



Statement of Structural Tests and Special Inspections

National Park Service - Denver Service Center

Park: Rocky Mountain National Park

PMIS: 160755

Project Name: Fall River Entrance

Structural Engineering Firm: JVA, Inc.

This Statement of Structural Tests and Special Inspections is being submitted as required by Chapter 17 of the 2021 International Building Code (IBC-21). It includes the following:

1. Seismic requirements
2. Wind requirements
3. Qualification requirements for Inspectors and Testing Technicians
4. Listing of Required Structural Tests and Special Inspections

The Construction Contractor’s Quality Control Supervisor will provide copies of all special inspection reports and associated documentation to the Contracting Officer. The Construction Contractor will be required to correct all deficiencies discovered in the Special Inspection and Structural Testing program.

Prepared by:

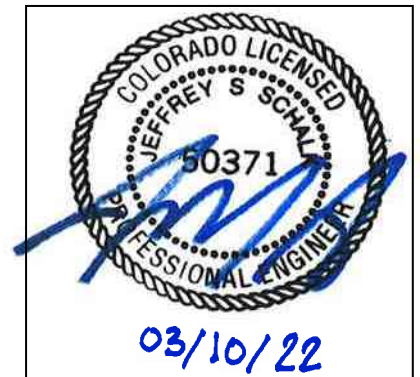
Jeffrey Schalk, PE

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Signature

03.10.22

Date



PE or SE Stamp

Seismic and Wind Requirements

Seismic Requirements, IBC-21 Section 1704.3.2

Description of seismic-force-resisting system and designated seismic systems subject to special inspections:

None. Seismic Design Category B; therefore, no special inspection of seismic-force resisting systems are required (IBC 1705.12)

Wind Requirements, IBC-21 Section 1704.3.3

Description of wind-force-resisting system and designated wind systems subject to special inspections:

3-second gust wind speed = 175 mph (ultimate) = 135 mph (allowable) > 110 mph (allowable), Exposure C; therefore, special inspections of wind-force resisting systems is required (IBC 1705.11)

IBC 1705.12.2, Structural Wood; Building Frame System, Light-Frame (Wood) Walls with Wood Structural Panels Rated for Shear Resistance; Periodic Special Inspection for nailing, bolting, anchoring, fastening of wood shear walls with nailing less than 6 inches on center, drag struts, and hold-downs.

Instructions:

1. Place an “X” in the column titled “Required?” for all Special Inspections and Tests required for this project.
2. In the column marked “Required Qualifications” provide the qualifications for the special inspector, using the list beginning on page 4, for all required Structural Tests and Special Inspections.
3. For those items listed as “Continuous,” continuous special inspection shall be as defined in Chapter 2, IBC-21.
4. For those items listed as “Periodic” provide the minimum number of tests, i.e. 20% of all field welds, or the amount of work to be inspected (e.g. 10% of all wall surfaces).
5. Attach completed Statement of Structural Tests and Special Inspections to the end of the Specification Section 01 40 00, Quality Requirements.

Qualification Requirements for Inspectors and Testing Technicians

PE/SE	Structural Engineer – licensed PE or SE specializing in the design of buildings and structures
PE/GE	Geotechnical Engineer – licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – graduate engineer who has passed the Fundamentals of engineering examination

American Concrete Institute (ACI) Certification

ACI-CCSI	Concrete Construction Special Inspector
ACI-LTT	Concrete Laboratory Testing Technician Level 1 or 2
ACI-STT	Concrete Strength Testing Technician
ACI-FTT	Concrete Field Testing Technician – Grade I

American Society of Non-Destructive Testing (ASNT) Certification

Non-Destructive Testing Technician – Level II or III

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
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Exterior Design Institute (EDI) Certification

EDI-EIFS	Certified EIFS inspector
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International Code Council (ICC) Certification

ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector
ICC-SSI	Soils Special Inspector
ICC-SFSI	Spray-applied Fireproofing Special Inspector
ICC-SMSI	Structural Masonry Special Inspector
ICC-SSBSI	Structural Steel and Bolting Special Inspector
ICC-SWSI	Structural Welding Special Inspector

National Institute for Certification in Engineering Technologies (NICET) Certification

NICET-CT	Concrete Technician – Levels I, II, III and IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III and IV
NICET-ST	Soils Technician - Levels I, II, III and IV

Other

Listing of Required Structural Tests and Special Inspections

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
General Special Cases (ref: IBC-21 Section 1705.1.1)					
X	1. Inspect post-installed anchor installation to concrete, including anchor type & dimensions, adhesive type, hole size and cleanliness, embedment, and adherence to manufacturer's instructions	ACI-CCSI ICC-RCSI		X	50% of anchors
Steel Construction (ref: IBC-21 Section 1705.2, AISC 360-16 Chapter N, AISC 341-16 Chapter J)					
Prior to Welding (AISC 360-16 Table N5.4-1)					
X	1. Welding procedure specifications (WPSs) available	AWS-CWI ICC-SWSI	X		
X	2. Manufacturer certifications for welding consumables available	AWS-CWI ICC-SWSI	X		
X	3. Material identification (type/grade)	AWS-CWI ICC-SWSI		X	At project startup
X	4. Welder identification system	AWS-CWI ICC-SWSI		X	At project startup
	5. Fit-up of groove welds (including joint geometry)	AWS-CWI ICC-SWSI			
X	a. Joint preparation			X	50% of welds
X	b. Dimensions (alignment, root opening, root face, bevel)			X	50% of welds
X	c. Cleanliness (condition of steel surfaces)			X	50% of welds
X	d. Tacking (tack weld quality and location)			X	50% of welds
X	e. Backing type and fit (if applicable)			X	50% of welds
X	6. Configuration and finish of access holes	AWS-CWI ICC-SWSI		X	50% of welds
	7. Fit-up of fillet welds	AWS-CWI ICC-SWSI			
X	a. Dimensions (alignment, gaps at root)			X	50% of welds
X	b. Cleanliness (condition of steel surfaces)			X	50% of welds
X	c. Tacking (tack weld quality and location)			X	50% of welds
X	8. Check welding equipment	AWS-CWI ICC-SWSI		X	When onsite
During Welding (AISC 360-16 Table N5.4-2)					
X	1. Use of qualified welders	AWS-CWI ICC-SWSI		X	50% of welds

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	2. Control and handling of welding consumables	AWS-CWI ICC-SWSI			
X	a. Packaging			X	50% of welds
X	b. Exposure control			X	50% of welds
X	3. No welding over cracked tack welds	AWS-CWI ICC-SWSI		X	50% of welds
	4. Environmental conditions	AWS-CWI ICC-SWSI			
X	a. Wind speed within limits			X	50% of welds
X	b. Precipitation and temperature			X	50% of welds
	5. WPS followed	AWS-CWI ICC-SWSI			
X	a. Settings on welding equipment			X	50% of welds
X	b. Travel speed			X	50% of welds
X	c. Selected welding materials			X	50% of welds
X	d. Shielding gas type/flow rate			X	50% of welds
X	e. Preheat applied			X	50% of welds
X	f. Interpass temperature maintained (min. /max.)			X	50% of welds
X	g. Proper position (F, V, H, OH)			X	50% of welds
X	h. Intermix of filler metals avoided unless approved (ref: AISC 341-16)			X	50% of welds
	6. Welding techniques	AWS-CWI ICC-SWSI			
X	a. Interpass and final cleaning			X	50% of welds
X	b. Each pass within profile limitations			X	50% of welds
X	c. Each pass meets quality requirements			X	50% of welds
After Welding (AISC 360-16 Table N5.4-3)					
X	1. Welds cleaned	AWS-CWI ICC-SWSI		X	50% of welds
X	2. Size, length and location of welds	AWS-CWI ICC-SWSI	X		
	3. Welds meet visual acceptance criteria	AWS-CWI ICC-SWSI			
X	a. Crack prohibition		X		
X	b. Weld/base-metal fusion		X		
X	c. Crater cross section		X		
X	d. Weld profiles		X		
X	e. Weld size		X		
X	f. Undercut		X		
X	g. Porosity		X		
X	4. Arc strikes	AWS-CWI ICC-SWSI	X		

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
X	5. k-area	AWS-CWI ICC-SWSI	X		
X	6. Backing removed and weld tabs removed (if required)	AWS-CWI ICC-SWSI	X		
X	7. Repair activities	AWS-CWI ICC-SWSI	X		
X	8. Document acceptance or rejection of welded joint or member	AWS-CWI ICC-SWSI	X		
X	9. Placement of reinforcing or contouring fillet welds (if required) (ref: AISC 341-16)	AWS-CWI ICC-SWSI	X		
X	10. Backing removed, weld tabs removed and finished, and fillet welds added (if required) (ref: AISC 341-16)	AWS-CWI ICC-SWSI	X		
Nondestructive Testing (AISC 360-16 Section N5.5)					
X	1. Risk Category II Structures - Perform Ultrasonic Testing on 10% of CJP groove welds in butt, T- and corner joints subject to transversely applied tension loading, in materials 5/16 in. thick or greater.	AWS-CWI ICC-SWSI		X	10% of welds
	2. Risk Category III or IV Structures - Perform Ultrasonic Testing on all CJP groove welds subject to transversely applied tension loading in butt, T- and corner joints, in materials 5/16 in. thick or greater.		X		
	3. Access Holes – Perform Magnetic Particle Testing or Liquid Penetrant Testing when the flange thickness exceeds 2 in. for rolled shapes, or when the web thickness exceeds 2 in. for built-up shapes.		X		
	4. Welded Joints Subject to Fatigue		X		
Nondestructive Testing (AISC 341-16 Section J6.2)					
X	1. k-area	AWS-CWI ICC-SWSI	X		
X	2. CJP Groove weld	AWS-CWI ICC-SWSI	X		
X	3. Lamellar tearing	AWS-CWI ICC-SWSI	X		
X	4. Beam cope and access hole	AWS-CWI ICC-SWSI	X		
	5. Reduced beam section repair		X		
X	6. Weld tab removal	AWS-CWI ICC-SWSI	X		
Prior to Bolting (AISC 360-16 Table N5.6-1)					
	These inspections are not required for snug-tight joints				

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	1. Manufacturer's certifications available for fastener materials	ICC-SSBSI	X		
	2. Fasteners marked in accordance with ASTM requirements	ICC-SSBSI		X	
	3. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	ICC-SSBSI		X	
	4. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	ICC-SSBSI		X	
	5. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	ICC-SSBSI		X	
	6. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used	ICC-SSBSI		X	
	7. Proper storage provided for bolts, nuts, washers and other fastener components	ICC-SSBSI		X	
During Bolting (AISC 360-16 Table N5.6-2)					
	These inspections are not required for snug-tight joints. These inspections are not required for pretensioned joints and slip-critical joints, when the installer is using the turn-of-nut method with matchmarking techniques, the direct-tension-indicator method, or the twist-off-type tension control bolt method.				
	1. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required	ICC-SSBSI		X	
	2. Joint brought to the snug-tight condition prior to the pretensioning operation	ICC-SSBSI		X	
	3. Fastener component not turned by the wrench prevented from rotating	ICC-SSBSI		X	
	4. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges	ICC-SSBSI		X	
After Bolting (AISC 360-16 Table N5.6-3)					
	Document acceptance or rejection of bolted connections	ICC-SSBSI	X		
Other Inspection Tasks (AISC 360-16 Section N5.8)					
	1. Verify compliance of fabricated steel with the details shown on the approved shop drawings.	PE/SE		X	
	2. Verify compliance of the erected steel frame with the details shown on the approved erection drawings, including braces, stiffeners, member locations and joint details.	PE/SE		X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	3. Anchor rods and other embedments supporting structural steel				
	a. Verify the diameter, grade, type and length of the anchor rod or embedded item.	ACI-CCSI		X	
	b. Verify the extent or depth of embedment into the concrete.			X	
	4. RBS requirements, if applicable (ref: AISC 341-16)				
	a. Contour and finish			X	
	b. Dimensional tolerances			X	
	5. Protected zone—no holes and unapproved attachments made by fabricator or erector, as applicable (ref: AISC 341-16)	PE/SE		X	
	6. H-piles - Protected zone—no holes and unapproved attachments made by the responsible contractor, as applicable (ref: AISC 341-16)			X	
Concrete Construction (ref: IBC-21 Table 1705.3)					
X	1. Inspect reinforcing steel, including prestressing tendons, and placement.	ACI-CCSI ICC-RCSI		X	Prior to each pour
X	2. Inspection of reinforcing steel welding in accordance with Steel Construction section above.	ACI-CCSI ICC-RCSI		X	50% of welds
X	3. Inspection of anchors cast in concrete.	ACI-CCSI ICC-RCSI		X	Prior to each pour
X	4. Inspection of anchors post-installed in hardened concrete members.	ACI-CCSI ICC-RCSI		X	50% of anchors
X	5. Verify use of approved design mix.	ACI-CCSI ICC-RCSI		X	Prior to each pour
X	6. Prior to placement fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	ACI-CCSI ICC-RCSI	X		
X	7. Inspect concrete and shotcrete placement for proper application techniques.	ACI-CCSI ICC-RCSI	X		
X	8. Inspect for maintenance of specified curing temperature and techniques.	ACI-CCSI ICC-RCSI		X	After each pour
	9. Inspection of prestressed concrete:				
	a. Application of prestressing forces		X		
	b. Grouting of bonded prestressing tendons in the seismic-force-resisting system.		X		
	10. Erection of precast structural members			X	
	11. Verification of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
X	12. Inspection formwork for shape, location and dimensions of the concrete member being formed.	ACI-CCSI ICC-RCSI		X	Prior to each pour
Masonry Construction (ref: IBC-21 Section 1705.4)					
	1. Inspect masonry construction in accordance with IBC-21 Section 1705.4 and TMS 602-16				
Level A Quality Assurance					
	Tests: None.				
	Inspection: Verify compliance with the approved submittal and project specifications.			X	
Level B Quality Assurance					
	Tests:				
	1. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-16 Specification Article 1.5B.1.b.3 for self-consolidating grout.	ICC-SMSI			
	2. Verify f'_m and f'_{aac} in accordance with TMS 602-16 Specification Article 1.4B prior to construction, except where specifically exempted.	ICC-SMSI			
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.	ICC-SMSI		X	
	2. At the start of masonry construction, verify:				
	a. Proportions of site-prepared mortar.	ICC-SMSI		X	
	b. Construction of mortar joints.			X	
	c. Grade and size of prestressing tendons and anchorages.				
	d. Location of reinforcement, connectors, prestressing tendons and anchorages.			X	
	e. Prestressing technique.			X	
	f. Properties of thin-bed mortar for AAC masonry. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	3. Prior to grouting, verify:				
	a. Grout space is clean.	ICC-SMSI		X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages.			X	
	c. Placement of reinforcing and connectors, and prestressing tendons and anchorages.			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	d. Proportions of site-prepared grout and prestressing grout for bonded tendons.			X	
	e. Construction of mortar joints.			X	
	4. During masonry construction, verify:				
	a. Size and location of structural members.	ICC-SMSI		X	
	b. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames, or other construction.			X	
	c. Welding of reinforcement.		X		
	d. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).			X	
	e. Application and measurement of prestressing force.		X		
	f. Placement of grout and prestressing grout for bonded tendons is in compliance.		X		
	g. Placement of AAC masonry units and construction of thin-bed mortar joints. (Continuous inspection is required for the first 5000 square feet of AAC masonry. Periodic inspection is required after the first 5000 square feet of AAC masonry.)		X	X	
	5. Observe preparation of grout specimens, mortar specimens and/or prisms.	ICC-SMSI		X	
Level C Quality Assurance					
	Tests:				
	1. Verify f'_m and f'_{aac} in accordance with TMS 602-16 Specification Article 1.4B prior to construction, and for every 5000 square feet during construction.				
	2. Verify proportions of materials in premixed or pre-blended mortar, prestressing grout, and grout other than self-consolidating grout as delivered to the project site.				
	3. Verify slump flow and Visual Stability Index (VSI) as delivered to the project site in accordance with TMS 602-16 Specification Article 1.5B.1.b.3 for self-consolidating grout				
	Inspection:				
	1. Verify compliance with the approved submittals and project specifications.			X	
	2. Verify:				
	a. Proportions of site-prepared mortar, grout and prestressing grout for bonded tendons			X	
	b. Grade, type and size of reinforcement and anchor bolts, and prestressing tendons and anchorages			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
	c. Placement of masonry units and construction of mortar joints.			X	
	d. Placement of reinforcement, connectors and prestressing tendons and anchorages.		X		
	e. Grout space prior to grouting.		X		
	f. Placement of grout and prestressing grout for bonded tendons.		X		
	g. Size and location of structural elements.			X	
	h. Type, size and location of anchors, including other details of anchorage of masonry to structural members, frames or other construction.		X		
	i. Welding of reinforcement.		X		
	j. Preparation, construction and protection of masonry during cold weather (temperature below 40°F) or hot weather (temperature above 90°F).			X	
	k. Application and measurement of prestressing force.		X		
	l. Placement of AAC masonry units and construction of thin-bed mortar joints.		X		
	m. Properties of thin-bed mortar for AAC masonry.		X		
	3. Observe preparation of grout specimens, mortar specimens and/or prisms.		X		
Wood Construction (ref: IBC-21 Section 1705.5)					
	1. Inspect prefabricated wood structural elements in accordance with Section 1704.2.5	PE/SE		X	
	2. High load diaphragms:				
	a. Verify sheathing grade and thickness.			X	
	b. Verify nominal size of framing members at adjoining panel edges.			X	
	c. Verify nail or staple diameter and length.			X	
	d. Verify number of fastener lines.			X	
	e. Verify spacing between fasteners in each line and at panel edges.			X	
	3. Shearwalls:				
X	a. Verify sheathing grade and thickness.	PE/SE		X	50% and one of each unique condition
X	b. Verify nominal size of framing members at adjoining panel edges.			X	50% and one of each unique condition
X	c. Verify nail or staple diameter and length.			X	50% and one of each unique condition
	d. Verify number of fastener lines.			X	

Required?	Structural Test or Special Inspection	Required Qualifications	Continuous	Periodic	Frequency of Periodic Test or Inspection
X	e. Verify spacing between fasteners in each line and at panel edges.			X	50% and one of each unique condition
X	f. Location and size of holdowns.			X	100%
	4. Verify nailing, bolting, anchoring and fastening of:				
X	a. Drag struts and collectors.	PE/SE		X	100%
	b. Braces.			X	
X	c. Hold-downs.			X	100%
	5. Metal-plate-connected wood trusses spanning 60 feet or greater:				
	a. Verify temporary installation restraint/bracing installed in accordance with the approved shop drawings.			X	
	b. Verify permanent individual truss member restraint/bracing installed in accordance with the approved shop drawings.			X	
Soils (ref: IBC-21 Table 1705.6)					
X	1. Verify materials below shallow foundations are adequate to achieve the required bearing capacity.	PE/GE		X	Once after excavation
X	2. Verify excavations are extended to proper depth and have reached proper material.	PE/GE		X	Once prior to pour
X	3. Perform classification and testing of compacted fill materials.	PE/GE		X	Once for each batch
X	4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	PE/GE	X		
X	5. Prior to placement of controlled fill, observe subgrade and verify that site has been prepared properly.	PE/GE		X	Once prior to backfilling
Wind Resistance (ref: IBC-21 Section 1705.11)					
X	1. Provide inspections when required by Section 1705.11.	PE/SE		X	