted
            II.D.8.1.1.1.1.3 Properly temperature-rated
            II.D.8.1.1.1.1.4 Provided with guards where subject to mechanical injury.
FIRE/LIFE SAFETY INSPECTION ITEMS

II.D.8.2. Sprinkler Rating

II.E. Installation

II.E.1. No unscheduled (not specified on approved drawings) cutting of structural members occurs.

II.E.2. Location

II.E.2.1. Wet standpipe cabinets of proper type, size, and base length are provided, located, and installed as specified.

II.E.2.1.1. Valve is not over specified limit above floor.

II.E.2.2. Proper Device/Piping Orientation

II.E.2.3. Device/Piping Protection

II.E.2.3.1. Mechanical damage (see Figure 3-1 on page 189 for an example).

II.E.2.3.2. Freezing (for both exterior components and those within building envelope which may be without heating, such as fire pump rooms).

II.E.2.3.2.1 Protection from temperatures below 40°F.

II.E.2.4. Underground (see NFPA 24)

II.E.2.4.1. Pathway from point of connection to building is free of encumbrances.

II.E.2.4.1.1 Note that even though the system is pressurized, added horizontal bends and vertical dips to the pipe layout due to unknown or unexpected obstacles may impact the hydraulic calculations and may necessitate system redesign.

II.E.2.4.2. Pipe-to-pipe connections.

II.E.2.4.3. Trench/Pipe Bedding

II.E.2.4.4. Installation Depth

II.E.2.4.5. Protection (if needed due to “hot” soil).

II.E.2.4.6. Thrust block installation.

II.E.2.4.7. Trench backfill requirements.

II.E.2.4.8. Check underground work to the point of connection, usually to a point 6” above the finished floor in a fire riser closet.

II.E.2.4.8.1 No fire line pipe joints are allowed under the building footing.

II.E.2.4.9. Verify that fire line does not run under building slab except at the entrance to the building fire riser room.

II.E.2.5. Riser

II.E.2.5.1. Clearance between riser and floor where it enters the building.

II.E.2.5.2. Back check valve, drains, bells, gauges and switches per requirements.

II.E.2.5.3. Correct flex couplings and 4-way braces.
FIRE/LIFE SAFETY INSPECTION ITEMS

II.E.2.6. Distribution System

II.E.2.6.1. Wet pipe systems:
   II.E.2.6.1.1 Alarm, valve assembly, and water flow indicators comply with connection diagram.

II.E.2.6.2. Dry pipe systems:
   II.E.2.6.2.1 Valve installation complies with connection diagram.
   II.E.2.6.2.2 Proper installation of air compressors and tanks.

II.E.2.6.3. Note differences between interior and exterior installations.
   II.E.2.6.3.1 Location of concealed and exposed lines is understood (vaulted ceilings are a common coordination problem).

II.E.2.6.4. Drainage valves or plugs allow complete drainage of entire system.
   II.E.2.6.4.1 These items are located so as not to cause water damage during usage.

II.E.2.6.5. Branch piping is off top of main.

II.E.2.6.6. Sprinkler lines are hung and braced, longitudinally and laterally as shown in approved construction documents.

II.E.2.6.7. Sprinkler Head Layout
   II.E.2.6.7.1 Sprinkler head water flow density may vary depending on hazard classification and construction type.
   II.E.2.6.7.2 Due to the diagrammatic nature of mechanical, plumbing and electrical designs, their installation layout may interfere with the intended design of the fire sprinkler system. The sprinkler head spacing is extremely important to the correct functioning of the system.
   II.E.2.6.7.2.1 Deviations from the approved drawings could be detrimental to the system performance and may require redesign.

II.E.2.6.8. Sprinkler head elevation above finished floor.
   II.E.2.6.8.1 If the designed elevation conflicts with structural members, ductwork, cable trays, cabinetwork and other similar items and the conflict will affect the sprinkler water discharge pattern, the PI shall notify the Architect immediately for resolution. (Deviations from the approved documents that add pipe elbows become more and more detrimental to the design capacity of the system, especially where small pipe sizes are involved due to the resulting increased friction loss.)
II.E.2.6.9. Ceilings

II.E.2.6.9.1 Ceiling design changes during construction affecting the Structural or Fire/Life Safety portions of such work are reviewed for their impact to the fire sprinkler design and DSA approved prior to installation.

II.E.2.6.9.2 Sprinkler heads not integrally tied to a ceiling system must have free lateral movement in any horizontal direction of a specified dimension. See IR 25-2.10 for more information.

II.E.2.7. Fire Pumps

II.E.2.7.1. Where fire pumps are indicated, check system is protected against any interruption in service.

II.E.2.7.2. Check pump room is fire rated per requirements.

II.E.2.7.2.1 If a separate pump house is provided, it is at least the specified distance away from the building.

II.E.2.8. Standpipes

II.E.2.8.1. Proper Drains

II.E.2.8.2. Proper Gauges.

II.E.2.9. Obstructions

II.E.2.9.1. Distribution Systems

II.E.2.9.1.1 Sprinkler lines crossing building expansion/seismic joints are properly installed for movement.

II.E.2.9.1.2 Sprinkler lines penetrating rated walls are properly installed to resist the passage of fire, smoke, hot gases and heat per requirements.

II.E.2.9.1.2.1 Sprinkler lines through rated walls are securely fastened on each side of the rated wall.

II.E.2.9.1.3 Sprinkler heads are protected from mechanical.

II.E.2.9.1.3.1 Check that heads have not been dropped, painted or otherwise compromised.

II.E.2.9.1.4 Sprinkler heads are not adjacent to any unusual heat source that might trigger premature sprinkler operation.

II.E.2.9.1.5 Above-ceiling sprinklers are accessible for repair and maintenance.

II.E.2.10. Signage/Labeling

II.E.2.10.1. Riser

II.E.2.10.2. Standpipes

II.E.2.10.3. Fire Pump and Fire Pump Room
II.E.2.10.3.1 Electrical fire pumps labeling per requirements (see IR_E-3).

II.E.2.11. Alarm-Supervised
   II.E.2.11.1. Riser Assembly
   II.E.2.11.2. Distribution System
   II.E.2.11.3. Standpipes
   II.E.2.11.4. Fire Pump Assembly.

II.F. Testing
   II.F.1. Special Requirements
      II.F.1.1. Underground
         II.F.1.1.1. If nearby construction has occurred during the time
                     interval between the approval of the DSA approved
                     documents and the start of construction, and the fire flow
                     is suspected of being reduced because of the
                     construction, verify the fire flow capacity per the
                     approved requirements.
      II.F.1.1.2. Mains or Hydrants
         II.F.1.1.2.1 Where underground mains and hydrants are
                     provided, check they are installed, completed and
                     in service prior to building construction work.

II.F.2. Post-Installation Testing
   II.F.2.1. Test devices for functionality.
   II.F.2.2. Test underground work per NFPA 25.
   II.F.2.3. Test sprinkler system and riser. (Note NFPA 13 Chapter 24
            addresses acceptance requirements in detail.)
      II.F.2.3.1. Sprinkler test valve is installed as shown on the approved
                  drawings (see GL-1).
   II.F.2.4. Fire Pumps (see NFPA 20 Chapter 14)
   II.F.2.5. Standpipes (see NFPA 14 Chapter 11)
   II.F.2.6. Wet pipe systems:
      II.F.2.6.1. Observe test of water flow alarm signal.
      II.F.2.6.2. Confirm alarm, valve assembly, and water flow indicators
                  for conformance with connection diagram.
   II.F.2.7. Dry pipe systems:
      II.F.2.7.1. Observe test of alarm signal time, etc...

II.G. Verify Owner has received all required literature, reference standards and
      instructions describing the proper operation and maintenance of the equipment and
      devices installed.
   II.G.1. Riser
   II.G.2. Distribution System
      II.G.2.1. Spare sprinkler heads are provided as specified.
   II.G.3. Fire Pumps
   II.G.4. Standpipes
FIRE/LIFE SAFETY INSPECTION ITEMS

3.3.3 Other Extinguishing Systems

Beside water-based ACTIVE PROTECTION fire suppression systems, other media are allowed. These are typically divided between dry and wet chemical agents. Although CBC sections 904 and 906 address the conditions requiring fire suppression by means other than water, the majority of the design, installation, testing and inspection requirements are addressed in the following reference standards, previously noted in 1.2.4 Codes and Referenced Standards on page 38:

- 2002 NFPA 17A Standard for Wet Chemical Extinguishing Systems
- 2008 NFPA 2001 Standard on Clean Agent Fire Extinguishing Systems

In addition, the following reference standards apply:

- 2007NFPA 10 Standard for Portable Fire Extinguishers
- 2002 NFPA 17 Standard for Dry Chemical Extinguishing Systems

Wet or dry agents are used in special cases where an agent is particularly suited to protect an area with an unusual type of hazard or where extra-quick and/or non-destructive (clean agent) extinguishing is desired. Such systems can be applied through a distributed pipe array or in individual hand-operated devices such as fire extinguishers.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Proper storage and handling of materials and devices.
   II.B. Devices
      II.B.1. Dry, wet and clean agent systems:
         II.B.1.1. System Type
         II.B.1.2. Systems for Type I cooking hoods
            II.B.1.2.1. Agent Capacity
            II.B.1.2.2. Safety Controls
         II.B.2. Confirm Owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.
      II.B.3. Hand-Operated Fire Extinguishers:
         II.B.3.1. Extinguisher Type
   II.C. Installation
FIRE/LIFE SAFETY INSPECTION ITEMS

II.C.1. Location
   II.C.1.1. Top of wall-mounted extinguishers is not over specified limit.
   II.C.1.2. Dry, wet and clean agent systems:
      II.C.1.2.1. Head or nozzle arrangement and its structural support system.
      II.C.1.2.2. Check manual activation apparatus is provided and properly located.
      II.C.1.2.3. Systems for Type 1 cooking hoods
         II.C.1.2.3.1 Nozzle Layout
   II.C.1.3. Hand-Operated Fire Extinguishers:
      II.C.1.3.1. Distribution distances of extinguishers per requirements.
      II.C.1.3.2. Extinguishers are in conspicuous and readily accessible locations along the normal paths of egress.
      II.C.1.3.2.1 Special hazard locations may require additional fire extinguishers where shown on approved construction documents.

II.C.2. Dry, wet and clean agent systems:
   II.C.2.1. System alarm connection to the general building fire alarm system.

II.C.3. Obstructions
   II.C.3.1. Dry, wet and clean agent systems:
      II.C.3.1.1. If system piping or system conduit penetrates a rated wall, verify penetration detail.

II.C.4. Signage/Labeling
   II.C.4.1. Dry, wet and clean agent systems:
      II.C.4.1.1. Warning signs and other visual indicators indicating that the system is about to be activated and/or has been activated.
      II.C.4.1.2. Systems for Type 1 cooking hoods.

II.D. Testing
   II.D.1. Dry, wet and clean agent systems:
      II.D.1.1. Test extinguishing system per NFPA 96 Chapter 11.
      II.D.1.2. Post-activation venting of system.
      II.D.1.2.1. Space is sealed to limit air leakage as required.
      II.D.1.3. Systems for Type 1 cooking hoods
         II.D.1.3.1. Verify automatic shut downs of the make-up air supply and the heating fuel system when the fire suppression system is activated.
FIRE/LIFE SAFETY INSPECTION ITEMS
3.3.4 Smoke Control Systems

Smoke control is a complex problem that is highly dependent on the geometry of the building in question and requires specialized design and inspection. The purpose of a smoke control system is to provide a tenable atmospheric environment for occupants during evacuation.

Smoke control systems can be either PASSIVE PROTECTION systems, where the use of smoke barriers or high bay spaces are used to control the movement of smoke to other areas; or ACTIVE PROTECTION, where mechanical means are used to utilize pressure differences to contain smoke within the event zone or control make-up air and exhaust rates sufficient to slow the descent of high level smoke accumulation to a minimum height above egress paths.

Besides CBC 909, smoke control system design is referenced by the CBC to the following reference standards:

- 2009 NFPA 92A, Recommended Practice for Smoke-Control Systems

I. Receipt of documentation for constructed elements:
   I.A. Proprietary Products
   I.A.1. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
   I.A.2. A rational analysis report shall be provided to the PI providing sufficient information and detail to adequately describe the elements of the design.
   I.B. Special Inspection Documentation
   I.B.1. Smoke control systems must have special inspection by a qualified inspector having expertise in fire protection engineering, mechanical engineering and certification as air balancers.
   I.B.1.1. Preliminary testing shall occur prior to concealment of the system
   I.B.1.2. Final testing shall occur prior to occupancy for pressure differential, leakage, flow, detection and control verification.

II. Inspection of the following items:
   II.A. Smoke control systems shall be inspected and tested by special agencies having expertise in fire protection engineering, mechanical engineering and certification as air balancers.
   II.A.1. Verify preliminary and final testing noted above occurs.
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3.3.5 Fire-Rated Assemblies

Fire rated assemblies are part of a building’s PASSIVE PROTECTION system, using vertical and horizontal barriers to prevent the migration of fire, smoke, heat and hot gases to other building areas. Different assemblies have different hourly ratings, depending on their materials and physical arrangement. The required rated assemblies, discussed primarily in CBC Chapter 7 and as shown on the DSA approved documents, are determined by the building’s construction type, occupancy, height, area and means of egress system. Openings and penetrations through fire-rated assemblies are addressed elsewhere in this document.

3.3.5.1 Walls

The information below applies to all fire-rated walls.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Verify if wall is a fire wall, fire barrier, fire partition, smoke barrier or smoke partition as described in CBC Chapter 7.
   II.A.1. Verify wall assemblies comply with requirements. Commonly specified ratings for wall (based on their function, e.g. fire wall, fire barrier, etc.) can be seen in Table 3-4 and Table 3-5 taken from CBC Table 707.3.9 and Table 706.4, respectively.
   II.A.2. Refer to the documents for the required fire rating of the building exterior walls based on fire separation distance (refer to Table 3-6, taken from CBC Table 602, for commonly specified fire ratings for these portions of the building).
   II.A.3. Confirm that fire walls are given construction priority for installation.
   II.A.4. Wall Assembly Components

<table>
<thead>
<tr>
<th>OCCUPANCY GROUP</th>
<th>FIRE-RESISTANCE RATING (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1, H-2</td>
<td>4</td>
</tr>
<tr>
<td>F-1, H-3, S-1</td>
<td>3</td>
</tr>
<tr>
<td>A, B, E, F-2, H-4, H-5, I, L, M, R, S-2</td>
<td>2</td>
</tr>
<tr>
<td>U</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3-4: CBC Table 707.3.9 - Fire Barrier Ratings

<table>
<thead>
<tr>
<th>GROUP</th>
<th>FIRE-RESISTANCE RATING (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, E, H-4, I, R-1, R-2, R-2.1, U, L</td>
<td>3a</td>
</tr>
<tr>
<td>F-1, II-3,b, II-5, M, S-1</td>
<td>3</td>
</tr>
<tr>
<td>H-1, H-2</td>
<td>4b</td>
</tr>
<tr>
<td>F-2, S-2, R-3, R-4</td>
<td>2</td>
</tr>
</tbody>
</table>

a. In Type II or V construction, walls shall be permitted to have a 2-hour fire-resistance rating.
b. For Group H-1, H-2 or H-3 buildings, also see Sections 415.4 and 415.5.

Table 3-5: CBC Table 706.4 - Fire Wall Ratings Based on Occupancy
FIRE/LIFE SAFETY INSPECTION ITEMS

TABLE 602
FIRE-RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS BASED ON FIRE SEPARATION DISTANCE**

<table>
<thead>
<tr>
<th>FIRE SEPARATION DISTANCE = X (feet)</th>
<th>TYPE OF CONSTRUCTION</th>
<th>OCCUPANCY GROUP H, L</th>
<th>OCCUPANCY GROUP F-1, M, S-I</th>
<th>OCCUPANCY GROUP A, B, E, F-2, L R*, S-2*, U*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5</strong> &lt; X &lt; 10</td>
<td>IA</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10 ≤ X &lt; 30</td>
<td>IA, IB</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>BB, VE</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>≥ 30</td>
<td>All</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm.

a. Load-bearing exterior walls shall also comply with the fire-resistance rating requirements of Table 601.

II.A.4.1. Wall coverings comply with specified smoke and flame spread ratings.

II.A.4.2. Insulation per requirements.

II.A.4.3. In combustible construction, check for fire blocking in concealed wall spaces. Verify openings comply with requirements. See 3.3.6 Fire Proofing of Structural Members on page 207.

II.A.4.4. Structural steel elements within wall requiring fireproofing are properly covered. See 3.3.6 Fire Proofing of Structural Members on page 207.

II.A.5. Continuity of wall:

II.A.5.1. There are many options available to the designer for maintaining the fire rating at the perimeter of the fire-rated wall. Below are several common conditions. Verify requirements per the approved documents.

II.A.5.1.1. Rated wall terminates at the roof deck or exterior wall; if so the wall or roof on either side of that rated wall may also need to be rated.

II.A.5.1.2. Rated wall continues beyond roof deck or exterior wall and extends beyond the roof deck and exterior wall.

II.A.5.1.2.1 Where parapets occur, they have the same fire resistance as that required for its supporting wall.

II.A.5.1.2.2 Where rated walls serve as an exterior wall where a building has two different roof levels, the fire-rated wall continues through the low roof/high roof junction.

Table 3-6: CBC Table 602 - Exterior Wall Fire Rating Requirements
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II.A.6. Opening Limitations
   II.A.6.1. No roof opening is provided within the specified distance of a fire wall.
   II.A.6.2. Electrical boxes in rated walls
      II.A.6.2.1. Not installed back to back but are properly spaced or have specified protective coverings.
   II.A.6.3.
II.A.7. Mounting devices and hardware connected directly to wall framing allow sufficient room for rated gypsum board or fireproofing to be installed properly.
II.A.8. Signage
   II.A.8.1. Rated walls are properly marked indicating their rating.
      II.A.8.1.1. In accessible concealed spaces and attics, after taping of joints and/or painting in those areas, rated walls are marked accordingly (see Figure 3-2).
   II.A.9. At fire walls, verify wall-floor/roof framing connections comply with documents for special details required to ensure structural stability if the structure on one side should collapse due to fire.

3.3.5.2 Horizontal Projections

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
II. Inspection of the following items:
   II.A. Fire Wall/Fire Barrier
      II.A.1. Rated assembly extends to the outer edge of projecting elements when it is within the indicated dimensions of the fire wall.
      II.A.2. Rated assembly extends through concealed spaces.
         II.A.2.1. Though the CBC has some exceptions to the required extent of fire walls/barriers through concealed spaces (for example, see

Figure 3-2: Examples of Fire/Smoke Rated Wall Identification
3.3.5.3 Horizontal Assemblies – Floor/Ceiling and Roof/Ceiling

The information below applies to all fire-rated floor/ceiling and roof/ceiling assemblies.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Horizontal Assembly Components
      II.A.1. Framing
         II.A.1.1. Assembly complies with:
            II.A.1.1.1. Framing Type
            II.A.1.1.2. Spacing
            II.A.1.1.3. Penetration Depth.
         II.A.1.2. Structural steel elements requiring fireproofing are properly covered.
            II.A.1.2.1. No utility or other item in the horizontal assembly compromises the integrity of the fireproofing.
            II.A.1.1.1. If intumescent paint is used, paint has sufficient room to expand when heated. (Intumescent paint typically expands 10x its original volume and only performs to its specification when fully expanded.)

II.B. Combustible Construction
      II.B.1. At interconnection between vertical and horizontal spaces, see 3.3.7 Concealed Spaces on page 208.
      II.B.2. Hot assemblies through a roof assembly, such as a gas vent stack, are separated from combustible construction per requirements. See 3.3.5.5 Penetrations of Assemblies on page 204 for additional requirements.
      II.B.3. Combustible vs. non-combustible materials in above-ceiling spaces:
         II.B.3.1. Note that above-ceiling spaces generally contain a multitude of materials and equipment, some of which may compromise the designation of such a space as “non-combustible.” The architect is required to provide on the drawings an analysis of the ceiling space and a confirmation statement that the listed materials conform with non-combustible requirements. If the PI observes materials in the ceiling space not listed and/or materials whose
II.C. Edge Details
   II.C.1. Floor/Ceiling
   II.C.2. Roof/Ceiling
   II.C.3. Joint system between wall and floor/roof-with-attic is securely installed (see Figure 3-3 for an example condition).
      II.C.3.1. At rated walls or floors/roofs, joint system must have a rating that matches or exceeds those elements.
      II.C.3.2. Though the CBC allows exceptions (see CBC 712), the approved construction documents dictate the requirements for the project.

II.D. Openings comply with 3.3.5.6 Openings in Rated Assemblies (Opening Protectives) on page 205.

3.3.5.4 Shaft Enclosures

Shaft enclosures are provided to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies. They include utility shafts, interior exit stairways, and elevator shafts. Shaft enclosures are typically built as fire barriers. Their purpose is to confine a fire to its floor of origin and to prevent fire, smoke, heat, and hot gases from migrating to other levels. Note that shaft enclosures are not always required depending on how many stories a utility run extends and whether the building has a fire sprinkler system, to mention just two exceptions found in CBC 708; verify with the DSA approved documents.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
   I.B. Receipt of Rational Analysis Report if elevator hoist way pressurization is a part of the design.

II. Inspection of the following items:
II.A. Rated Shafts
   II.A.1. Shaft enclosure fire rated construction.
   II.A.2. Location of shaft enclosures and their contents.
      II.A.2.1. Note if shaft enclosures penetrate rated horizontal assemblies.
      II.A.2.2. If a portion of a shaft enclosure includes an exterior wall the shaft rating may not be required on the exterior wall unless it is shown in the approved construction documents.
      II.A.2.3. Verify the top and bottom of shaft complies
   II.A.3. No shaft enclosure penetration is permitted other than that necessary for the purpose of the shaft enclosure.
   II.A.4. Duct and air transfer openings in a shaft enclosure per requirements.
      II.A.4.1. Though there are some exceptions given in CBC 716, the approved construction documents dictate requirements for the project.

3.3.5.4.1 Elevators
Elevators are mobile cabs within a building shaft that allow people and materials to move vertically through a building. Elevators may be unsafe in a fire because:
   - A person may push a call button and wait for an elevator that may never respond.
   - In a panic an elevator may be overcrowded which would prevent the doors from closing and the elevator from operating.
   - A power failure could happen any time, preventing elevator operation.
   - An elevator may be called to the fire floor, exposing cab occupants to the fire.

Reference standards for elevators include the following:
   - CBC Chapter 30
   - ASME 17.1 as referenced in CBC section 3001.2
   - CFC sections 607 and 907
   - NFPA 13, section 8.15.5
   - NFPA 72, Chapter 21

Because elevator hoistways are frequently rated shafts, the documentation and inspection items indicated in 3.3.5.4 Shaft Enclosures on page 201 apply to elevator shafts as well. The additional inspection items noted below specifically apply to elevators:

I. Inspection of the following items:
   I.A. Elevators
      I.A.1. Specified signage indicating usage of stairs in case of fire.
         I.A.1.1. EXCEPTION: There are allowances to use elevators if they are part of the accessible means of egress, such as in a building four
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or more stories above or below the level of exit discharge. Verify requirements with the approved construction documents.

I.A.2. Elevator doorway and cab interior dimensions comply with requirements (e.g. confirm sufficient room is provided for an ambulance gurney or stretcher). Refer to 4.2.5 Elevators and Lifts on page 226 for additional dimensional requirements.

I.A.3. Emergency recall operation per requirements.
   I.A.3.1. Phase I (smoke detection)
   I.A.3.2. Phase II (fire fighter operation)

I.A.4. Standby power per requirements (e.g. usually seen in elevators required for accessible egress, fire service access, occupant evacuation elevators, or high-rises). Refer to 5.4.1 Emergency and Standby Power Systems on page 265 for additional documentation and inspection requirements.

I.A.4.1. Elevator Equipment
I.A.4.2. Elevator Room Ventilation and Cooling Equipment
I.A.4.3. Elevator Cooling Controller Equipment

I.B. Elevator Shafts
   I.B.1. Elevator Shaft Rating
   I.B.2. Continuity of Rating
      I.B.2.1. Structural attachments for elevator guide rails typically penetrate rated assemblies. Refer to approved construction documents for rated penetration detail.
      I.B.2.2. Where shown in approved plans, an enclosed elevator lobby is provided as part of the elevator shaft enclosure.
         I.B.2.2.1. Though there are many exceptions to this requirement (see CBC 708.14.1), the approved construction documents dictate requirements for the project.
         I.B.2.2.2 Elevator doors:
            I.B.2.2.2.1 Fire Rating
            I.B.2.2.2.2 Smoke Rating
            I.B.2.2.2.3 Draft Protection
            I.B.2.2.2.4 The above elevator door requirements may not be provided by the elevator door themselves; some features may be provided by a rated elevator lobby or additional smoke/draft rated door immediately in front of the elevator doors. Refer to the approved construction documents for requirements.
   I.B.3. Only utilities related to the elevator shall be allowed in the elevator shaft.
   I.B.4. Automatic Fire Suppression Systems
      I.B.4.1. Fire sprinkler placement in shaft and machine rooms, when applicable.
         I.B.4.1.1. Automatic power disconnect to elevator and machine rooms prior to sprinkler activation.
3.3.5.5 Penetrations of Assemblies

Each of the various types of penetrations through rated assemblies require specific methods of protection that are addressed in the DSA approved documents. Information in the approved construction documents typically reference a UL Through-Penetration Firestop System detail. The purpose of these details is to maintain the integrity of the rated assembly for the duration of the required fire-resistance rating despite being punctured by utilities and other penetrants used in construction. Combustible penetrants will be found to have more restrictive requirements than non-combustible penetrants. Note that penetrations may either go through the entire assembly (through-penetration) or just through a portion of the assembly (membrane penetration). In either case, in their final constructed state, they act to restrict the passage of fire, hot gases, smoke, and, in some cases, heat.

The following applies to fire-rated assemblies:

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Appropriate product is used based on fire-rating and type of assembly (e.g. wall, floor/roof/ceiling, etc.) per requirements.
      II.A.1. Confirm penetration detail for each listed assembly for each subcontractor work (one detail will not fit all situations).
         II.A.1.1. Electrical/data penetrations using cable trays and wiring bundles often require special penetration details – verify per requirements.
      II.A.2. Penetrant
         II.A.2.1. Some penetrations may require a minimum spacing between penetrants; verify with documents.
         II.A.2.2. Penetrants are securely anchored on each side of the wall.
         II.A.2.3. Penetrant material type matches the DSA approved detail (some penetration details require a metal sleeve of a minimum length.)
         II.A.2.4. Penetrant meets the rated assembly at the specified angle; anything less compromises the assembly rating.
         II.A.2.5. Penetrants at a seismic joint have movement capability on each side of the wall while still maintaining secure fastening through the rated assembly. (A protected annular space is often specified.)
         II.A.2.6. Duct penetrations have specified smoke/fire dampers.
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II.A.2.6.1. California State Fire Marshall labels are clearly visible.
II.A.2.6.2. Confirm proper installation of smoke/fire damper.
   II.A.2.6.2.1 Orientation of damper with respect to air flow (e.g. some devices may be put in upside down or facing the wrong direction with respect to air-flow and, thus, ineffective).
II.A.2.6.2.2 Dampers are securely attached.
II.A.2.6.2.3 Adequate access to be able to reset after a test or fire event.
II.A.2.6.3. Though the CBC allows exceptions to providing smoke/fire dampers (see CBC 716.5), the approved construction documents dictate requirements.

3.3.5.6 Openings in Rated Assemblies (Opening Protectives)

Openings in rated assemblies, meaning fire door assemblies and fire window assemblies, are designed and installed to maintain the integrity of the rated wall assembly that they are associated with. The fire protection rating for an opening protective is generally less than the required fire resistance of the wall since doors and windows do not usually have material/fuel loading stored directly against them.

Although CBC Chapter 7 addresses many details regarding fire doors and fire windows, the code refers to the following standard for additional installation information:

- 2007 NFPA 80 Fire Door and Other Opening Protectives

In order to make use of the information below, it is important to identify the type of assembly in which an opening is placed to ensure that the proper label or installation or other inspection related items are verified or carried out.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Doors/Shutters
      II.A.1. Fire Protective Rating Labeling
         II.A.1.1. Complies with NFPA 80
         II.A.1.2. Permanently affixed and not painted over.
         II.A.1.3. Has the following information:
            II.A.1.3.1. Manufacturer name or some other means to identify manufacturer.
II.A.1.3.2. Name or trademark of inspection agency issuing label.
II.A.1.3.3. Fire Protection Rating
II.A.1.3.4. Temperature rating (when applicable – e.g. at exit
closures and exit passageways when automatic fire
sprinklers are not installed throughout the building).
II.A.1.4. Where fire exit hardware is part of the door, labeling indicates
such.
II.A.2. Fire doors are self-closing or automatic-closing per requirements.
II.A.2.1. Doors that are automatic-closing by smoke detection close within
the specified time delay.
II.A.3. Oversized doors
II.A.3.1. Either labels indicate door is oversized, or an inspection certificate
by a DSA approved inspector is provided. The inspection
certificate must indicate conformance to requirements for the
following:
II.A.3.1.1. Design
II.A.3.1.2. Material
II.A.3.1.3. Construction
II.A.3.1.4. No fire test was performed.
II.A.4. Doors in fire rated corridors and smoke barriers (also see 3.5.1
Fire/Smoke Protection of Means of Egress subsection II.A.2.1 Doors In
Corridors on page 213 for additional requirements):
II.A.4.1. Gaskets or seals around their perimeter.
II.A.4.2. Closers that properly close and latch the door.
II.A.4.3. Metal thresholds where noted per the approved construction
documents.
II.A.4.4. Louvers are not allowed in rated door assemblies in rated
corridors and/or smoke barriers.
II.A.4.4.1. EXCEPTION: Viewports less than the specified limits
and consisting of certain construction are acceptable.
II.A.4.5. Verify hardware is appropriate to the door rating per
requirements.
II.A.4.6. No miscellaneous holes, gaps or other imperfections or
adjustments that would nullify fire rating.
II.A.4.6.1. Metal doors cannot be “cut to fit.”

II.B. Frames
II.B.1. Fire Protective Rating Labeling
II.B.1.1. Labels permanently affixed and not painted over.
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II.B.2. No miscellaneous holes, gaps or other imperfections or adjustments that would nullify fire rating.
   II.B.2.1. Metal frames cannot be “cut to fit.”

II.B.3. 

II.C. Glazing in doors
   II.C.1. Fire Protective Rating Labeling
   II.C.2. Label for safety glazing in rated fire doors.

II.D. Windows/Shutters in rated walls
   II.D.1. Fire Protective Rating Labeling
      II.D.1.1. Labels for glazing should be readable and not obscured by the window stops.
   II.D.2. Label for safety glazing in fire protection rated glazing in fire window assemblies in areas subject to human impact per requirements.

3.3.6 Fire Proofing of Structural Members

In order for a building to gain additional allowable area, height, and number of stories (see CBC Table 503) a building must be built to a higher level of fire resistance. One way to achieve this goal is through PASSIVE PROTECTION provided by fireproofing various building elements in order to obtain a fire rating of one, two, or three hours. The elements that require fire protection are the primary structural frame, the floor and secondary members, the roof and secondary members, interior and exterior bearing walls, and interior and exterior non-bearing walls.

Primary frame members of various types of materials achieve fire ratings through different methodologies. Typically structural steel is protected with a spayed fire-resistant material (SFRM), steel reinforcing with concrete, and wood can achieve a rating depending on its use and thickness. The fire resistance rating requirements for these building elements are spelled out in CBC Table 601 (see Table 3-3 on page 184).

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Required thickness and type of fire protection per requirements.
      II.A.1. Required thickness may vary based on member classification being “restrained” or “unrestrained”.

II.A.2. Fireproofing is not damaged from weather intrusions or from mechanical damage.
   II.A.2.1. Fireproofing is not compromised by wall framing, wall backing, furring, supports, or utility runs; the full thickness of protection is continuous for the entire member length.
   II.A.3. Where intumescent paint is used, verify there is sufficient room for the paint to expand. (Intumescent paint typically expands 10x its original volume and only performs to its specification when fully expanded.)

II.B. Primary structural columns and beams required to be protected have individual encasement on all four sides their full length, including connections to other members. (Primary structural frame elements are considered to be “the columns and the girders, beams, trusses and spandrels having direct connections to the columns and all other members which are essential to the stability of the building as a whole.” See CBC 1102B.

II.C. Structural framing inside a rated wall is individually protected per requirements.

II.D. Secondary members are protected per requirements, when applicable.

3.3.7 Concealed Spaces

In combustible construction (e.g. wood, etc.), because concealed spaces provide avenues for fire and hot gases to travel without building occupant awareness, proper installation of fire/smoke/draft protection in these areas is crucial. Regardless of fire-rating, the following information applies to the various concealed spaces often found in buildings with combustible construction. See CBC 717.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Fire/smoke/draft stop construction complies with requirements to block off fire/smoke or hot gasses.
      II.A.1. Walls
          II.A.1.1. Fire blocking at specified locations:
          II.A.1.2. Horizontal Spacing
              II.A.1.2.1. At ceiling and floor levels.
          II.A.1.3. Vertical Spacing
      II.A.2. Floor/Roof/Ceiling
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II.A.2.1. Close off continuous space between wall (vertical) framing and floor/roof framing (horizontal).

II.A.2.2. At concealed sleeper spaces above masonry or concrete fire-rated floors, fire blocking is provided.
   II.A.2.2.1. No space beneath floor exceeds specified area limits.
   II.A.2.2.2. Under permanent partitions fire blocking is provided per requirements.

II.A.2.3. Draftstops are provided per requirements.

II.A.3. Architectural features (e.g. soffits, enclosed canopies, walkway covers, etc.).
   II.A.3.1. Fire blocking between exterior wall and end of architectural feature per requirements.

II.A.4. In Type I or II construction, combustible construction is not permitted, unless specifically shown in the approved construction documents (if shown, it is usually based on the allowed exceptions in CBC 717.5).
3.4 Hazardous Materials

Hazardous materials are considered unsafe to life and/or property because they are ignitable, corrosive, reactive or toxic (for an explanation of commonly seen hazardous material signage, see http://www.compliancesigns.com/nfpadiamonds.shtml). Such items may be found in any state: solid, liquid, gas or dust, and can be in usable or waste condition. Buildings that manufacture, process, generate, store or otherwise use hazardous materials in quantities that exceed the maximum allowable per control area (defined as an area bounded by fire barriers, horizontal assemblies, fire walls or exterior walls in any combination and as listed in CBC Table 307.1(1)), constitute an above-average fuel load and are therefore considered H-occupancies subject to the limitations spelled out in the CBC. Because there is a multitude of different high-hazard operations state-wide, the code categorizes such facilities in terms of their degree of hazard rather than define them in terms of their function.

Hazardous materials in excess amounts are generally required to be located along an exterior wall to help facilitate fire-fighting operations and venting of the products of combustion. In some cases they may need to be located in a detached building set away from other buildings and/or property lines a minimum distance, depending on their hazard level. Hazardous materials and electrical sparking could be a dangerous combination and may be need to be separated. Note that the potential hazard of adjacent incompatible materials (materials that when mixed have the potential to react in a manner that generates heat, fumes, gases or byproducts which are hazardous to life or property) is not addressed in the CBC and requires expert advice for resolution during the design phase.

The code allows for some factors that can mitigate the hazard of a material. Such mitigations can include the following (this is not an exhaustive list):

- Size of a hazardous material container.
- Whether the material is part of an open or closed system.
- How material is packaged.
- How and in what configuration material is stored.
- Whether the material is stored in a hazardous material storage cabinet or concealed space.
- Whether there is sufficient ventilation to prevent hazardous concentrations.
- Whether there is an emergency or stand-by power system.
- Whether an hazardous activity occurs inside or outside.
- Whether the building is fire sprinklered.
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In any case, these issues are required to be resolved in the design phase and their solutions via the use of PASSIVE and ACTIVE fire control systems shall be indicated on the DSA approved documents. Testing and inspection for each passive and active system shall be carried out as discussed elsewhere in this document.
3.5 Means of Egress

This section addresses the safe exiting system for a building. The general principles on which means of egress are based are:

1. The egress system will provide occupants alternative paths of travel to a place of safety to avoid a fire.
2. The system will shelter occupants from fire and the products of combustion.
3. The system will accommodate all occupants of a structure.
4. The egress system shall be clear, unobstructed, well-marked and illuminated so that the user can exit without requiring any tools, keys, special knowledge or effort.

3.5.1 Fire/Smoke Protection of Means of Egress

Proper protection from smoke and fire for occupants within the means of egress system is crucial. Life safety from fire is a matter of successfully evacuating the occupants of a building to a place of safety; thus, it is a function of time: time for detection, time for notification, and time for egress. A properly designed egress system provides all of the above. Once in a safe egress system the exit pathway must maintain its fire-safe integrity to the point of the exit discharge.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.

II. Inspection of the following items:
   II.A. Corridors
      II.A.1. Corridor rating and construction per requirements.
      II.A.1.1. Walls (See 3.3.5.1 Walls on page 197 for additional information.)
         II.A.1.1.1. The rated “envelope” should be continuous to the exit.
         II.A.1.1.1.1 If corridor is a rated tunnel construction, horizontal rated assembly is constructed per requirements.
      II.A.1.1.2. Utility penetrations through rated corridor walls per requirements. (See also 3.3.5.5 Penetrations of Assemblies on page 204.)
II.A.1.1.2.1 Check especially all penetrations above the corridor ceiling if the rated corridor walls extend up to the deck.

II.A.2. Corridor width matches approved documents.
   II.A.2.1. Doors In Corridors
      II.A.2.1.1. Door swings do not encroach more than the specified limit into the minimum required width of the corridor (construction drawings should indicate the minimum required width).
      II.A.2.1.1.1 Exit doors provide the specified minimum clear exit width measured between the face of the door at the 90° open position and the face of the door stop.
      II.A.2.1.2. Panic hardware is typically required for corridor exit doors – verify with approved construction documents.
      II.A.2.1.2.1 Where noted on approved plans, classroom door hardware provides locking ability from the inside (see BU 11-05 and Security vs. Exiting: Door Locking Hardware in Schools).
      II.A.2.1.3. Door swing does not compromise the direction of exiting.
      II.A.2.1.4. Check doors, lites in doors, frames and hardware provided are constructed, labeled and installed properly (see 3.3.5.6 Openings in Rated Assemblies (Opening Protectives) on page 205 for additional requirements).
      II.A.2.1.5. Exit doors are clearly distinguishable from the adjacent construction.

II.A.3. Window frames and glazing in corridor walls are constructed, labeled and installed per the documents (see 3.3.5.6 Openings in Rated Assemblies (Opening Protectives) on page 205 for additional requirements).

II.A.4. Emergency Lighting
   II.A.4.1. Emergency artificial lighting for the corridor is supplemented with battery packs or other emergency power systems.
   II.A.4.2. Lighted exit lights, both high and low-level, are clearly visible per their listing.

II.A.5. Fire alarm devices in the corridor per requirements. See also 3.3.1 Fire/Smoke Alarms on page 185.

II.A.6. Fire sprinkler devices in the corridor per requirements. See also 3.3.2 Automatic Fire Suppression Systems on page 187.
FIRE/LIFE SAFETY INSPECTION ITEMS

II.A.7. Fire extinguishers in corridor per requirements.

II.B. Exits

II.B.1. Exit doors are provided per requirements.
   II.B.1.1. Number of exit doors for each room per requirements.
   II.B.1.2. Distance between multiple exit doors for a given room or space per requirements.
   II.B.1.3. Panic hardware, when applicable (see 4.2.6 Doors and Hardware on page 227 for additional information).
   II.B.1.4. Tactile exit sign (see 4.2.1 Signage on page 224 for additional information).
   II.B.1.5. Lighted Exit Sign

II.B.2. Exit doors provide the specified minimum clear exit width measured between the face of the door at the 90° open position and the face of the door stop.

II.B.3. Exit door leafs are not wider than specified in the approved construction documents.

II.B.4. Exterior exit doors located in a rated exterior wall are properly rated and labeled (see 3.3.5.6 Openings in Rated Assemblies (Opening Protectives) on page 205 for additional requirements).

II.C. Stairways, ramps and upper floor exitways

II.C.1. For accessible features of stairs and ramps, see the appropriate sections in 4 ACCESS COMPLIANCE INSPECTION ITEMS beginning on page 216.

II.C.2. Exit stairways are given construction priority for installation.

II.C.3. The exit loading for stairs, ramps and upper floor exitways is determined by the cumulative load for the rooms they serve. Verify the minimum width required is provided as shown on the approved construction documents.

II.C.4. Stair rise-to-run ratio, especially where the top or bottom of an exterior stair meets a sloping public way, walkway or driveway.
   II.C.4.1. Exterior steps are sloped to not accumulate standing rain water.

II.C.5. Handrails and Guardrails
   II.C.5.1. Handrail and guardrail heights per requirements.
   II.C.5.2. Ramp handrails do not each encroach more than the specified limits into the required exit width
   II.C.5.3. Stair handrails are provided within the specified distance of the required exit width.
II.C.6. Confirm exterior stairs and ramps have no possibility of storage underneath unless the space is enclosed with fire rated construction indicated in the approved drawings.

II.C.6.1. If enclosed space is provided under an enclosed stair verify it is fire rated per requirements and that access to the space is not directly from within the stair enclosure.

II.C.7. If exterior stairs, ramps and upper floor exitways are of combustible construction, fire sprinklers are provided per requirements; see 3.3.2 Automatic Fire Suppression Systems on page 187.

II.C.8. In combustible construction verify fire blocking is provided in concealed spaces per requirements.

II.C.9. Areas of refuge are provided where required by the approved construction documents.

II.C.10. Egress illumination extends fully through the exit discharge.

II.C.10.1. Verify required luminosity is achieved at walking surfaces (see IR 10-1).
4 ACCESS COMPLIANCE INSPECTION ITEMS
ACCESS COMPLIANCE INSPECTION ITEMS

Due to the nature of the accessibility inspection items, there are no requirements for receipt of documentation beyond the approved construction documents. Therefore, the items listed below are strictly inspection items that are to be verified for compliance with the approved construction documents.
4.1 Site

I. Inspection of the following items:

I.A. Location

I.A.1. An accessible route of travel between all buildings and accessible site facilities, including parking serving (see Figure 4-1):
  - I.A.1.1. Area of new work

I.B. Key features of an accessible path of travel (POT):

I.B.1. Dimensions
  - I.B.1.1. Slope/cross-slopes
  - I.B.1.2. Level changes leading to additional accessible features (e.g. ramps, stairs, etc.).
  - I.B.1.3. Maintenance of specified clear width and height
    - I.B.1.3.1. Projections into path
      - I.B.1.3.1.1 Overhanging obstructions
  - I.B.1.4. Warning Curbs

I.B.2. Surfaces
  - I.B.2.1. Materials on and along POT.

I.B.3. Tactile Requirements
  - I.B.3.1. Tactile indicators along POT.

I.B.4. Visual Requirements
  - I.B.4.1. Visual indicators along POT.
ACCESS COMPLIANCE INSPECTION ITEMS

I.C. Civil Engineering work related to accessibility.

4.1.1 Parking

I. Inspection of the following items:

I.A. Location

I.A.1. Location and layout of accessible parking on the site
I.A.2. Number of accessible spaces per lot for multiple lots.
I.A.3. POT connection for:
   I.A.3.1. Ramps at accessible spaces.
   I.A.3.2. Passenger or Bus Loading zones.
   I.A.3.2.1. Verify “drop-off/pick-up” areas do not encroach into fire
          lane (see 3.1 Site Issues subsection IIA.4.1 on page
          179 for additional information).

I.B. Dimensions

I.B.1. Parking Spaces
I.B.2. Access Aisles
I.B.5. Parking Structures
   I.B.5.1. Special dimensions and clearance requirements per approved
           construction documents.

I.C. Visual Requirements

I.C.1. Paint and required markings.
I.C.2. Signage at each type of space.
I.C.3. ‘Tow-away’ sign at lot entrances.

I.D. Special equipment, where occurs per requirements:

I.D.1. Parking lot ticket dispensers.
I.D.2. Electric vehicle charging station.

4.1.2 Signage

I. Inspection of the following items:

I.A. Location

I.A.1. "Tow-away" sign(s) at parking lot entrance(s).
I.A.2. At accessible parking spaces (see Figure 4-2).
   I.A.2.1. Van Signs
   I.A.2.2. International symbol of accessibility (ISA) at accessible spaces.
ACCESS COMPLIANCE INSPECTION ITEMS

I.B. Dimensions
   I.B.1. Sign size
   I.B.2. Height
   I.B.3. Text Dimensions
I.C. Visual Requirements
   I.C.1. Text of “Tow-away” sign(s) at parking lot entrance(s).
I.D. When specified in approved construction documents, verify directional signs.

4.1.3 Walks

I. Inspection of the following items:
   I.A. Location
      I.A.1. See 4.1 Site on page 218 for location information.
      I.A.2. Edge protection if sloping adjacent grade occurs.
   I.B. Dimensions
      I.B.1. Walk/POT Width
      I.B.2. Distance between landings on sloping walks.
      I.B.3. Passing Spaces
      I.B.4. Slope/cross-slope
         I.B.4.1. At door and gate landings.
      I.B.5. Warning Curbs
   I.C. Surfaces
      I.C.1. Texture and slip-resistance, including at level changes.
      I.C.2. Transition of new walk to existing walk.
      I.C.3. Drainage gratings (see Figure 4-3)
         I.C.3.1. Locations
         I.C.3.2. Type
         I.C.3.3. Opening size/orientation.
   I.D. Tactile Requirements
      I.D.1. Tactile indicators along POT.
   I.E. Visual Requirements
      I.E.1. Visual indicators along POT.
   I.F. Civil Engineering work related to accessibility.

Figure 4-3: Incorrect Grating Type
ACCESS COMPLIANCE INSPECTION ITEMS

4.1.4 Curb Ramps

I. Inspection of the following items:
   I.A. Location
      I.A.1. See 4.1 Site on page 218 for location information.
      I.A.2. Crossings at vehicular ways.
      I.A.3. Configuration (see Figure 4-4).
   I.B. Dimensions
      I.B.1. Landings at top and bottom.
      I.B.2. Slope
   I.C. Surfaces
      I.C.1. Border Grooves
      I.C.2. Detectable Warnings
      I.C.3. Slip-resistance
   I.D. Visual Requirements
      I.D.1. Finish/contrast versus adjacent sidewalk.

4.1.5 Ramps and Landings

I. Inspection of the following items:
   I.A. Location
      I.A.1. New and existing ramps on accessible POT.
      I.A.2. Landings
         I.A.2.1. Top
         I.A.2.2. Bottom
         I.A.2.3. Intermediate
ACCESS COMPLIANCE INSPECTION ITEMS

I.A.2.3.1. Between level landings.
I.A.2.3.2. Change of direction
I.A.2.4. At door or gate.
I.A.3. Guards, if required.

I.B. Dimensions
   I.B.1.1. Sloped to prevent standing water.
I.B.2. Ramp
   I.B.2.1. Slope/cross-slope
      I.B.2.1.1. Sloped to prevent standing water.
   I.B.2.2. Length
   I.B.2.3. Width
I.B.3. Landings (top/bottom/intermediate)
   I.B.3.1. Slope/cross-slope
      I.B.3.1.1. Sloped to prevent standing water.
   I.B.3.2. Length
   I.B.3.3. Width
   I.B.3.4. Distance between level landings.
I.B.4. Handrails
   I.B.4.1. Handrail Location
   I.B.4.2. Handrail Extensions
I.B.5. Guide Curb or Rails

I.C. Surfaces
I.C.1. Surfaces behind handrails per requirements.

4.1.6 Stairs and Landings

I. Inspection of the following items:
   I.A. Location
      I.A.1. New stairs/stairways, existing modified stairs/stairways.
   I.B. Dimensions
      I.B.2. Treads
         I.B.2.1. Markings for the visually-impaired.
      I.B.3. Risers
      I.B.4. Landings
         I.B.4.1. Sloped to prevent standing water.
      I.B.5. Handrails
         I.B.5.1. Handrail Location
         I.B.5.2. Handrail Extensions
   I.C. Surfaces
      I.C.1. Slip-resistance
         I.C.1.1. Treads
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I.C.1.2. Landings
I.C.2. Surfaces behind handrails per requirements.

I.D. Visual Requirements
I.D.1. Markings for the visually-impaired.

4.1.7 Gates

I. Inspection of the following items:
   I.A. Location
      I.A.1. Configuration
   I.B. Dimensions
      I.B.3. Level landings
         I.B.3.1. Width
         I.B.3.2. Depth
      I.B.4. Hardware (see Figure 4-5).
   I.C. Gate Construction

Figure 4-5: Gates
ACCESS COMPLIANCE INSPECTION ITEMS

4.2 Building

I. Inspection of the following items:
   I.A. Location on site.
   I.B. Proximity to accessible features.

4.2.1 Signage

I. Inspection of the following items:
   I.A. Locations
     I.A.1. ISA
     I.A.2. Room Identification Signs
     I.A.3. Tactile Exit Signs
     I.A.4. Elevator or platform lift identification, way-finding
     I.A.5. Stairway Signage
       I.A.5.1. Directional Signage (see Figure 4-6).
     I.A.6. Area of refuge
     I.A.7. Building directory
     I.A.8. Text Telephone (if applicable).
     I.A.9. Signage at special-use areas
       I.A.9.1. Assistive Listening Systems
       I.A.9.2. Restroom Doors (see Figure 4-7).
   I.B. Dimensions
     I.B.1. Mounting height
       I.B.1.1. Room Identification Signs
       I.B.1.2. Tactile Exit Signs
   I.C. Visual Requirements
     I.C.1. Type/font
       I.C.1.1. Size
       I.C.1.2. Style
       I.C.1.3. Raised Text
       I.C.1.4. Color contrast
       I.C.1.5. Texture of sign
   I.D. Tactile Requirements
     I.D.1. Corresponding braille text for visual signs.
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4.2.2 Hallways, Corridors, Vestibules

I. Inspection of the following items:
   I.A. Location
      I.A.1. POT to area of new work.
   I.B. Dimensions
      I.B.1. Widths of:
         I.B.1.1. Halls
         I.B.1.2. Corridors
         I.B.1.3. Exit Balconies
      I.B.2. Passing spaces (if required) at long halls/corridors.
      I.B.3. Maneuvering clearances at
         I.B.3.1. Turns
         I.B.3.2. Switchbacks
         I.B.3.3. Doors
            I.B.3.3.1. Door swing clearances at vestibules.
         I.B.3.4. Gates
      I.C. Guards at balconies and other required areas.

4.2.3 Ramps and Landings

I. Inspection of the following items:
   I.A. Location
      I.A.1. New and existing ramps on accessible path of travel.
      I.A.2. Landings
         I.A.2.1. Top
         I.A.2.2. Bottom
         I.A.2.3. Intermediate
            I.A.2.3.1. Between level landings.
            I.A.2.3.2. Change of direction
         I.A.2.4. At door or gate.
      I.A.3. Guards, if required.
   I.B. Dimensions
      I.B.1. Ramp
         I.B.1.1. Slope/cross-slope
         I.B.1.2. Length
         I.B.1.3. Width
      I.B.2. Landings (top/bottom/intermediate)
         I.B.2.1. Slope/cross-slope
         I.B.2.2. Length
         I.B.2.3. Width
         I.B.2.4. Distance between level landings.
      I.B.3. Handrails
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I.B.3.1. Handrail Location
I.B.3.2. Handrail Extensions
I.B.4. Guide Curb or Rails
I.C. Surfaces
  I.C.1. Surfaces behind handrails per requirements.

4.2.4 Stairs and Landings

I. Inspection of the following items:
   I.A. Location
     I.A.1. New stairs/stairways, existing modified stairs/stairways.
   I.B. Dimensions
     I.B.2. Treads
       I.B.2.1. Markings for the visually-impaired.
     I.B.3. Risers
     I.B.4. Landings
       I.B.4.1. Sloped to prevent standing water.
   I.B.5. Handrails
     I.B.5.1. Handrail Location
     I.B.5.2. Handrail Extensions
   I.C. Surfaces
     I.C.1. Slip-resistance
       I.C.1.1. Treads
       I.C.1.2. Landings
     I.C.2. Surfaces behind handrails per requirements.
   I.D. Visual Requirements
     I.D.1. Markings for the visually-impaired.

4.2.5 Elevators and Lifts

I. Inspection of the following items:
   I.A. Location:
     I.A.1. Passenger/Freight Elevators
     I.A.2. Hall lantern fixtures.
     I.A.3. Door jamb markings.
   I.B. Emergency Features
     I.B.1. Emergency operation
     I.B.2. Intercom System
     I.B.3. Signaling Devices
     I.B.4. Door re-opening sensors.
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I.C. Dimensions
  I.C.1. Height of centerline of hall call buttons in elevator lobby or hall.
  I.C.2. Clear Opening Width
  I.C.3. Interior Of Cab
    I.C.3.1. Handrail type and location.
  I.C.4. In-car controls (see Figure 4-8).
    I.C.4.1. Configuration
    I.C.4.2. Identification

I.D. Surfaces
  I.D.1. Surfaces behind handrails per requirements.

I.E. Visual Requirements
  I.E.1. In-car controls
    I.E.1.1. Button style and dimensions.

I.F. Tactile Requirements
  I.F.1. In-car controls
    I.F.1.1. Braille text for buttons.

4.2.6 Doors and Hardware

I. Inspection of the following items:

I.A. Location
  I.A.1. All Doors
    I.A.1.1. Main Entry
    I.A.1.2. Passage Doors
    I.A.1.3. Single or double leaf.

I.B. Dimensions
  I.B.1. Width
    I.B.1.1. Clear Opening
  I.B.2. Height
  I.B.3. Clearances at:
    I.B.3.1. Strike-side
    I.B.3.2. Push-side
    I.B.3.3. Approach
  I.B.4. Threshold
ACCESS COMPLIANCE INSPECTION ITEMS

I.B.5. Hardware Mounting Height

I.C. Hardware
   I.C.1. Hardware Group
   I.C.2. Type of hardware (see Figure 4-9).

I.D. Additional door/door related features
   I.D.1. Operational Effort
      I.D.1.1. Maximum effort to operate door(s).
   I.D.2. Closer
   I.D.3. Kick Plate
   I.D.5. Automatic doors
      I.D.5.1. Fire Doors
   I.D.6. Locations/types of:
      I.D.6.1. Door Stops
      I.D.6.2. Hold-Open Devices

4.2.7 Plumbing Fixtures

I. Inspection of the following items:
   I.A. Dimensions
      I.A.1. Counter height and knee clearance at sink(s) (refer to 4.2.8 Cabinets and Counters on page 229 for additional requirements)
      I.A.2. Clear floor space for approach and use.
   I.B. Operational Effort
      I.B.1. Fixture operating force required.
ACCESS COMPLIANCE INSPECTION ITEMS

4.2.7.1 Drinking Fountains

I. Inspection of the following items:
   I.A. Location
      I.A.1. High-Low combination
      I.A.2. Number of drinking fountains.
   I.B. Dimensions
      I.B.1. Approach and clear space for use (see Figure 4-11 and Figure 4-10).
      I.B.2. Alcove or space at ‘wing walls’ (see Figure 4-11).

   I.B.2.1. Width
   I.B.2.2. Depth
   I.B.3. Height of bubbler.
   I.B.4. Clear height of:
      I.B.4.1. Knee space
      I.B.4.2. Toe space.
   I.B.5. Location of bubbler on unit.
   I.B.6. Alternate dimensions for children, if applicable.

4.2.8 Cabinets and Counters

I. Inspection of the following items:
   I.A. Location
      I.A.1. Clear access at employee work areas and work stations.
ACCESS COMPLIANCE INSPECTION ITEMS

I.A.2. Accessibility at storage cabinets and built-in equipment (see Figure 4-12).

I.B. Dimensions

I.B.1. Countertop (accessible knee space)
   I.B.1.1. Height
   I.B.1.2. Depth
   I.B.1.3. Width
      I.B.1.3.1. Minimum width of circulation space(s) at casework).
   I.B.1.4. Minimum counter length.
   I.B.1.5. Clearance at theft protection barriers.

I.C. Visual Requirements
   I.C.1. ISA at locations, if required.

4.2.9 Alarms and Fire Extinguishers

I. Inspection of the following items:

I.A. Location
   I.A.1. Coordinate with Fire/Life Safety requirements (refer to 3.3.1 Fire/Smoke Alarms on page 185 and 3.3.3 Other Extinguishing Systems on page 194).

I.B. Dimensions
   I.B.1. Front/parallel approach to alarm initiating device, on accessible route.
   I.B.2. Height of:
      I.B.2.1. Mounting of:
         I.B.2.1.1. Audible Devices
         I.B.2.1.2. Visual Devices (see Figure 4-13)
ACCESS COMPLIANCE INSPECTION ITEMS

I.B.2.2. Extinguisher Handle
I.B.2.3. Cabinet Handle

I.C. Operational Effort
   I.C.1. Force required to initiate alarm device.

I.D. Visual Requirements
   I.D.1. Visual Devices

4.2.10 Public Telephones

I. Inspection of the following items:
   I.A. Location
      I.A.1. Number and location of pay or closed-circuit telephones.
      I.A.2. Location of telephone book, if provided.
      I.A.3. Location of signage for accessible phones.
   I.B. Dimensions
      I.B.1. Access path and clear space at accessible telephones.
      I.B.2. Knee Clearances
      I.B.3. Height of operable parts.
         I.B.3.1. Shelf Height
   I.C. Visual Requirements
      I.C.1. Location of signage for accessible phones.
   I.D. Volume control provided or text telephones.
ACCESS COMPLIANCE INSPECTION ITEMS

4.2.11 Restrooms

I. Inspection of the following items:
   I.A. Location
      I.A.1. Clear path of travel to accessible fixtures.
   I.B. Dimensions
      I.B.1. Clear Entry Width
   I.C. Visual Requirements
      I.C.1. Room Identification Signage
      I.C.2. Door Symbols

4.2.11.1 Water Closet and Water Closet Compartments

I. Inspection of the following items:
   I.A. Dimensions
      I.A.1. Compartment door required clear space side or end entry.
         Figure 4-14: Example Measurement of Maneuvering Clearances
      I.A.2. Clear maneuvering space within compartment (see Figure 4-14).
      I.A.3. Location of flush valve.
      I.A.4. Height if toilet seat.
      I.A.5. Dimension to centerline of fixture from adjacent wall (see Figure 4-15).
      I.A.6. Ambulatory accessible stall requirements.
I.B. Compartment door hardware.

4.2.11.2 Grab Bars

I. Inspection of the following items:
   I.A. Location within stall relative to toilet.
   I.B. Dimensions
      I.B.1. Length
      I.B.2. Diameter
      I.B.3. Space from wall.
      I.B.4. Mounting height (by ‘user group’).
      I.B.5. Position relative to toilet.

4.2.11.3 Accessories

I. Inspection of the following items:
   I.A. Location
      I.A.1. Location and mounting heights of dispensers/disposal units.
      I.A.2. Allowable types of dispensers/disposal units.
   I.B. Dimensions
      I.B.1. Maximum projection of dispensers and equipment.
ACCESS COMPLIANCE INSPECTION ITEMS

4.2.11.4 Lavatories

I. Inspection of the following items:
   I.A. Location
      I.A.1. Total Number
   I.B. Dimensions
      I.B.1. Height of:
         I.B.1.1. Mounting
         I.B.1.2. Rim Height (see Figure 4-16).
      I.B.2. Centering from wall (see Figure 4-17).
      I.B.3. Knee Clearances
   I.C. Insulation/protection under lavatories.

4.2.11.5 Urinals

I. Inspection of the following items:
   I.A. Location
      I.A.1. Number and location of accessible urinals.
   I.B. Dimensions
      I.B.2. Height of:
ACCESS COMPLIANCE INSPECTION ITEMS

I.B.2.1. Mounting
I.B.2.2. Rim
I.B.2.3. Flush Controls (if applicable).

4.2.11.6 Showers and Locker Areas

I. Inspection of the following items:

I.A. Location
   I.A.1. Number and location of accessible showers.
   I.A.2. Bench near accessible locker.

I.B. Dimensions
   I.B.1. Based on specific type of shower unit.
   I.B.2. Height of:
       I.B.2.1. Mounting of controls.
       I.B.2.2. Hand-held sprayer/hose.
       I.B.2.3. Grab Bars
       I.B.2.4. Seat
       I.B.2.5. Soap Dish
       I.B.2.6. Threshold, if applicable.
   I.B.3. Maximum Floor Slope
   I.B.4. Accessible mirror
   I.B.5. Bench near accessible locker (see Figure 4-18)
       I.B.5.1. Locker clear space.

I.C. Accessible hardware at locker
I.D. Visual Requirements
   I.D.1. Locker with ISA on door.

Figure 4-18: Various Accessible Locker Types
5 OTHER BUILDING COMPONENTS AND SYSTEMS
OTHER BUILDING COMPONENTS AND SYSTEMS

Besides a structural frame with architectural components and ACTIVE PROTECTION fire/life safety systems, buildings also include various other elements that contribute to the whole: mechanical, plumbing, gas, and electrical systems including signal systems such as data, communication and security. All of these must integrate within the framework of the building in a way that does not compromise its overall fire/life safety.

Because mechanical, plumbing, gas, electrical, and signal drawings tend to be diagrammatic in nature, the actual installed work may not resemble the DSA approved layout drawings. Changes in layout due to unexpected structural obstructions and other utility impediments may compromise the effective layout of fire alarm and fire sprinkler systems. Furthermore, these same layout changes may inadvertently encroach into rated assemblies or other required clear spaces (see Figure 5-1). Such changes to design during the construction phase must be properly documented and received DSA review and approval before installation. Once all of these systems components are in place, walking along the routes for each utility can facilitate identification of the potential problems noted.

Figure 5-1: Improper Piping Location at AC Switch
OTHER BUILDING COMPONENTS AND SYSTEMS

The following information is applicable to all mechanical, plumbing, gas, electrical, signal and similar systems.

I. Receipt of documentation for constructed elements:
   I.A. For proprietary products, refer to 1.3 Proprietary Products on page 40 for requirements.
   I.B. Shop Drawings:
      I.B.1. Receipt of design professional approved shop drawings.
   I.C. Materials/Test Documentation:
      I.C.1. Submittal to design professional of all required samples, documentation, etc. for review, testing, evaluation, and approval.
      I.C.2. The vendor or supplier submits certificates, affidavits or other documentation.
      I.C.3. All materials are identifiable by an appropriate means, such as one or more of the following:
         I.C.3.1. Tags
         I.C.3.2. Markings
         I.C.3.3. Stamps
      I.C.4. Materials identified conform to specified requirements, such as the following, as applicable:
         I.C.4.1. Type
         I.C.4.2. Size
         I.C.4.3. Material
         I.C.4.4. Gauge
         I.C.4.5. Weight
         I.C.4.6. Grade
         I.C.4.7. Treatment
         I.C.4.8. Finish
         I.C.4.8.1. Pattern
         I.C.4.8.2. Color
      I.C.5. Extent and schedule of required testing and third-party inspection services understood.
         I.C.5.1. Laboratory tests, reports, off-site inspections, etc. have been performed as required and are evidenced before the installation.
         I.C.5.2. Third-Party Inspection Documentation:
            I.C.5.2.1. Verify qualifications for those performing inspections.
               I.C.5.2.1.1 Testing and Inspection Laboratory
               I.C.5.2.1.2 Engineers
               I.C.5.2.1.3 Agencies
               I.C.5.2.1.4 Manufacturers’ Representatives
               I.C.5.2.1.5 Others
OTHER BUILDING COMPONENTS AND SYSTEMS

I.C.6. For additional testing requirements, some of which may require documentation, refer to the subsection Testing in each of the sections listed below (usually located near the end of the section):
   I.C.6.1. 5.1 Mechanical on page 241.
   I.C.6.2. 5.2 Plumbing (Including Wet-Side Mechanical) on page 250.
   I.C.6.3. 5.3 Gas on page 255.
   I.C.6.4. 5.4 Electrical on page 257.
   I.C.6.5. 5.5 Signal on page 267.

I.D. Collect, review, and file all copies of tests, certificates, reports, delivery tags, etc., issued by on-site and off-site parties, agencies, and inspectors.

II. Inspection of the following items:

II.A. Prior To Installation
   II.A.1. All materials (equipment and items) delivered to site (or to approved off-site location) are inspected for damage in transit.
   II.A.1.1. All accessories, parts, and items required and approved are available for use before material is installed.
   II.A.1.2. Approved samples are on-site or evidenced before installation as specified.
   II.A.2. Materials are adequately stored and protected.
   II.A.3. Containers are properly labeled, sealed, and unopened.
   II.A.4. Materials are new unless otherwise specified.

II.B. During Installation
   II.B.1. Work is inspected during installation in a timely manner so that deficiencies of materials or methods can be readily identified and corrected.
   II.B.1.1. The architect and consultants are notified before phases of work are closed up as required or instructed.
   II.B.1.2. Changes to work due to field conditions are recorded.
   II.B.2. Existing and adjacent work connections and tie-in are suitably performed as specified.
   II.B.2.1. Allow no unscheduled (i.e. not detailed on approved plans) cutting, boring, notching or other alteration of structural members or connections.
   II.B.2.1.1. Ensure those special provisions for pipes passing through or parallel to footings are met as required. (Refer to 2.1.1.3 Underground Utilities on page 50 for additional information.)
   II.B.2.2. Surfaces to receive materials are acceptable and satisfactory as required.
   II.B.2.2.1. Adequate protection is provided for adjacent surfaces before, during and after installation.
   II.B.2.3. Climatic and temperature conditions are suitable and as required before, during, and after installation.
OTHER BUILDING COMPONENTS AND SYSTEMS

II.B.2.3.1. Adequate lighting and other working conditions are provided so that proper workmanship can be performed.

II.B.3. Local or state agency code inspections (e.g. health department, public works, Cal-OSHA) have been performed as required. Accompany local code inspector.

II.B.3.1. Observe tests and inspections performed in the field.

II.C. Post-Installation

II.C.1. Work installed is cleaned and adjacent work is protected if required during cleaning.

II.C.1.1. Work areas are cleaned periodically before installation, where required.

II.C.1.2. At completion of phases as required, debris is removed periodically and not piled so as to cause damage.

II.C.2. Installed work is properly protected.
5.1 Mechanical

The following applies to all mechanical systems.

I. Inspection of the following items:
   I.A. Condition of using building equipment for temporary heat is understood and/or approved.
   I.B. Heat Generation/Emitting Equipment
      I.B.1. Location
      I.B.2. Expansion joints are provided and guided.
      I.B.3. Expansion Tanks
         I.B.3.1. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
         I.B.3.2. Provided with accessories and drain.
      I.B.4. Piping (see 5.2 Plumbing (Including Wet-Side Mechanical) on page 250 and ID Piping below on page 243 for additional information).
         I.B.4.1. Shutoff for fuel and water are provided.
         I.B.4.2. Valves are provided to shut down sections of system if required.
            I.B.4.2.1. Valves are labeled if required.
            I.B.4.2.2. Safety and relief valves are provided and set to the specified pounds per square inch gauge or gauge pressure (psig).
            I.B.4.2.3. Discharges are piped to drains.
      I.B.5. Oil Storage Tank
         I.B.5.1. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
         I.B.5.2. Approved standard tank capacity and calibration.
         I.B.5.3. Required Openings
         I.B.5.4. Minimum cover and/or clearance.
         I.B.5.5. Tank heaters, if required, and coatings.
      I.B.6. Boilers
         I.B.6.1. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
         I.B.6.2. Pressure boilers conform with or are identified with ASME code.
         I.B.6.3. Bases or refractory bases are provided as required.
         I.B.6.4. Expansion joint in floor around boiler.
         I.B.6.5. Oil burning equipment
            I.B.6.5.1. Size of burner tips.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.B.6.5.2. Location of electrodes.
I.B.6.5.3. Position of gas or oil pilot.
I.B.6.5.4. Clearances for removal of burner from furnace.
I.B.6.6. Gas burners
   I.B.6.6.2. Regulators and controls provided.
   I.B.6.6.3. Regulator installed in a vertical position.
   I.B.6.6.4. Gas vents piped to exterior.
I.B.7. Forced draft fans
   I.B.7.1. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
   I.B.7.2. Alignment and Rotation
   I.B.7.3. Accessibility for lubrication.
   I.B.7.4. Damper operation as required.
   I.B.7.5. Insulation Application
I.B.8. Furnaces
   I.B.8.1. Adequate space for maintenance, operation, repair, and servicing of equipment.
      I.B.8.1.1. Clearances to all equipment electric panels are adequate.
   I.B.8.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
   I.B.8.3. Fire-resistive surfaces and spacing are provided as specified.
   I.B.8.4. Combustion air provisions are made as specified.
I.B.9. Combustion air systems are provided when applicable.
   I.B.9.1. Breaching and Flues
      I.B.9.1.1. Material
      I.B.9.1.2. Construction
      I.B.9.1.3. Type
I.B.10. Terminal Units
   I.B.10.1. Heating and Ventilating Units
      I.B.10.1.1. Location and layout is coordinated.
      I.B.10.1.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
      I.B.10.1.3. Vibration isolators, per requirements.
      I.B.10.1.4. Access doors are provided and are tight.
      I.B.10.1.5. Flexible pipe connectors are provided per requirements.
      I.B.10.1.6. Controls are provided per requirements.
   I.B.10.2. Unit Heaters
      I.B.10.2.1. Location
OTHER BUILDING COMPONENTS AND SYSTEMS

I.B.10.2.2. Clearances
I.B.10.2.3. Noise level is within specified range.
I.B.10.2.4. Adequate air distribution is provided.
I.B.10.2.5. Controls

I.B.10.3. Base Board Units
I.B.10.3.1. Location
I.B.10.3.2. Type
I.B.10.3.3. Size
I.B.10.3.4. Mounting
I.B.10.3.5. Controls
I.B.10.3.6. Covers, access doors, dampers, and end plates are provided to extent required.

I.C. Refrigeration
I.C.1. Adequate space for maintenance, operation, repair, and servicing of equipment.
I.C.1.1. Clearances to all equipment electric panels are adequate.
I.C.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
I.C.3. All rotating parts, belts, etc., have guards or other appropriate protection.
I.C.4. Fire separation from fuel-fired equipment is provided, if required.
I.C.5. Freeze protection devices and materials are provided if required.

I.D. Piping (see 5.2 Plumbing (Including Wet-Side Mechanical) on page 250 for additional information).
I.D.1. Air vents are installed at high points and drains installed at low points as required in water lines.
I.D.2. Vapor barriers, adhesives, and sealants are noncombustible where specified.
I.D.3. Insulation for flanges, fittings, and valves per requirements.
I.D.4. Cooling coil condensate drains with trap seals per requirements.

I.E. Equipment
I.E.1. Adequate space for maintenance, operation, repair, and servicing of equipment.
I.E.1.1. Clearances to all equipment electric panels are adequate.
I.E.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
I.E.3. Condensers
I.E.3.1. Air-Cooled
I.E.3.1.1. Airflow is not obstructed.
I.E.3.1.2. Wind deflectors per requirements.
I.E.3.2. Water-Cooled
I.E.3.2.1. Confirm proper flow is provided.
I.E.3.2.2. No leaks occur.
I.E.3.3. Evaporative Condenser
I.E.3.3.1. Confirm proper spray coverage.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.E.3.3.2. Quiet Float Valve
I.E.3.3.3. Water Level

I.E.4. Compressors
  I.E.4.1. Reciprocating Compressor
    I.E.4.1.1. Shaft alignment on direct drive.
    I.E.4.1.2. Suction and discharge pressures.
    I.E.4.1.3. Gauges
    I.E.4.1.5. Cylinder Overheating
  I.E.4.2. Centrifugal Compressor
    I.E.4.2.1. Alignment of unit, drive, and gear box.
    I.E.4.2.2. Noise within specified range.
    I.E.4.2.3. Vibration within specified range.
    I.E.4.2.4. Gauges

I.E.5. Receivers
  I.E.5.1. Located out of direct sunlight when outside of building.
  I.E.5.2. Relief valve size and proper discharging to atmosphere.
  I.E.5.3. Drain
  I.E.5.4. Purge Valve
  I.E.5.5. Liquid Level Indicator
  I.E.5.6. Shutoff Valve
  I.E.5.7. Items required to be piped to exterior do so.

I.E.6. Cooling Towers
  I.E.6.1. Mist Eliminators
  I.E.6.2. Overflow and drain piping per requirements.
  I.E.6.3. Mechanical Draft Cooling Tower
    I.E.6.3.1. Unobstructed air intake is provided.
    I.E.6.3.2. Fan rotation and speed.
    I.E.6.3.3. Belt Tension
    I.E.6.3.4. Weather protection is provided for motor per requirements.

I.E.7. Pumps
  I.E.7.1. Supported to be free of excess vibration per requirements.
  I.E.7.2. Support of surrounding piping.
  I.E.7.3. Gauges
  I.E.7.4. Motors

I.F. Air Handling Units and Fans
  I.F.1. Adequate space for maintenance, operation, repair, and servicing of equipment.
    I.F.1.1. Clearances to all equipment electric panels are adequate.
  I.F.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
  I.F.3. Confirm fan rotation direction prior to power being connected.
  I.F.4. Belt Driven Method
OTHER BUILDING COMPONENTS AND SYSTEMS

I.F.4.2. Pulley and belt are aligned.
I.F.4.3. Bearing and belt numbers before connection of ducts is made to unit.
I.F.4.4. Guards or other protection for rotating equipment and belts.

I.F.5. Lubrication of equipment, if required, is accessible and extends to exterior of unit.

I.F.6. Equipment exposed to weather is protected from direct exposure per requirements.
  I.F.6.1. Roof mounted equipment is flashed at curbs per requirements.
  I.F.6.2. Gooseneck and rain hoods are provided and installed to prevent moisture entrance into system.

I.F.7. Backdraft dampers and/or sound traps are provided as required on exhaust fans.
  I.F.7.1. Check for operation, rattle, felt strips, separate frames, etc. as required.

I.F.8. Exhaust and supplies are oriented to avoid conflict.

I.G. Filters and Screens
  I.G.1. Type
  I.G.2. Adequate space is provided for removal, repair, and replacement of filters.
  I.G.3. Air stream can be distributed over entire filter area.
  I.G.4. Proper amount of adhesive and washing tank for viscous medium type filters are provided.
  I.G.5. Sealing strips are provided as required.
  I.G.6. Electrostatic filters have warning lights and interlocks as required.
     I.G.6.1. Ionizers have free access and do not have loose wires or sparking.
  I.G.7. Automatic sprays provide complete washing and spray coverage.
  I.G.8. Traveling screen filters are observed for oil charge and operation of screen.
  I.G.9. Renewable Roll Filters
     I.G.9.1. Tracking Of Roll
     I.G.9.2. Media Runout Switch
     I.G.9.3. Timer Setting
     I.G.9.4. Static Pressure Control
     I.G.9.5. Tension On Media
     I.G.9.6. Spare filters are provided as required.
        I.G.9.6.1. Equipment filters to be clean and/or replaced as required at date of acceptance.
     I.G.9.7. Bird and insect screen of proper mesh size and material is provided as required.
     I.G.9.8. Isolation is made between dissimilar metals.
  I.G.10. All filters and screens are clean at completion of final tests.

I.H. Ductwork
OTHER BUILDING COMPONENTS AND SYSTEMS

I.H.1. Location
I.H.1.1. Ductwork is provided with means to adjust to expansion and contraction where needed and as shown on the approved construction documents.
I.H.1.2. Appropriate space and headroom are provided for proper operation, servicing, cleaning, and repair.
I.H.1.2.1. Lighting is suitably located with respect to equipment.
I.H.1.2.2. Clearances to all equipment electric panels are adequate and per requirements.

I.H.2. Ductwork layout is coordinated with other trades to avoid congestion and interference.
I.H.2.1. Hangers
I.H.2.2. Stiffeners
I.H.2.3. Reinforcement
I.H.2.4. Anchorage and bracing of ductwork (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
I.H.2.5. Slope ratio of transitions, radius of curved duct, air turns, and deflectors are provided as specified.

I.H.2.6. Environmental Air
I.H.2.6.1. Ceiling space used as a return air plenum contains plenum rated cable.
I.H.2.6.2. Corridors do not serve as supply, return, exhaust, relief, or ventilation air ducts per the approved construction documents.
I.H.2.6.2.1. Though there are exceptions to these requirements given in CBC 1018.5, the approved construction documents dictate requirements for the project.
I.H.2.6.3. Air moving systems supplying air in excess of specified limits to enclosed spaces within buildings are equipped with an automatic shutoff per requirements.

I.H.2.7. Exhaust Air
I.H.2.7.1. Flammable vapor or dust to be exhausted is interlocked with the equipment creating the vapor or dust per requirements.
I.H.2.7.2. Exhaust ducts do not have dampers, unless specifically shown on approved drawings.
I.H.2.7.3. Fume hoods are exhausted separately from the building exhaust system.
I.H.2.7.3.1. Roof-top exhaust stack is at specified height above the roof surface.
I.H.2.7.3.2. Generally, fume hoods are not manifolded together, but there are exceptions; check with
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approved construction documents. See also IR M-1.

I.H.2.7.4. Type I Cooking Hoods (See NFPA 96 for additional information.)
I.H.2.7.4.1 Exhaust directly to the outside per requirements.
I.H.2.7.4.2 Located away from building air intakes per requirements.

I.H.3. Type
I.H.4. Material
I.H.5. Thickness
I.H.6. Shape
I.H.7. Joints
  I.H.7.1. Type
  I.H.7.2. Seams
  I.H.7.3. Check for breaks or cracks.
  I.H.7.4. Joint provides a smooth surface on interior of duct.
  I.H.7.5. Laps are in direction of air flow.
  I.H.7.6. Flexible connectors are fabricated and provided where specified.
I.H.8. Splitter dampers are provided if required and operating mechanism is accessible.
I.H.9. Access doors and/or access space is provided at all items requiring servicing.
  I.H.9.1. Size is sufficient for access and maintenance for the following (this is not an exhaustive list):
    I.H.9.1.1. Fire Dampers
      I.H.9.1.1.1 Fire dampers of type required are furnished and installed as specified (refer to 3.3.5.5 Penetrations of Assemblies subsection II.A.2.6 on page 204 for additional information).
    I.H.9.1.2. Automatic Dampers
    I.H.9.1.3. Manual Dampers
    I.H.9.1.4. Coils
    I.H.9.1.5. Heaters Filters
    I.H.9.1.6. Thermostats
I.H.10. Duct Lining and Insulation
  I.H.10.1. Ducts are tested for air tightness, if required, before installation of insulation.
  I.H.10.2. Material
    I.H.10.2.1. Fire retardant or incombustible where noted.
  I.H.10.3. Type
  I.H.10.4. Thickness
  I.H.10.5. Extent
  I.H.10.6. Method of fastening and installation are as specified.
  I.H.10.7. Sound deadening and vapor barrier are provided as specified.
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I.H.10.8. Insulation subject to damage is protected as specified.
I.H.10.9. Vapor barrier integrity is maintained.

I.I. Outlets, Diffusers, Registers and Grilles
   I.I.1. Materials
   I.I.2. Type
   I.I.3. Finish
   I.I.4. All ducts, plenums, and equipment are thoroughly cleaned of all debris before supply outlets are installed.
   I.I.5. Volume control devices are provided as required and are accessible.
   I.I.6. Gaskets are provided and installed as required.
   I.I.7. Items are securely attached and supported per requirements (see IR 25-2.10 for 2010 CBC or IR 25-2.07 for 2007 CBC).

I.J. Penetrations
   I.J.1. Mechanical penetrations through rated assemblies including floors, roofs, walls and shafts comply with approved construction documents. See 3.3.5.5 Penetrations of Assemblies on page 204 for additional information.

I.K. Conflicts
   I.K.1. Mechanical equipment does not interfere with the normal use and operation of doors, windows, and other required facilities.

I.L. Emergency Requirements
   I.L.1. Mechanical system has emergency power capability where required.
      I.L.1.1. Such systems are clearly labeled.
   I.L.2. Machinery may require a disconnect switch; verify per requirements.
   I.L.3. Safety and relief valves are provided and set to specified PSIG.
   I.L.4. Safety operating controls are provided as required.

I.M. Testing
   I.M.1. Verify system is completely clean and flushed of all debris.
   I.M.2. Operate system in presence of agencies and engineers, as required.
      I.M.2.1. Verify outside air settings and damper operation.
      I.M.2.1.1. Relocatable buildings with wall-mounted HVAC units are commonly shipped with outside air dampers secured shut.
   I.M.2.2. Ducts are tested for air tightness, if required, before installation of insulation.
   I.M.3. Balancing:
      I.M.3.1. All bearings are lubricated.
      I.M.3.2. Tension of pulleys and belts is adjusted.
      I.M.3.3. Guards are in place
      I.M.3.4. All adjustments, connections, etc., are made.
      I.M.3.5. Balancing report is provided.
   I.M.4. Test and verify compliance of the mechanical system with the approved construction documents.

I.N. Maintenance.
   I.N.1. Required signs and labeling are provided.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.N.1.1. Signs/labels are not covered by insulation or painted out.
I.N.2. System is operated and instruction given to future operating personnel.
I.N.3. Verify Owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.
5.2 Plumbing (Including Wet-Side Mechanical)

In addition to the items noted below, refer to the CPC.

I. Inspection of the following items:
   I.A. Pipe and fitting materials per requirements (see BU 09-10).
      I.A.1. Material
      I.A.2. Type/Grade
      I.A.3. Size
      I.A.4. Weight
      I.A.5. Corrosion protection measures (e.g. PVC coated conduit) are provided as specified.
   I.B. Location
      I.B.1. Underground Installation (Refer to 2.1.1.3 Underground Utilities on page 50 for additional information.)
         I.B.1.1. Depth
         I.B.1.2. Clearances
         I.B.1.3. Backfilled per requirements.
      I.B.2. Grades and location of piping with respect to other features of the building are understood.
         I.B.2.1. Existing lines and conflict with other trade’s work is coordinated to avoid congestion or interference.
            I.B.2.1.1. Excavation of stubs or lines to which connection will be made is performed before trenching for new work.
      I.B.2.2. Prior to placement of foundation, slabs, walls, and floors, confirm piping sleeves meet requirements for:
         I.B.2.2.1. Number
         I.B.2.2.2. Size
         I.B.2.2.3. Locations
         I.B.2.2.4. Adequacy to receive insulation, caulking, or other requirements.
      I.B.2.3. Coordinate riser locations, size and spacing with structural requirements where risers pass through structural elements (e.g. foundation, curb, sill plates, etc.).
         I.B.2.3.1. No cutting, notching, boring or other modifications of structural members unless specifically shown on approved drawings.
   I.B.3. Pipe supports, hangers, and anchorage’s are provided and spaced as specified.
      I.B.3.1. Isolation between pipe and support is provided as specified.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.B.3.1.1. Piping is provided with means to adjust to expansion and contraction where needed and as shown on the approved construction documents.

I.B.3.2. At restrooms with waterless urinals, additional piping per requirements is provided (see IR P-1).

I.B.4. Protection is provided to keep concrete, trash, debris, etc., out of lines.

I.B.4.1. Capping and plugging is as required.

I.B.4.1.1. Verify lines are cleaned at completion, with inspection as specified.

I.B.5. Vents are terminated the specified clear distance from building openings.

I.C. Pipe Fittings

I.C.1. Pipes to be threaded are squarely cut, threaded, and reamed properly.

I.C.1.1. Fabrication equipment used is adequate.

I.C.1.1.1. Lines are reamed.

I.C.1.1.2. Tapered threads are used.

I.C.1.2. Joints are wiped clean.

I.C.2. Pipes to be soldered are cut with tool, reamed, brightened and soldered using flux and solder required.

I.C.2.1. Pipes and fittings weakened by overheating are replaced.

I.C.3. Pipes with flanged joints are gasketed per requirements.

I.C.3.1. Drift pins and spud wrenches are not used.

I.C.4. Pipes to be welded are prepared per requirements.

I.C.4.1. Welder to be properly certified, if specified (see 1.2.2 Required During Construction on page 32 for additional information).

I.C.5. Pipes to be cemented are properly joined.

I.C.5.1. Manufacturer's instructions and approved construction documents for pipe and cement are followed.

I.C.6. Installation of valves, unions, and fittings.


I.C.6.1.1. Access to valves is possible.

I.C.6.1.2. Orientation of valves and valve systems is as specified.

I.C.6.1.3. Vapor seal, were required.

I.C.6.2. Proper Fittings

I.C.6.2.1. Strainers

I.C.6.2.2. Checks

I.C.6.2.3. Gauges

I.C.6.2.4. Air Reliefs

I.C.6.2.5. Drips

I.C.6.2.6. Traps

I.C.6.3. Valves and fittings are insulated as required.

I.C.6.3.1. If hangers are required to be installed over insulation, see that high-density insulation inserts and metal shields are provided per requirements.

I.C.6.4. Balancing Cocks
OTHER BUILDING COMPONENTS AND SYSTEMS

I.C.7. Pipes and joints are wrapped or coated as required.
   I.C.7.1. Dissimilar metals have dielectric or isolating couplings; no contact of dissimilar metal piping occurs.
   I.C.7.1.1. Copper pipes are wrapped with specified tape (or equivalent dielectric) adjacent to steel studs.

I.C.8. Proper alignment without strain on joints.
I.C.9. Future provisions, such as capped lines, and proper location and identification are provided if required.

I.D. Soil, Waste, and Vent Systems

I.D.1. Rough-ins for fixtures and equipment are located and installed as required.
I.D.2. No-hub pipe is installed and hung as required.
   I.D.2.1. Clamps are provided at:
      I.D.2.1.1. Base of risers
      I.D.2.1.2. At every floor penetration
   I.D.2.2. Support is provided at every closet bend, trap, arm, etc., unless otherwise specified.
I.D.3. Exterior manholes, lampholes, and cleanouts are located and installed as required.
   I.D.3.1. Slope of lines and their alignment are as specified.
   I.D.3.2. Cleanouts to grade are provided as required.
I.D.4. Floor drains, airway drains, floor sinks, etc., are elevated and properly located with respect to finish floor (i.e. recessed slab at tile/mortar bed floor) and will adequately drain area served.
   I.D.4.1. Provisions are adequate for connection to membranes, waterproofness, etc.
      I.D.4.1.1. Clamping rings are provided as required in floors with membranes.
   I.D.4.2. Trap primers are provided as specified (floor drains, sinks).
   I.D.4.3. Cleanouts are located to allow access, and locations are as specified.
I.D.5. Dielectric unions and connectors per requirements.
I.D.6. Provisions for settlement and shrinkage are made if specified.
I.D.7. Vent piping, combined and concealed in spaces provided, sloped on horizontals, and extended through roof are flashed and counter-flashed as required.

I.E. Water Supply

I.E.1. Rough-ins to fixtures and equipment are located and installed as required.
I.E.2. Coordination is made for meters, shutoffs, hydrants, boxes, etc.
   I.E.2.1. In large structures, shutoff valves are provided if required to isolate portions of system.
I.E.3. Valves for proper function are as required
   I.E.3.1. Location and accessibility are understood.
   I.E.3.2. Verify location and type of access panels.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.E.3.3. Verify that water system can be drained at lowest point.
I.E.3.4. All valves are labeled, if required.
I.E.4. Air chambers or shock absorbers are provided as specified.
I.E.4.1. Sound and vibration isolators are provided as specified.
I.E.5. Dielectric unions and connectors per requirements.
I.E.6. Allowance for expansion and contraction is provided.

I.F. Fixtures
I.F.1. Installation
I.F.1.1. Adequate blocking, backing, and brackets are provided to receive fixtures (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information).
I.F.1.1.1. Hot water generators are securely anchored.
I.F.1.1.1.1. All gauges, valves, strainers, etc. are visible and accessible.
I.F.1.2. Installed fixtures are undamaged and protected during construction.
I.F.1.2.1. Use of fixtures is avoided until system is complete and tested.
I.F.1.3. Fixtures are installed with specified components:
I.F.1.3.1. Accessories
I.F.1.3.2. Trim
I.F.1.3.3. Brass
I.F.1.3.4. Finish
I.F.1.3.5. Stops
I.F.1.3.6. Vacuum Breakers
I.F.1.3.7. Strainers
I.F.1.3.8. Escutcheons
I.F.1.3.9. Flanges
I.F.1.3.10. Cover Plates
I.F.1.4. Fixtures are installed level.
I.F.1.4.1. All gauges, valves, strainers, etc. are visible and accessible.
I.F.1.5. Piping is provided to floor drains or exterior from relief valves.
I.F.1.5.1. Pressure reducing valve is installed and set to pressure as required.
I.F.1.5.2. Floor drains, roof drains, etc., with clamping rings are properly installed to membrane and weeps are cleared as provided.
I.F.1.5.2.1. Observe that shower drains are similarly installed as required.

I.G. Penetrations
I.G.1. Plumbing penetrations through rated assemblies including floors, roofs, walls and shafts comply with approved construction documents.

I.H. Conflicts
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I.H.1. Plumbing equipment does not interfere with the normal use and operation of doors, windows, and other required facilities.
I.H.2. Piping over electrical equipment does not encroach into the required clear space.

I.I. Emergency Requirements

I.I.1. Specified relief valves are provided for pressurized systems.

I.J. Testing

I.J.1. Test and verify compliance of the plumbing system with the approved construction documents.

I.J.1.1. All pipes are inspected for damage and tested, inspected before covering up.

I.J.1.1.1. Observe testing process.
I.J.1.1.2. Water supply system piping, lines are sterilized as specified.

I.J.1.1.2.1 Proper Dosage
I.J.1.1.2.2 Distribution
I.J.1.1.2.3 Retention
I.J.1.1.2.4 Final Flush Out
I.J.1.1.2.5 Certification is provided.

I.J.1.1.3. Fixtures

I.J.1.1.3.1 Fixtures are properly cleaned at completion.
I.J.1.1.3.2 Check temperature and pressure settings for relief valves.
I.J.1.1.3.3 Faucets operate easily and are in proper position.
I.J.1.1.3.4 Flush water closets for proper operation.

I.K. Maintenance

I.K.1. Required signs and labeling are provided.
I.K.1.1. Piping is painted and/or identified for flow and type.
I.K.1.2. Signs/labels are not covered by insulation or painted out.
I.K.2. Verify Owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.
5.3 Gas

In addition to the information below, also refer to the CPC and 2009 NFPA 54 National Fuel Gas Code.

I. Inspection of the following items:
   I.A. Piping
      I.A.1. Material
      I.A.2. Grade
      I.A.3. Size
      I.A.5. Piping ventilation per requirements.
      I.A.6. Drip pockets are provided per requirements.
      I.A.7. Plug cocks, as pressure regulators and insulating couplings are installed as required. All are labeled if required.

   I.B. Location
      I.B.1. Underground Installation (Refer to 2.1.1.3 Underground Utilities on page 50 for additional information.)
         I.B.1.1. Depth
         I.B.1.2. Clearances
         I.B.1.3. Backfilled per requirements.
      I.B.2. Gas piping is provided with means to adjust to expansion and contraction where needed and indicated in approved construction documents.
      I.B.3. Support and bracing/anchorage per requirements.
      I.B.4. Alignments with existing piping, where applicable.

   I.C. Penetrations
      I.C.1. Gas penetrations through rated assemblies including floors, roofs, walls and shafts comply with approved construction documents.

   I.D. Conflicts
      I.D.1. Gas equipment does not interfere with the normal use and operation of doors, windows, and other required facilities.

   I.E. Emergency Requirements
      I.E.1. Specified relief valves are provided for pressurized pipes.
      I.E.2. Earthquake activated shut-off valve is provided (refer to BU 11-03 for other commonly specified conditions associated with seismic safety for gas piping).
         I.E.2.1. Refer to Earthquake Sensitive Automatic Gas Shut-off Valve Certifications for a list of certified valves.
         I.E.2.2. Refer to Excess Flow Automatic Gas Shut-off Valve Certifications for a list of certified valves.
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I.E.2.3. Refer to Verified Laboratories Qualified for Testing Earthquake-Sensitive and Excess Flow Gas Shut-off Devices for a listing of DSA approved laboratories for testing shut-off valves.

I.E.3. Emergency manual shut-off valve is provided.
I.E.3.1. Emergency shut-off valve is provided in lab spaces and kitchens.

I.F. Testing
I.F.1. Test and verify compliance of the gas system with the approved construction documents.

I.G. Maintenance
I.G.1. Required signs and labeling are provided.
I.G.1.1. Signs/labels are not covered by insulation or painted out.
I.G.2. Gas lines in slab are accessible from a trench with a removable trench-plate cover.
I.G.3. Verify Owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.
5.4 Electrical

In addition to the information below, also refer to the CEC.

I. Inspection of the following items:
   I.A. Conduit and Cable
      I.A.1. Material
      I.A.2. Size
      I.A.3. Type/Grade
         I.A.3.1. Observe limitations on use of different types of conduit (this is not an exhaustive list):
            I.A.3.1.1. Rigid
            I.A.3.1.2. Flexible Metal
               I.A.3.1.2.1 Thin-Wall
               I.A.3.1.2.2 Liquid-Tight
            I.A.3.1.3. Plastic
            I.A.3.1.4. Cement-Asbestos
            I.A.3.1.5. Impregnated-Fiber
      I.A.4. Fittings
         I.A.4.2. Weather tight where applicable.
      I.A.5. Insulating Bushings
      I.A.6. Connector Linings
      I.A.7. Double lock nuts are provided as required.
   I.B. Location
      I.B.1. Clearances to all equipment electric panels are adequate.
      I.B.2. Underground Installation (Refer to 2.1.1.3 Underground Utilities on page 50 for additional information.)
         I.B.2.1. Depth
         I.B.2.2. Clearances
         I.B.2.3. Backfilled per requirements.
      I.B.3. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
      I.B.4. Means are provided to accommodate contraction and expansion at building expansion joints as required.
      I.B.5. Conduit
         I.B.5.1. Exposed conduit locations comply with requirements.
            I.B.5.1.1. Exposed conduits are installed parallel or perpendicular to structure.
            I.B.5.1.2. Vertical runs are plumb.
         I.B.5.2. Conduit is secured and fastened as specified.
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I.B.5.2.1. Runs in wet areas are elevated above surface at specified dimension.
I.B.5.3. Conduit is provided with means to adjust to expansion and contraction where needed and indicated in approved construction documents.
I.B.5.4. Field cutting of conduit square cut, reamed or filed, and cleaned of oil and filings.
I.B.5.5. Pull wires/ropes/strings are provided, extend full length, and are of the type required.

I.B.6. Raceways and Busways
I.B.6.1. Support is provided as specified in approved construction documents.
   I.B.6.1.1. Bracing/anchorage is provided per requirements.
   I.B.6.1.2. Provision for expansion is in accordance with manufacturer’s instructions and as shown in approved construction documents.
   I.B.6.1.3. Support of vertical raceways at each floor level is provided in multistory structures per requirements.
I.B.6.2. Raceways
   I.B.6.2.1. Raceways are kept closed during construction.
   I.B.6.2.2. Underfloor Raceways
      I.B.6.2.2.1 Cross sectional dimensions are as specified.
      I.B.6.2.2.2 Specified setting depth has been provided at junction boxes.
      I.B.6.2.2.3 Raceways are parallel with floor construction, firmly supported at proper elevation and in straight alignment.
      I.B.6.2.2.4 All joints are tight and sealed in accordance with manufacturer’s instructions and approved construction documents between sections and to junction boxes.
      I.B.6.2.2.4.1 No damaged joints are allowed.
      I.B.6.2.2.5 Inserts, both preset and post-installed, are or will be secure to raceways and set flush with floor.
I.B.6.3. Busway
   I.B.6.3.1. Busway is accessible as required.
   I.B.6.3.2. Plug-in features and top of devices per requirements.
   I.B.6.3.3. Trolley busways, trolleys, brushes, contact rollers, and flexible cables have good contact and move freely.
   I.B.6.3.4. Grounding of busway housing is provided per requirements.
   I.B.6.3.5. Joints are tightened in strict accordance with manufacturer’s instructions.
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I.B.6.3.6. Component sections are legibly identified and marked with voltage, amperage, and name of manufacturer per requirements.

I.B.7. Conductors
I.B.7.1. Material
I.B.7.2. Size
I.B.7.3. Stranding
I.B.7.4. Type of Insulation
I.B.7.5. Pulling of conductors and cables per requirements.
  I.B.7.5.1. Suitable equipment and methods.
  I.B.7.5.2. No damage to sheath jackets or insulation.
I.B.7.6. Connectors and joints are clean and tight.
  I.B.7.6.1. Connectors, lugs, clamps, etc., to connect copper and aluminum are approved for specific application.
  I.B.7.6.1.1 Where subject to moisture, materials provided comply with requirements to avoid galvanic corrosion.
  I.B.7.6.2. All connections are made in accessible junction or outlet boxes, not in conduits.
I.B.7.7. Color coding of wires, including neutral and grounding (see I.C.1 Fixtures on page 263 for additional information), and branch circuits per requirements.
  I.B.7.7.1. Neutral is insulated throughout per requirements.
I.B.7.8. Branch circuit conductors extending through fluorescent fixtures in continuous runs per requirements.

I.B.8. Cable Systems
I.B.8.1. Cables are secured per requirements.
I.B.8.2. Metal-clad cable (BX) is installed per requirements.
  I.B.8.2.1. Cutting is performed without conductor damage.
  I.B.8.2.2. Bushings are installed per requirements.
I.B.8.3. Nonmetallic-cable is only installed in specified areas.
  I.B.8.3.1. Used in wet locations or areas exposed to dampness including exterior masonry walls.
  I.B.8.3.2. In wood or cold formed steel light frame construction, nonmetallic-cable is located within wall to prevent driving of nails into cable.
  I.B.8.3.2.1 Protection plates are provided where required.
I.B.8.4. Cable is covered by finishes per requirements.

I.B.9. Outlets
I.B.9.1. Locations of outlets per approved drawings.
  I.B.9.1.1. Wall receptacle, switch outlets, and fixture outlets are mounted at height and location specified.
I.B.9.1.2. Based on proposed furniture and equipment layout, verify suitable clearances to outlets will be provided when those items will be placed near outlets.

I.B.9.1.3. Door swings, equipment, and other features are not in conflict for convenience of use.

I.B.9.1.4. Light outlets in mechanical and equipment rooms are located to suit servicing and maintenance and extend below ducts and ceiling.

I.B.9.2. Junction, pull, and outlet boxes are of type, size, and location required.

I.B.9.2.1. Boxes are securely and rigidly supported and do not rely on conduits for this support.

I.B.9.2.2. Boxes are accessible.

I.B.9.2.3. Cast boxes and special boxes are provided as required in exposed areas, exterior areas, wet locations, and hazardous locations.

I.B.9.2.4. All boxes exposed to weather are weatherproof.

I.B.9.2.5. Plaster rings, extension rings, etc., are provided.

I.B.9.2.5.1 Where noncombustible surfaces occur, specified space is provided from finish.

I.B.9.2.5.1.1 Combustible surface has flush mounting.

I.B.9.2.5.1.1.1 No combustible material is exposed to interior of box.

I.B.9.2.6. Number of conductors in boxes does not exceed limits specified.

I.B.9.3. Unused openings are closed.

I.B.9.4. Grounding continuity is maintained, including jumper if required.

I.B.9.5. Prior to close-in, architect is notified.

I.B.9.6. Special inspection is provided, when specified.

I.B.9.7. Installed devices comply with requirements (the list below is not exhaustive):

I.B.9.7.1. Type
I.B.9.7.2. Voltage
I.B.9.7.3. Amperage
I.B.9.7.4. Color

I.B.9.8. Switches

I.B.9.8.1. Installed in hot leg of circuit (not neutral)
I.B.9.8.2. "On" position is up, except for momentary contact.
I.B.9.8.3. 3-way and 4-way switches.

I.B.9.9. Device plates per requirements (the list below is not exhaustive).

I.B.9.9.1. Material
I.B.9.9.2. Type
I.B.9.9.3. Ganging
I.B.9.9.4. Finish
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I.B.9.5. Completely cover openings.
I.B.9.6. In contact and flush with surface.
I.B.9.7. Plumb (not dished or bowled).
I.B.9.8. Surface-mounted boxes are provided with compatible plates and without overhanging edges.
I.B.9.10. Neutral of multi-wire circuit will not be interrupted by removal of device or fixture.

I.B.10. Motors
I.B.10.1. Motors have voltage rating, and number of phases to suit supply system.
I.B.10.2. Motor rotation is correct for driven machine.
I.B.10.3. Motors subject to vibration or mounted on adjustable bases are connected with flexible metal conduit
I.B.10.3.1. Liquid-tight or explosion-proof flexible metal conduit provided where required.
I.B.10.4. Flexible metal conduit length is as required and allows flexibility in all possible motor locations.
I.B.10.5. Observe lubrication requirements are met prior to operation.

I.B.11. Motor Control, Disconnects, and Starters
I.B.11.1. Motor Control
I.B.11.1.1. Horsepower and voltage rating is to be at least equal to motor controlled.
I.B.11.1.1.2. Each controller with disconnect per requirements.
I.B.11.1.2. Automatic control devices (e.g. thermostats, float and pressure switches) are adequately rated and as required.
I.B.11.1.3. All control accessories are furnished as required (the list below is not exhaustive):
I.B.11.1.3.1. Start-stop push buttons.
I.B.11.1.3.2. Pilot Lights.
I.B.11.1.3.3. Selector Switches.
I.B.11.1.4. Motor controllers do not have excessive humming or noise under operating conditions.
I.B.11.2. Magnetic coil voltage is same as control circuit voltage (may be different from motor voltage).
I.B.11.3. Disconnects
I.B.11.3.1. Manual disconnect switch is provided for each motor and motor starter, as specified.
I.B.11.3.2. Motor nameplate full-load rated currents are compared with ratings of motor-running overcurrent protective devices (heater).
I.B.11.3.2.1. Heaters of proper size are installed in starters.
I.B.11.4. Electrical Service and Distribution
OTHER BUILDING COMPONENTS AND SYSTEMS

I.B.12.1. Service
I.B.12.1.1. Provisions are made in construction for service entrance system in accordance with utility company requirements and coordinated with drawings.
   I.B.12.1.1.1 Clearances under service drops are provided.
I.B.12.1.2. Sleeves and spaces are provided of sizes required.
I.B.12.1.3. Meter location and main disconnect location are understood.

I.B.12.2. Transformers
I.B.12.2.1. Pad for exterior transformer conforms to requirements.
I.B.12.2.2. Location and installation method is understood.
I.B.12.2.3. Transformer is of type required.
I.B.12.2.4. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).

I.B.12.3. Switchboards and Panelboards
I.B.12.3.1. Location
   I.B.12.3.1.1 Clearance space provided is adequate.
   I.B.12.3.1.2 Mounting Height
   I.B.12.3.1.3 Distance from handle of top switch or breaker to finish floor not to exceed specified limits.
   I.B.12.3.1.4 Isolation of boards per requirements.
I.B.12.3.2. Anchorage (refer to 2.5.1 Mechanical/Electrical/Plumbing Equipment on page 159 for additional information, where applicable).
I.B.12.3.3. Conduits do not support boards.
I.B.12.3.4. Spaces are provided as required by approved construction documents for future circuits.
I.B.12.3.5. Spare breakers are provided and installed as required by approved construction documents.

I.B.12.4. Grounding
I.B.12.4.1. Visually inspect all grounding system conductors, connections, and electrodes as work progresses.
I.B.12.4.2. Grounding connectors are accessible for inspection.
I.B.12.4.3. Grounding is protected against mechanical injury.
I.B.12.4.4. If water piping system is used, check that pipe is metallic per requirements.
   I.B.12.4.4.1 No insulating fitting is interposed in pipe between round wire connection point and interior or exterior pipe system.
I.B.12.4.5. Contact surfaces are clean and dry.
   I.B.12.4.5.1 Metal-To-Metal
   I.B.12.4.5.2 Tight Bolt Connections
I.B.12.4.6. Ground Rods
OTHER BUILDING COMPONENTS AND SYSTEMS

I.B.12.4.6.1 Material
I.B.12.4.6.2 Size
I.B.12.4.6.3 Length
I.B.12.4.6.4 Number
I.B.12.4.6.5 Installation

I.B.12.4.7. Connectors are compatible with metal and pipes.
I.B.12.4.7.1 Verify aluminum connectors.
I.B.12.4.8. Grounding conductor is connected to both ends of metallic raceway in which it is installed.
I.B.12.4.8.1 Both grounding and raceway are connected to grounding electrode in accordance per requirements.

I.C. Lighting

I.C.1. Fixtures
I.C.1.1. Fixtures comply with approved shop drawings for fixtures.
I.C.1.2. All accessories are provided.
I.C.1.3. Ballast type is as required fluorescent or high-intensity discharge, voltage, power factor, overload protection, proper rating, low temperature, etc.
I.C.1.3.1. Ballasts are quiet.
I.C.1.4. Lamp type per requirements.
  I.C.1.4.1. Wattage
  I.C.1.4.2. Energy Saving
  I.C.1.4.3. Style
  I.C.1.4.4. Color
  I.C.1.4.5. Characteristics
  I.C.1.4.6. Long Life
I.C.1.4.7. Note fluorescent lamps at start of installation to verify proper operation upon completion.
I.C.1.4.8. Lamps are new and installed before completion, or reinstalled if required.
I.C.1.4.9. Additional new lamps are provided to compensate for contractors use of building lighting system if required.
I.C.1.5. Fixtures are adjusted or aimed as required.
I.C.1.6. Fixtures are suitably protected and cleaned at completion of work.
I.C.1.7. All fixtures are grounded as required.

I.C.2. Frames and accessories per requirements.
I.C.2.1. Confirm compatibility with adjacent surfaces
I.C.2.2. No light leaks
I.C.2.3. Weather Proof
I.C.2.4. Corrosion resistant
I.C.2.5. Finishes Match

I.C.3. Inspect cartons and lens to see whether acrylic or styrene plastic is provided as required.
OTHER BUILDING COMPONENTS AND SYSTEMS

I.C.4. Location
   I.C.4.1. Lighting layout is coordinated with architectural drawings and
discrepancies are reported.
   I.C.4.2. Layout is coordinated with work of other trades, especially
mechanical and fire sprinklers.
   I.C.4.3. Suspension, supporting, and mounting methods are as required.
   I.C.4.3.1. Confirm plumbness and alignment.
   I.C.4.4. Mounting height and location are as required.
I.C.5. During installation, see that defective louvers, cracked glass or plastic,
chipped porcelain or finish, distortion, or other defects are corrected before
completion.
   I.C.5.1. Doors are properly aligned, with proper clearance.
   I.C.5.2. Retaining devices function properly.

I.D. Grounding
   I.D.1. Grounding conductor is securely attached to equipment, devices, etc., and
forms complete grounding system.
   I.D.1.1.1. Grounding conductor for equipment when run with circuit
conductors complies with color coding requirements
(commonly specified as either bare or green coded).
   I.D.2. GFI receptacles are provided per requirements (see IR E-2 for commonly
specified locations).
   I.D.3. All grounding complies with the approved construction documents.
   I.D.3.1. Where fittings occur, confirm tightness is appropriate to maintain
ground continuity.
   I.D.3.2. Photovoltaic systems are properly grounded per requirements.

I.E. Penetrations
   I.E.1. Electrical penetrations through rated assemblies including floors, roofs,
walls and shafts comply with approved construction documents.
   I.E.1.1. Electrical racks through rated walls often require special through-
penetration details per approved drawings.

I.F. Conflicts
   I.F.1. Electrical equipment does not interfere with the normal use and operation
of doors, windows, and other required facilities.

I.G. Emergency Requirements
   I.G.1. High-voltage spaces have the specified exiting and panic hardware.
   I.G.2. Battery storage per the approved construction documents.
   I.G.3. UPS, automatic transfer systems, fuel cell, emergency power and stand-by
power systems per requirements.
   I.G.4. Machinery may require a disconnect; verify per requirements.

I.H. Testing
   I.H.1. Grounding tests for relocatable buildings (see IR E-1).
   I.H.2. Test and verify compliance of the electrical system with the approved
construction documents.

I.I. Maintenance
OTHER BUILDING COMPONENTS AND SYSTEMS

I.I.1. Required signs and labeling are provided.
   I.I.1.1. Photovoltaic systems have specified labeling.
   I.I.1.2. Signs/labels are not covered by insulation or painted out.
I.I.2. All electrical equipment and devices have the specified clear work space.
I.I.3. Verify Owner has received all required literature, reference standards and
       instructions describing the proper operation and maintenance of the
       equipment and devices installed.

5.4.1 Emergency and Standby Power Systems

Emergency power systems are essentially fire safety systems (e.g. exit signage and egress
illumination), whereas standby power systems focus more on the continued operation of critical
equipment in a building (e.g. elevators, fire pumps). Emergency power is typically available in
10 seconds after the primary power fails, whereas standby power is available in 60 seconds.

In addition to the references noted for Electrical Systems, the following apply to emergency
and standby power systems:

- CBC Chapter 27
- CFC Chapter 604
- NFPA 110
- NFPA 111

In addition to the testing and inspection items noted for Electrical Systems, the information
below applies to emergency and standby power systems.

I. Inspection of the following items:
   I.A. Emergency and standby power is provided at locations specified in the approved
   construction documents. Common equipment, locations or areas often include:
   I.A.1. Equipment
      I.A.1.1. Horizontal Sliding Doors
      I.A.1.2. Fire Alarm/Detection Systems
      I.A.1.3. Smoke Control Systems
      I.A.1.4. Fire Pumps
      I.A.1.5. Voice/alarm communication systems in:
         I.A.1.5.1. A-occupancy
         I.A.1.5.2. Covered Malls
         I.A.1.6.1. Exit Signs
   I.A.2. Locations/Areas
      I.A.2.1. Hazardous Materials Areas
      I.A.2.2. Occupied Areas Underground
OTHER BUILDING COMPONENTS AND SYSTEMS

I.A.2.3. Elevators, including elevator car lighting.
   I.A.2.3.1. Accessible means of egress elevators.

I.A.2.4. High-Rise Buildings

I.A.2.5. I-2 occupancy when located at or above 75 feet (e.g. in high-rise buildings)

I.A.2.6. I-3 Occupancy

I.A.2.7. L Occupancy

I.B. Verify special requirements at generators.
   I.B.1. Fire barrier rating in high-rise buildings.
   I.B.2. Fuel capacity time duration.

I.C. Testing of Emergency and Standby Power Systems shall comply with NFPA 110 and NFPA 111.
5.5 Signal

I. Inspection of the following items:

I.A. Location

I.A.1. Underground Installation (Refer to 2.1.1.3 Underground Utilities on page 50 for additional information.)
  I.A.1.1. Depth
  I.A.1.2. Clearances
  I.A.1.3. Backfilled per requirements.

I.A.2. Conduit and cable are provided with means to adjust to expansion and contraction where needed and indicated in approved construction documents.

I.A.3. Support and bracing/anchorage per requirements.

I.B. Penetrations

I.B.1. Signal penetrations through rated assemblies including floors, roofs, walls and shafts comply with approved construction documents.
  I.B.1.1. Signal racks through rated walls often require special through-penetration details per approved drawings.

I.C. Conflicts

I.C.1. Signal equipment does not interfere with the normal use and operation of doors, windows, and other required facilities.

I.D. Testing

I.D.1. Test and verify compliance of the signal system with the approved construction documents.

I.E. Maintenance

I.E.1. Required signs and labeling are provided.
  I.E.1.1. Signs/labels are not covered by insulation or painted out.

I.E.2. Verify Owner has received all required literature, reference standards and instructions describing the proper operation and maintenance of the equipment and devices installed.
APPENDIX A – DSA 103 CORRELATION MATRIX
## APPENDIX A – DSA 103 CORRELATION MATRIX

### DSA 103 Correlation Matrix

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<tr>
<td>1. GENERAL:</td>
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<tr>
<td>a. Verify that:</td>
<td></td>
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<tr>
<td>• site has been prepared properly prior to placement of controlled fill and/or excavations for foundations,</td>
<td>2.1.1.1 Site on page 45</td>
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<tr>
<td>• foundation excavations are extended to proper depth and have reached proper material, and</td>
<td>2.1.1.2 Building Pad on page 49</td>
</tr>
<tr>
<td>• materials below footings are adequate to achieve the design bearing capacity.</td>
<td>2.1.1.3 Underground Utilities on page 50</td>
</tr>
<tr>
<td>b. Perform qualification testing of fill materials.</td>
<td>2.1.3.1 Segmental Retaining Walls on page 54</td>
</tr>
<tr>
<td>b. Verify use of proper materials and inspect lift thicknesses, placement, and compaction during placement of fill.</td>
<td>2.1.3.2 Masonry Retaining Wall on page 57</td>
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<tr>
<td>c. Test compaction of fill.</td>
<td>2.1.3.3 Concrete Retaining Wall on page 58</td>
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<td>2. COMPACTED FILLS:</td>
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<td>2.1.1.1 Site on page 45</td>
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<td>b. Building Pad on page 49</td>
<td>2.1.1.2 Building Pad on page 49</td>
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<td>c. Underground Utilities on page 50</td>
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<td>3. DRIVEN DEEP FOUNDATIONS (PILES):</td>
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<td>a. Driven Deep Foundations (Piles) on page 65</td>
<td>2.2.2.1 Driven Deep Foundations (Piles) on page 65</td>
</tr>
<tr>
<td>a. Verify pile materials, sizes and lengths comply with the requirements.</td>
<td>2.2.2.1 Driven Deep Foundations (Piles) on page 65</td>
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<tr>
<td>b. Determine capacities of test piles and conduct additional load tests as required.</td>
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<td><strong>c. Inspect driving operations and maintain complete and accurate records for each pile.</strong></td>
<td>2.2.2.1 Driven Deep Foundations (Piles) on page 65</td>
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<tr>
<td><strong>d. Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.</strong></td>
<td>2.2.2.1 Driven Deep Foundations (Piles) on page 65</td>
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<tr>
<td><strong>e. Steel piles.</strong></td>
<td>2.2.2.1.1 Steel Piles on page 67</td>
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<td>2.2.2.1.1.1 Helical Piles on page 67</td>
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<td>2.2.2.1.2 Composite Steel Piles on page 68</td>
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<tr>
<td><strong>f. Concrete piles, and concrete filled piles.</strong></td>
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<td>2.2.2.1.3.3 Precast on page 68</td>
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<tr>
<td><strong>g. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.</strong></td>
<td>2.2.2.1 Driven Deep Foundations (Piles) on page 65</td>
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<td><strong>4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):</strong></td>
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<td>2.2.2.4 Compacted Aggregate Piers/Rammed Aggregate Piers/Vibro Stone Columns on page 72</td>
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<tr>
<td><strong>a. Inspect drilling operations and maintain complete and accurate records for each pier.</strong></td>
<td>2.2.2.2 Cast-In-Place Deep Foundations (Piers) on page 69</td>
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<td>2.2.2.4 Compacted Aggregate Piers/Rammed Aggregate Piers/Vibro Stone Columns on page 72</td>
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<tr>
<td><strong>b. Verify locations of piers.</strong></td>
<td>2.2.2.2 Cast-In-Place Deep Foundations (Piers) on page 69</td>
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<td>2.2.2.4 Compacted Aggregate Piers/Rammed Aggregate Piers/Vibro Stone Columns on page 72</td>
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<tr>
<td><strong>c. Confirm pier diameters, plumbness, bell diameters (if applicable), lengths, and embedment into bedrock (if applicable). Record concrete or grout volumes.</strong></td>
<td>2.2.2.2 Cast-In-Place Deep Foundations (Piers) on page 69</td>
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<td>2.2.2.3 Micropiles on page 71</td>
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</table>
| **d.** Confirm adequate end strata bearing capacity. | 2.2.2.2 Cast-In-Place Deep Foundations (Piers) on page 69  
2.2.2.3 Micropiles on page 71  
2.2.2.4 Compacted Aggregate Piers/Rammed Aggregate Piers/Vibro Stone Columns on page 72 |
| **e.** Concrete piers. | 2.2.2.2 Cast-In-Place Deep Foundations (Piers) on page 69  
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2.2.2.4 Compacted Aggregate Piers/Rammed Aggregate Piers/Vibro Stone Columns on page 72 |

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| **a.** Placement of soil reinforcement, drainage devices, and backfill. | 2.1.3.1 Segmental Retaining Walls on page 54  
2.1.3.2 Masonry Retaining Wall on page 57  
2.1.3.3 Concrete Retaining Wall on page 58 |
| **b.** Segmental retaining walls; inspect placement of units, dowels, connectors, etc. | 2.1.3.1 Segmental Retaining Walls on page 54 |
| **c.** Concrete retaining walls. | 2.1.3.3 Concrete Retaining Wall on page 58 |
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2.1.4.1 Soil Nails on page 59  
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### CONCRETE

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### 7. CAST IN PLACE CONCRETE

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### Material Verification and Testing:

| **a.** Verify use of required design mix. | 2.1.3.3 Concrete Retaining Wall on page 58 |
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b. Test reinforcing steel.
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| k. Verify protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F). | 2.3.2 Masonry on page 89  
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**Inspection:**

d. Verify member locations, bracing and all details constructed in the field.

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## 18. HIGH STRENGTH BOLTS:

### Material Verification of High-Strength Bolts, Nuts, and Washers:

**a.** Verify identification markings and manufacturer’s certificates of compliance conform to ASTM standards specified in the DSA approved documents.

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b. Test high-strength bolts, nuts and washers.
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**Verification of Materials, Equipment, Welders, etc:**

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## 19.2 FIELD WELDING:

**a.** Inspect groove, multi-pass, and fillet welds > 5/16"

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### DSA 103 Correlation Matrix

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<td>2.7.1</td>
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<td>Reviews Stands, Grandstands, and Bleachers on page 177</td>
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<td><strong>c.</strong> Inspect end-welded studs (ASTM A-108) installation (including bend test)**</td>
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<tr>
<td><strong>d. Inspect floor and roof deck welds</strong></td>
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<td><strong>e. Inspect welding of structural cold-formed steel</strong></td>
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**f. Inspect welding of stairs and railing systems**

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- 2.3.4.1.1 Beams on page 122
- 2.3.4.1.1.1 Composite on page 122
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- 2.3.4.1.2.1 Composite on page 125

**g. Verification of reinforcing steel weldability**

- 2.3.1 Concrete on page 74
- 2.3.2 Masonry on page 89

**h. Inspect welding of reinforcing steel.**

- 2.3.1 Concrete on page 74
- 2.3.2 Masonry on page 89

### 20. NONDESTRUCTIVE TESTING:

**a. Ultrasonic**

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- 2.3.4.1.1 Beams on page 122
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<tr>
<td>2.4.4.1.3 Special Plate Shear Wall (SPSW) on page 156</td>
<td>2.4.4.1.4 Cantilever Column Systems on page 156</td>
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**b. Magnetic Particle**

<table>
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## 21. STEEL JOISTS AND TRUSSES:
### APPENDIX A – DSA 103 CORRELATION MATRIX

#### DSA 103 Correlation Matrix

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<tr>
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</table>
| **a.** Verify size, type and grade for all chord and web members as well as connectors and weld filler material; verify joist profile, dimensions and camber (if applicable); verify all weld locations, lengths and profiles; mark or tag each joist. | 2.3.4.1.1.2 Steel Joists/Joist Girders/Trusses on page 123  
2.4.4.1.1.4 Special Truss Moment Frame (STMF) on page 154 |
| **22. SPRAY APPLIED FIRE-PROOFING:** | |
| **a.** Examine structural steel surface conditions, inspect application, take samples, measure thickness, and verify compliance of all aspects of application with DSA approved documents. | 2.3.4.1 Structural Steel on page 116  
2.3.4.1.1 Beams on page 122  
2.3.4.1.1.2 Steel Joists/Joist Girders/Trusses on page 123  
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2.4.4.1.3 Special Plate Shear Wall (SPSW) on page 156  
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| **b. Test bond strength.** | 2.3.4.1 Structural Steel on page 116  
2.3.4.1.1 Beams on page 122  
2.3.4.1.1.2 Steel Joists/Joist Girders/Trusses on page 123  
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|                           | 2.4.4.1.2.4 Buckling Restrained Braced Frame
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<tr>
<td>(BRBF) on page 156</td>
<td>2.4.4.1.4 Cantilever Column Systems on page 156</td>
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</tbody>
</table>

23. **OTHER STEEL:**

Refer to the building specific DSA approved **DSA 103** form and appropriate sections in this manual.

#### WOOD

- 2.3.3 Wood on page 96
- 2.4.3 Wood on page 142

24. **PREFABRICATED WOOD STRUCTURAL ELEMENTS:**

- **a.** Inspect fabrication of structural glued-laminated timber. 2.3.3 Wood on page 96
- **b.** Inspect fabrication of manufactured open-web trusses. 2.3.3 Wood on page 96

25. **OTHER WOOD:**

Refer to the building specific DSA approved **DSA 103** form and appropriate sections in this manual.

**OTHER**

27. **SKYLIGHT LOAD TEST**

Refer to the building specific DSA approved **DSA 103** form and appropriate sections in this manual.

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*Table A0-1: DSA 103 Correlation Matrix*
APPENDIX B – REFERENCED DSA FORMS
## APPENDIX B – REFERENCED DSA FORMS

**Form DSA-121**

*CALIFORNIA DEPARTMENT OF GENERAL SERVICES*

**DIVISION OF THE STATE ARCHITECT**

**CHECKLIST FOR SITE INSPECTION OF RELOCATABLE BUILDINGS**

*To be completed by the Project Inspector when the construction work is 100% complete*

**For use on single-story relocatable projects only, in lieu of semi-monthly reports**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
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<tbody>
<tr>
<td>School</td>
<td>DSA File Number</td>
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<tr>
<td>Inspector</td>
<td>DSA Application Number</td>
</tr>
<tr>
<td>Number of buildings on site under this application</td>
<td>Date</td>
</tr>
<tr>
<td>Building Serial Numbers</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** The Inspector of Record must complete and submit a copy of this checklist to DSA for each site along with a Verified Report (Form DSA-6) by the date of the building’s occupancy.

1. Received DSA-approved plans and specifications ........................................... YES | NO | N/A
2. Building location same as shown on approved plans. (Any deviation requires DSA approval.) ....... YES | NO | N/A
3. I.D. tag has correct application number; for new construction, application number and serial numbers match in-plant inspector's form 6, and correct floor, roof, and wind load for site.... YES | NO | N/A
4. Received DSA-approved Test & Inspection Form, verified material testing and special inspections listed were performed ........................................... YES | NO | N/A
5. Finish floor elevation with respect to grade is same as shown on approved plans or within limits of DSA IR 16-1 ........................................... YES | NO | N/A
6. Underfloor vent size and location same as shown on approved plans and are unobstructed ............ YES | NO | N/A
7. Wood foundation plates are pressure-treated and identified with tags having appropriate treatment identification ........................................... YES | NO | N/A
8. Wood foundation plate size and layout and steel pipes per approved plans .......................... YES | NO | N/A
9. Shear transfer plates or connectors or structural plywood skirting and nailing per approved plans ... YES | NO | N/A
10. Concrete foundation per approved plans .................................................................. YES | NO | N/A
11. Fire alarm system installed per approved plans and testing passed ............................... YES | NO | N/A
12. Ramp slope starts a minimum of 42 inches from the door strike ....................................... YES | NO | N/A
13. All disabled access requirements per approved plans, such as path of travel, toilet upgrading, signage, ramp transitions, parking, etc.......................... YES | NO | N/A
14. Electrical bonding between steel frame modules and ramp .......................................... YES | NO | N/A
15. Electrical grounding and testing - specify results: __________________ ohms .................. YES | NO | N/A

**Important: Read before using this form**

Section 4-337, Part 1, Title 24 California Code of Regulations requires inspectors to submit semi-monthly reports. This checklist is an acceptable alternate to this requirement for site inspections of single-story, factory-built relocatable building projects only. Failure to submit a semi-monthly report or this alternate checklist may be grounds for DSA to withdraw your approval. This alternate will reduce the total amount of paperwork generated and reviewed. It will also provide DSA a means for a timely and effective visit to the job site, evaluation of the inspector, and closing of the application. This checklist must be completed and promptly submitted to DSA by the date of occupancy. If the construction is complete and in compliance with approved plans and specifications, attach a 100% (final) verified report (Form DSA-6). If the construction is not complete and/or there are outstanding deviations, attach a verified report that notes the percentage complete and includes a list of deviations.
Certificate of Compliance – Approved Bleacher / Grandstand Fabricator

Certification form to be completed by the manufacturer of the Bleacher or Grandstand at the completion of fabrication. Completed form is to be submitted to the owner, project inspector, the engineer or architect in general responsible charge, and DSA.

(Use this form only for bleachers whose overall height is 20' or less from the top of the foundation at the front to the uppermost seatboard)

BSA File #: __________ - __________
Application #: __________ - __________

Bleacher/Grandstand ID: ____________________

I certify (or declare) under the penalty of perjury that the following statements are true: (All boxes must be checked for the submittal to be considered complete.)

☐ I have personal knowledge, as defined in Title 24, Part 1, Section 4-336, of the fabrication of the bleacher/grandstand identified above.

☐ The materials and works performed for the fabrication of the bleacher/grandstand identified above are in accordance with DSA approved construction documents.

Attachments:

☐ Proof of accreditation of the fabrication shop where the bleacher/grandstand identified above was fabricated

☐ Welding inspection reports for shop welds

☐ Certificates for seatboards and footboards, i.e. mill certification.

Signed: ___________________________ Date: ___________________________

Engineer LEA Lab. Engineer

Print Name: ___________________________ CA Reg./ License No.: ___________________________

Engineer Stamp: ___________________________
### Bleacher/Grandstand Material Certification - Unapproved Fabricator

Material Certification form to be completed by the DSA approved Special Inspector and attached to his/her daily inspection reports (DSA-250)

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Material</th>
<th>ASTM Standard, Grade, or Test Report</th>
<th>Certified, Stamped, or Tested by</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

I certify (or declare) under penalty of perjury that the materials listed above have been used in the construction of the referenced bleacher or grandstand.

Signed: ____________________________ Date: ______________

DSA Approved Special Inspector

Print Name: ____________________________

---

Form DSA-131  
(rev. 01-11-12)
### APPENDIX B – REFERENCED DSA FORMS

**DAILY COMPACTION TEST REPORT**

<table>
<thead>
<tr>
<th>TEST #</th>
<th>TEST DATE</th>
<th>Soils Type #</th>
<th>LOCATION</th>
<th>ELEV.</th>
<th>% MOIST.</th>
<th>DENSITY (pcf)</th>
<th>% B.E. CONTRACTION</th>
<th>REMARK</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

### Soil Type / Description

<table>
<thead>
<tr>
<th>Soil Type / Description</th>
<th>USCS Soil Class</th>
<th>Optimum Moisture (%)</th>
<th>Max Dry Density (pcf)</th>
</tr>
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<tr>
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<td></td>
</tr>
</tbody>
</table>

*REMARK:* (1. Denotes failing test  2. Denotes passing retest)

**The Material**  
- **WAS**  
- **WAS NOT**  

Sampled and Tested in accordance with the Requirements of the DSA Approved Documents.

**The Material Tested**  
- **NET**  
- **DID NOT MEET**

See Retest #(s) __________________  
Report Date(s) __________________

**cc:** Project Architect  
Structural Engineer  
Project Inspector  
DSA Regional Office

Gauge #: __________________
Moisture Standard: __________________
Density Standard: __________________

Signature __________________  
Date __________________

Print Name / Title __________________

**ADDITIONAL COMMENTS (DSA-211) ATTACHED**
### Sieve Analysis Test Report

**Testing Information**

- Sample weight before wash (g):
- Sample weight after wash (g):
- Total loss after sieving, <0.3% (%):

<table>
<thead>
<tr>
<th>Sieve size</th>
<th>Weight Retained (grams)</th>
<th>Cumulative Weight Retained (g)</th>
<th>% Retained Each Sieve</th>
<th>% Passing</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.5&quot; (63.5 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2&quot; (50 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5&quot; (37.5 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1&quot; (25 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.75&quot; (19 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5&quot; (12.5 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.375&quot; (9.5 mm)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.4 (4.75 mm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.8 (2.36 mm)</td>
<td></td>
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</tr>
<tr>
<td>No.16 (1.18 mm)</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>No.30 (600 μm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No.50 (300 μm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No.100 (150 μm)</td>
<td></td>
<td></td>
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<tr>
<td>No.200 (75 μm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Applicable ASTM Test Methods:

REMARKS:

The Material: □ WAS □ WAS NOT Sampled and Tested in accordance with the Requirements of the DSA Approved Documents.

The Material Tested: □ NET □ DID NOT MEET The Requirements of the DSA Approved Documents.

CC: Project Architect
    Structural Engineer
    Project Inspector
    DSA Regional Office

Signature: __________________________ Date: __________

Print Name / Title: __________________________

Additional Comments (DSA-211) Attached.
## Testing Information

### ASTM Specification

**Specimen ID:**

**Date Tested:**

**Manufacturer:**

**Heat Number:**

**Bar No.:**

**Yield Point, lbs.:**

**Maximum Load, lbs.:**

**Yield (psi):**

**Tensile Strength (psi):**

**Elongation Spec (%):**

**Elongation (%):**

**Bend Results**

**Pass/Fail**

- [ ] Full Size Specimen(s)
- [ ] Reduced Size Specimen(s)

**Applicable ASTM Test Methods:**

**Remarks:**

---

### The Material

- [ ] WAS
- [ ] WAS NOT

**Sampled and Tested in Accordance with**

**The Requirements of the DSA Approved Documents.**

**cc:** Project Architect

**Structural Engineer**

**Project Inspector**

**DSA Regional Office**

### The Material Tested

- [ ] MET
- [ ] DID NOT MEET

**The Requirements of the DSA Approved Documents.**

**Signature:**

**Date:**

**Print Name / Title:**
## APPENDIX B – REFERENCED DSA FORMS

### DIVISION OF THE STATE ARCHITECT

CALIFORNIA DEPARTMENT OF GENERAL SERVICES

---

### COMPRESSION TEST REPORT

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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<tr>
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<tr>
<td>Address:</td>
<td></td>
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<tr>
<td>CA</td>
<td></td>
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<tr>
<td>Project Name:</td>
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<td>Location in Structure:</td>
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<td>Sampled By:</td>
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<td>Exp. Date:</td>
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<td>Lab Job #:</td>
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<td>LEA #:</td>
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<tr>
<td>DSA FILE #:</td>
<td></td>
</tr>
<tr>
<td>DSA APPL #:</td>
<td></td>
</tr>
</tbody>
</table>

---

### SAMPLING INFORMATION

<table>
<thead>
<tr>
<th>Material</th>
<th>Concrete</th>
<th>Grout</th>
<th>Mortar</th>
<th>Prisms</th>
<th>Cores</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specified Strength (psi)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Actual</th>
<th>Spec.</th>
<th>Pass/ Fail</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Slump (inches)</th>
<th>Concrete Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Air (%)</td>
<td>Truck #:</td>
</tr>
<tr>
<td>Unit Weight (pcf)</td>
<td>Ticket #:</td>
</tr>
<tr>
<td>Air Temperature (°F)</td>
<td>Time Batched:</td>
</tr>
<tr>
<td>Mix Temperature (°F)</td>
<td>Time Sampled:</td>
</tr>
</tbody>
</table>

Set #: of _____ yds of ______ total yds
Sampled from: Chute Hose Other

---

### TESTING INFORMATION

<table>
<thead>
<tr>
<th>Identification</th>
<th>Date Samples Received</th>
<th>Curing Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Tested</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age in Days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diameter/Size (in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correction Factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross Sect. Area (in.²)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Load (lbs.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compr. Strength (psi)</td>
<td></td>
<td></td>
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<tr>
<td>Fracture Type</td>
<td></td>
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</tr>
</tbody>
</table>

Applicable ASTM Test Methods: Concrete: Average of 2 (28 day) tests: psi
Mortar, Grout, Shotcrete: Average of 3 (28 day) tests: psi

Tested by: ------------------

Remarks:

---

### THE MATERIAL

- Was
- Was Not

Sampled and Tested in accordance with the requirements of the DSA Approved Documents.

---

### THE MATERIAL TESTED

- Met
- Did Not Meet

The requirements of the DSA Approved Documents.

---

cc: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office

Signature: ____________________________
Date: _____________________________
Print Name / Title: ____________________________
# APPENDIX B – REFERENCED DSA FORMS

## DIVISION OF THE STATE ARCHITECT

**CALIFORNIA DEPARTMENT OF GENERAL SERVICES**

### CONCRETE MASONRY UNIT TEST REPORT

<table>
<thead>
<tr>
<th>School District:</th>
<th>LEA #:</th>
<th>DSA FILE #:</th>
</tr>
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<tbody>
<tr>
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<tr>
<td>Address:</td>
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<tr>
<td>Project Name:</td>
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<tr>
<td>Report Date:</td>
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<tr>
<td>Sampled At:</td>
<td></td>
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<tr>
<td>Block Manufacturer:</td>
<td></td>
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<tr>
<td>Sampled By:</td>
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<tr>
<td>Exp. Date:</td>
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<tr>
<td>Lab Facility:</td>
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<td>Lab Doc #:</td>
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<tr>
<td>Lab Job #:</td>
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</tbody>
</table>

**Material Description:**

| Physical Properties of Units (Average) | Date Received: |

<table>
<thead>
<tr>
<th>Length (in.)</th>
<th><strong>Received Weight (lbs.)</strong></th>
<th>Lightweight</th>
<th>Specimen Size:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width (in.)</td>
<td>Moisture Content (%)</td>
<td>Medium Weight</td>
<td>Reduced</td>
</tr>
<tr>
<td>Height (in.)</td>
<td>Density (pcf)</td>
<td>Normal Weight</td>
<td></td>
</tr>
</tbody>
</table>

**Summary of Tests – Results Specified Conformance**

<table>
<thead>
<tr>
<th>Net Compressive Strength (psi):</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorption (pcf)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Min. Face Shell Thickness (in.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Minimum Web Thickness (in.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Equivalent Web Thickness (in.)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Equivalent Thickness (in.)</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**Compressive Strength – Individual Test Results**

- Date Test Started: 
- **Reason, If Specimen is less than full size**
  - Face Shell Projections
  - Unsupported Projections
  - Test Machine Capacity

**Absorption & Received Moisture - Individual Test Results**

- Date Tested: 
- ASTM C90 Requirements: 
  - (Water Absorption max pcf – Average of 3 Units)
    - Lightweight – Less than 105 pcf
    - Medium Weight – 105 to less than 125 pcf
    - Normal: –125 pcf or more

Applicable ASTM Test Methods:

**REMARKS:**

**The Material**

- **WAS**
- **WAS NOT**

SAMPLED AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE DSA APPROVED DOCUMENTS.

**The Material Tested**

- **MET**
- **DID NOT MEET**

THE REQUIREMENTS OF THE DSA APPROVED DOCUMENTS.

**cc:** Project Architect
- Structural Engineer
- Project Inspector
- DSA Regional Office

**Signature**

**Date**

**Print Name/Title**

---

**PAGE 1 OF 1**

**FORM DSA-205 (rev 06/28/11)**

**Concrete Masonry Unit Test Report**

**DGS**

**CALIFORNIA DEPARTMENT OF GENERAL SERVICES**

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**PAGE 321 OF 329**

**DIVISION OF THE STATE ARCHITECT**

**DEPARTMENT OF GENERAL SERVICES**

**STATE OF CALIFORNIA**
# APPENDIX B – REFERENCED DSA FORMS

## MASONRY CORE TEST REPORT

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<td>Lab Facility:</td>
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<td>Location in Structure:</td>
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<td>Sampled By:</td>
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## TESTING INFORMATION

### Core # 1

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<tbody>
<tr>
<td>Core Number</td>
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</tr>
<tr>
<td>Ave. Diameter (in.)</td>
<td></td>
</tr>
<tr>
<td>Length (Rec’d) (in.)</td>
<td></td>
</tr>
<tr>
<td>Date Grouted</td>
<td></td>
</tr>
<tr>
<td>Core Location</td>
<td></td>
</tr>
<tr>
<td>Material Description</td>
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<td>Date Received</td>
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### Core # 2

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<tr>
<td>Ave. Diameter (in.)</td>
<td></td>
</tr>
<tr>
<td>Length (Rec’d) (in.)</td>
<td></td>
</tr>
<tr>
<td>Date Grouted</td>
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</tr>
<tr>
<td>Core Location</td>
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<tr>
<td>Material Description</td>
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<td>Date Received</td>
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### Core # 3

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<tr>
<td>Ave. Diameter (in.)</td>
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<tr>
<td>Length (Rec’d) (in.)</td>
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<td>Date Grouted</td>
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### Core # 4

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<tr>
<td>Core Number</td>
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<td>Ave. Diameter (in.)</td>
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<tr>
<td>Length (Rec’d) (in.)</td>
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<tr>
<td>Date Grouted</td>
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<tr>
<td>Core Location</td>
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<tr>
<td>Material Description</td>
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<tr>
<td>Date Received</td>
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### Shear Bond Strength (psi)

<table>
<thead>
<tr>
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<tbody>
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<tr>
<td>Core # 1 Outside</td>
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<tr>
<td>Core # 2 Inside</td>
<td></td>
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<tr>
<td>Core # 2 Outside</td>
<td></td>
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<tr>
<td>Core # 3 Inside</td>
<td></td>
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<tr>
<td>Core # 3 Outside</td>
<td></td>
</tr>
<tr>
<td>Core # 4 Inside</td>
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<tr>
<td>Core # 4 Outside</td>
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### Load (lbs.)

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Core # 1 Outside</td>
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<tr>
<td>Core # 2 Outside</td>
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<tr>
<td>Core # 4 Inside</td>
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<tr>
<td>Core # 4 Outside</td>
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</table>

### Shear Strength (psi)

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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<tbody>
<tr>
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<td>Core # 1 Outside</td>
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<td>Core # 2 Inside</td>
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<td>Core # 4 Inside</td>
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### Specified Strength (psi)

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<td>Core # 3 Inside</td>
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<td>Core # 3 Outside</td>
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<td>Core # 4 Inside</td>
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<td>Core # 4 Outside</td>
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### Date Tested

<table>
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<tbody>
<tr>
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<td>Core # 4 Inside</td>
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<td>Core # 4 Outside</td>
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### Pass/Fail?

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<td>Core # 1 Outside</td>
<td></td>
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<tr>
<td>Core # 2 Inside</td>
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<td>Core # 4 Inside</td>
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### Core Condition Summary

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<tr>
<td>Core # 4 Outside</td>
<td></td>
</tr>
</tbody>
</table>

### REMARKS:

- ADDITIONAL COMMENTS (DSA-211) ATTACHED.

## The Material

- WAS
- WAS NOT

Sampled and Tested in accordance with the requirements of the DSA Approved Documents.

**CC:** Project Architect  
Structural Engineer  
Project Inspector  
DSA Regional Office

## The Material Tested

- MET
- DID NOT MEET

The requirements of the DSA Approved Documents.

**Signature:**

**Date:**

**Print Name / Title:**

---

**FORM DSA-207 (rev 02/16/11)**  
Masonry Core Test Report  
DGS CALIFORNIA DEPARTMENT OF GENERAL SERVICES

**PAGE 1 OF 1**

---

**DIVISION OF THE STATE ARCHITECT**  
**DEPARTMENT OF GENERAL SERVICES**  
**STATE OF CALIFORNIA**
## APPENDIX B – REFERENCED DSA FORMS

### Division of the State Architect

CALIFORNIA DEPARTMENT OF GENERAL SERVICES

---

**HIGH STRENGTH BOLT TEST REPORT**

<table>
<thead>
<tr>
<th>School District:</th>
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<th>DSA FILE #:</th>
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<thead>
<tr>
<th>Project Name:</th>
<th>Structure:</th>
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<td>Location in Structure:</td>
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<tr>
<td>Sampled By:</td>
<td>Sample Date:</td>
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<td>Report Date:</td>
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### TESTING INFORMATION

- Applicable ASTM Test Methods: [ ]
- Material Identifiable - Attach Certificates [ ]
- Material Unidentifiable [ ]

---

### SPECIMENS

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<tr>
<th>TYPE</th>
<th>MANUFACTURER</th>
<th>LOT NO.</th>
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<th>DIAMETER</th>
<th>LENGTH</th>
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### ROCKWELL HARDNESS

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<td>Nut #1</td>
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<td>Washer #1</td>
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### PROOF LOAD

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<tbody>
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<td>Test</td>
<td>Spec.</td>
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### ELONGATION

<table>
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<th>Spec.</th>
<th>Test</th>
<th>Spec.</th>
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</table>

### WEDGE TENSILE

|------|------|-------|------|-------|

---

### REMARKS:

---

### ADDITIONAL COMMENTS (DSA 211) ATTACHED.

---

### The Material

- [ ] WAS
- [ ] WAS NOT

Sampled and Tested in accordance with the requirements of the DSA Approved Documents.

---

### The Material Tested

- [ ] MET
- [ ] DID NOT MEET

The Requirements of the DSA Approved Documents.

---

**cc:** Project Architect
Structural Engineer
Project Inspector
DSA Regional Office

**Signature:**

**Date:**

**Print Name / Title:**

---

**FORM DSA-208 (rev 02/18/11)**
High Strength Bolt Test Report

---

**PAGE 1 OF 1**
## APPENDIX B – REFERENCED DSA FORMS

### Division of the State Architect

**CALIFORNIA DEPARTMENT OF GENERAL SERVICES**

### FIREPROOFING DENSITY TEST REPORT

**School District:**

**Attn:**

**Address:**

**CA**

**Exp. Date:**

**DSA APPL #:**

**Lab Facility:**

**Lab Doc #:**

**Lab Job #:**

**Sampled By:**

**Test Date:**

**Sample Date:**

**Manufacturer:**

**Lot #:**

**Type:**

**Project Specification / Minimum Density (pcf):**

### Sample Table

<table>
<thead>
<tr>
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<th>Sample Location</th>
<th>Specimen Area (sq. in.)</th>
<th>Average Thickness (In.)</th>
<th>Dry Density (pcf)</th>
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</tr>
</tbody>
</table>

**Applicable ASTM Test Methods:**

**REMARKS:**

**The Material**

- **Was**
- **Was Not**

**Sampled and Tested in accordance with the Requirements of the DSA Approved Documents.**

**The Material Tested**

- **Met**
- **Did Not Meet**

**The Requirements of the DSA Approved Documents.**

**cc:**

- Project Architect
- Structural Engineer
- Project Inspector
- DSA Regional Office

**Signature**

**Date**

**Print Name / Title**

**ADDITIONAL COMMENTS (DSA-211) ATTACHED.**

**FORM DSA-209 (rev 02/16/11)**

**PAGE 1 OF 1**

**DIVISION OF THE STATE ARCHITECT DEPARTMENT OF GENERAL SERVICES STATE OF CALIFORNIA**
# APPENDIX B – REFERENCED DSA FORMS

## Division of the State Architect

CALIFORNIA DEPARTMENT OF GENERAL SERVICES

---

### ADDITIONAL COMMENTS

<table>
<thead>
<tr>
<th>LEA #:</th>
<th>Lab Doc #:</th>
<th>Lab Job #:</th>
<th>DSA FILE #:</th>
<th>DSA APPL #:</th>
</tr>
</thead>
</table>

**Attachment to form:** Check one

- DSA-201
- DSA-204
- DSA-207
- DSA-210
- DSA-202
- DSA-205
- DSA-208
- DSA-250
- DSA-203
- DSA-206
- DSA-209
- DSA-292

Any additional comments that will not fit in remarks section of DSA Test or Inspection report forms should be written below.

Attach to respective form.

---

Teacher’s Initials

---

FORM DSA-211 (rev 09/11)
APPENDIX B – REFERENCED DSA FORMS

Division of the State Architect
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

SPECIAL INSPECTION REPORT

School District: ____________________________ LEA #: ____________________________ DSA FILE #: __________
Attn: ____________________________________ Exp. Date: ____________________________ DSA APPL #: __________
Address: CA __________________________________ Lab Facility: ____________________________ Lab Doc. #: __________
________________________________________ Lab Job #: ____________________________

Special Inspection Reports must be distributed to the parties listed below within 14 days of the inspection. Reports of non-compliant conditions must be distributed immediately. Separate reports shall be prepared for each type of special inspection on a daily basis. Each report shall be completed and signed by the special inspector conducting the inspection.

Project Name: ____________________________ Report Date: ____________________________
Project Location: __________________________
Contractor: ____________________________ Fabricator: ____________________________

Type of Inspection
☐ Batch Plant
☐ Masonry
☐ Fireproofing
☐ Prestressed Concrete
☐ High Strength Bolting
☐ Deep Foundation
☐ Shotcrete
☐ Welding

DSA Approved Documents:

Work Inspected:

☐ ADDITIONAL COMMENTS (DSA 211) ATTACHED.

The Work ____________ The Work Inspected ____________
☐ WAS ____________ ☐ NET ____________
☐ WAS NOT ____________ ☐ DID NOT MEET ____________

Inspected in accordance with the Requirements of the DSA Approved Documents

Material Sampling ____________ N/A
☐ WAS ____________ ☐ WAS NOT ☐ N/A

Performed in accordance with DSA Approved Documents

cc: Project Architect
Structural Engineer
Project Inspector
DSA Regional Office
School District

Signature of Special Inspector: ____________________________ Date: ____________
Print Name / Title: ____________________________
CERTIFICATION #: ____________________________

FORM DSA-250 (rev 02/16/11)
Special Inspection Report