



## Off-Site Construction: Coordination of Fabrication and Building Site Inspections

Code officials discourage the use of off-site construction due to lack of familiarity with the process and how code compliance is verified. This fact sheet will provide information for code officials and contractors regarding inspection requirements, model code and standards requirements, and variations in state plan review and inspection practices. There are many advantages of off-site construction, and increased understanding of the process will not only benefit the construction industry but also result in more sustainable, affordable, and well-constructed buildings.

### What is Off-Site Construction?

With off-site construction, panelized systems, whole-building modules, or pods are constructed in a factory setting to provide protection of materials from inclement conditions during assembly and to allow work to continue uninterrupted. Panelized systems or modular buildings may include mechanical, electrical, or plumbing system components. Alternatively, these components may be installed on-site. Off-site components can be provided as either open or closed systems. Open systems or assemblies allow all elements of the component to be inspected by the authority having jurisdiction (AHJ) at the building site. Closed systems are sealed so that inspection on the job site cannot be conducted without causing damage to the component.

- *Panelized systems* include manufactured wall or floor assemblies, structural insulated panels (SIPs), or precast panels. Some panelized systems can be open or closed.
- *Modular buildings* or whole-building modules encompass a room, an entire building, or a section (ex. half) of a building. Some buildings or modules can be open or closed.

Note: Whole building modules exclude “manufactured housing” which is regulated by the U.S. Department of Housing and Urban Development (HUD).

### States With Off-Site Construction Regulations

Thirty-nine states regulate off-site construction at the state level, which means that the off-site elements of a project are reviewed and inspected under the auspices of a state off-site construction building program. Jurisdictions reference off-site construction using different terminology such as industrialized buildings, factory-built buildings, or prefabricated buildings. Additionally, each jurisdiction has specific rules for the various types of off-site construction (volumetric or non-volumetric) and construction segment (residential, commercial, or both). Off-site building programs outline quality control protocols and requirements for third-party plan review and/or inspections (where allowed), and whether inspections can be done through remote virtual inspections (RVI). In these states, all on-site elements of projects and assembly of off-site construction components at the job site are the responsibility of the AHJ. There are 33 states that have off-site programs for commercial and residential construction (39 if we count either commercial or residential), for both plan review and inspections.

## States Without Off-Site Construction Regulations

In states without adopted statewide programs, all aspects of the project fall under the jurisdiction of local code officials. Local jurisdictions often do not have an established off-site construction program to effectively work with off-site construction projects. Jurisdictions can work with third-party providers to help smooth this process through plan review and inspections, but the process must be established on a project-by-project basis. Quality control protocols must be adopted by the AHJ prior to approving off-site construction.

## Where Do Inspections Take Place and How Many are Required?

In the United States, the requirements for off-site construction vary from state to state. Off-site construction projects typically are not constructed in the same jurisdiction where the building is ultimately sited, and each location may follow different code requirements. However, it is important to note that it is the code requirements and other policies in place at the project's final site that must be met.

Because the fabrication of off-site components happens in a factory, there must be a robust inspection process to assure that what is delivered to the job site meets the local code requirements. This is done through an in-factory inspection and quality assurance process. As discussed above, specific requirements can vary from jurisdiction to jurisdiction, but best practices have been captured in standards developed by the International Code Council and the Modular Building Institute (ICC/MBI 1200 Standard for Off-Site Construction: Planning, Design, Fabrication, and Assembly and 1205 Standard for Off-Site Construction: Inspection and Regulatory Compliance.)



*Photo: Modular Building Institute*

In general, factories must be approved by the state which includes requirements for a quality assurance/quality control program. Where allowed, third-party review and inspection agencies are also approved by the state to act on the state's behalf and under their oversight. State employees or approved third-party agencies review the factory quality programs regularly and inspect the factories to ensure they are being followed. Additionally, the third-party agency or the state reviews and approves the plans for off-site construction projects and then performs in-factory inspections of the fabricated components. If everything is in compliance the component is issued a decal indicating such compliance. The component also often has a data plate indicating key characteristics including the code it meets and specific load requirements.

The number and frequency of inspections in the factory may vary based on state requirements and the nature of the components being produced. However, the inspection schedule has been determined by the state and third-party agency to assure delivery of safe, resilient and sustainable buildings. Required on-site inspections should not change due to off-site construction, but coordination is needed with the delivery of off-site components and on-site inspections to avoid schedule delays (off-site assembly can happen on accelerated timelines and in tighter timeframes when compared to on-site projects). Typical new building inspection checklists include foundations,



site drainage, framing, insulation, roof, electrical, HVAC, plumbing, fire protection, and final. Some of these inspections may be exclusively conducted on-site (e.g., foundations and site-work) while others may be done both in the factory and on-site (e.g., framing, insulation, electrical, HVAC, plumbing and fire). On-site inspectors for off-site projects have the added responsibility to verify that the off-site components have the necessary labels indicating they went through the plan review and in-factory inspection process and have arrived to the job site undamaged. Local AHJs also need to inspect the connections of off-site components with each other and with site-built components (structural, MEP, fire, etc.). Inspection checklists should identify which inspections are to be performed off-site and which inspections are to be performed at the building site.

### Who Inspects Off-Site Construction?

Some state and local AHJs adopt policies for off-site construction inspections, particularly projects constructed mostly outside of the jurisdiction, whereas others have a project-by-project protocol. Both approaches describe the responsibilities of inspectors, builders, and fabricators. During the plan review phase, builders should identify the off-site construction facility. It is important to know that the off-site construction must be built to the adopted code requirements of the jurisdiction where the building site is located.

- *State or local Inspectors:* Training in the aspects of off-site construction inspections is important to have consistent recordkeeping and communications with fabricators and builders. Off-site inspections may employ remote virtual inspections (RVI).
- *Third-party inspectors:* Many AHJs rely on third-party agencies in the off-site construction location to inspect the work. Seventy-five percent of states require use of third-party inspectors for at least some types of off-site construction. A third-party inspector certifies factory quality, provides plan review and audits the materials and assemblies. Third-party inspectors are reviewed and approved by the state, covered by third-party insurance, and are often accredited by accreditation bodies to ISO standards.

When off-site construction components or modules arrive at the building site, labels will be found affixed in a conspicuous location verifying that the off-site construction has been inspected for compliance with locally adopted codes. Documentation verifying what has been inspected at the off-site construction facility will confirm what needs to be inspected at the building site by the AHJ.

### Third-Party vs. State Plan Reviews and Inspections

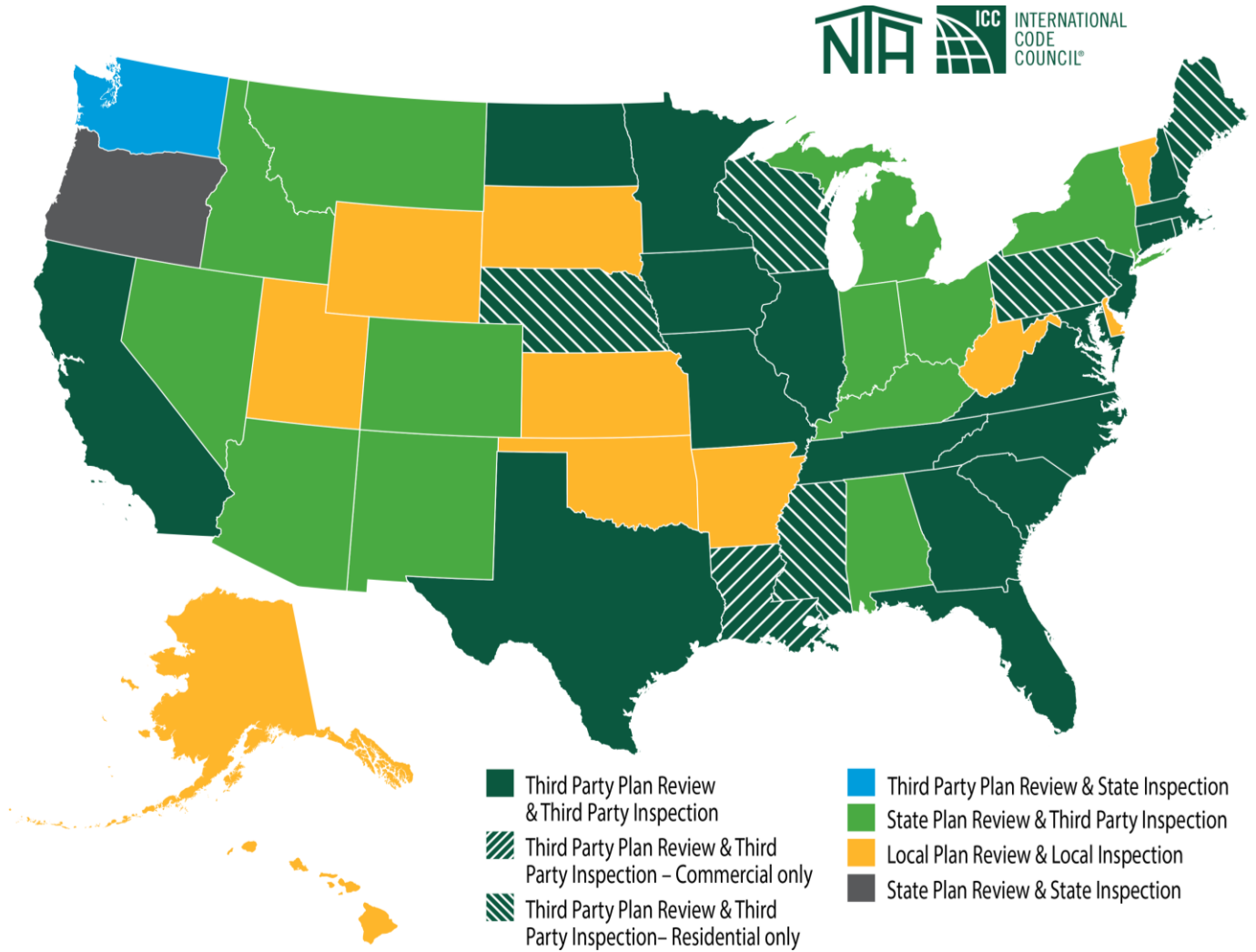


Figure 1: State Regulation of Off-site Construction, as of January 2022, International Code Council, NTA