Chairperson Lofgren, Ranking Member Davis, and Members of the Committee:

Thank you for the opportunity to discuss the Architect of the Capitol's (AOC) efforts to renovate the Cannon House Office Building (Cannon project). AOC intends to preserve the historic character of and address deterioration to components and systems in the 111 year-old Cannon Building, and improve the functionality of suites for members of the House of Representatives (Members). The Cannon project is nearing the mid-point of its planned 10-year duration.

My statement today provides information on (1) the status of the Cannon project and (2) changes to the project's estimated cost at completion. It is based on our 2009 and 2014 assessments of AOC's planning and cost estimating for the Cannon project prior to the start of construction as well as our observations made during construction to support congressional oversight of the project.[1] Detailed information on the scope and methodologies for our 2009 and 2014 reports can be found in GAO's published products, which are cited throughout this testimony. Our ongoing observations of the construction have included reviews of AOC's project summary reports, construction contractor reports, and other project documentation and recurring discussions with AOC and contractor officials as well as other project stakeholders.

We conducted the work on which this statement is based in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

The Cannon Building, completed in 1908, is the oldest congressional office building and occupied by Members and their staffs. (See fig. 1.) The Cannon Building houses 142 office suites, five conference rooms, four hearing rooms, and the Caucus Room, which can

[1]GAO, *Architect of the Capitol: Plans for Renovating the Cannon House Office Building and Garages,* GAO-09-673T (Washington, D. C: May 6, 2009) and *Architect of the Capitol: Incorporating All Leading Practices Could Improve Accuracy and Credibility of Projects' Cost Estimates*, GAO-14-333 (Washington, D. C.: Mar. 25, 2014). In our 2014 report, we found that AOC's cost estimating policies and guidance did not require a quantitative risk and uncertainty analysis nor the reporting of the resulting confidence level of the estimate. We made recommendations for AOC to incorporate leading practices into agency guidance and submit confidence levels of cost estimates to Congress. AOC implemented our recommendations. These leading practices are listed in GAO, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Capital Program Costs*, GAO-09-3SP (Washington, D. C.: Mar. 2, 2009).

accommodate large meetings. The building also includes a library, food servery, and a health unit.

Figure 1: Cannon House Office Building, Washington, D. C.

Source: Architect of the Capitol. | GAO-19-712T

AOC began developing the scope for the Cannon project in approximately 2004 when its consultant conducted a facility condition assessment that identified the building's deficiencies. This condition assessment identified, for example, that the hot water, heating and air-handling systems had components dating back to the 1930s that are in need of replacement. In addition, the assessment identified deficiencies such as an outdated fire alarm system for which repair parts were difficult to obtain, worn and damaged marble tile in corridors, and original windows that were damaged and often nonfunctional.

AOC continued its planning and design work through 2014 to establish the final scope of the Cannon project, which entailed correcting most of the identified deficiencies and addressing current requirements such as for energy conservation, physical security, hazardous materials abatement, and historic preservation. Key components of the project, among other things, include:

- substantial reconfiguration of member suites and the reconstruction of the building's top floor to convert storage space into new suites,
- refurbishment of windows and installation of a new roof,
- preservation of the building's stone exterior,
- replacement of all plumbing, heating and cooling, fire protection, electrical, and alarm systems, and

- refurbishment of restrooms to make them more accessible to people with disabilities.

As part of the development process for the Cannon project, AOC established a budget of approximately $753 million. Key components of the budget include costs for the construction contract; architect and engineering (A/E) design services; construction management support; security; furniture and fixtures; swing space design and construction; contractor incentive bonuses; and contingency.[2]

AOC is using the Construction Manager as Constructor (CMc) delivery method to implement the Cannon project. Under this approach, AOC:

- contracted with a construction contractor that consulted on the project's design, and
- negotiated with the construction contractor to set a "guaranteed maximum price" for the construction work based on the completed design.[3]

AOC also contracted with an A/E firm, which produced the design for the project and is providing consultation during construction, and with a Construction Manager as Agent (CMa), that provides administrative and technical support to AOC in managing the construction work.

AOC scheduled the Cannon project's construction in five sequential phases with an initial phase (Phase 0) for utility work and four subsequent phases (Phases 1 through 4) to renovate the north-, south-, east-, and west-facing sides of the building. Each phase is scheduled around a 2-year congressional session. As the project progresses, tenants displaced during construction (Phases 1 through 4) are to move to temporary offices while other occupants are to remain in the building sections not affected by construction.

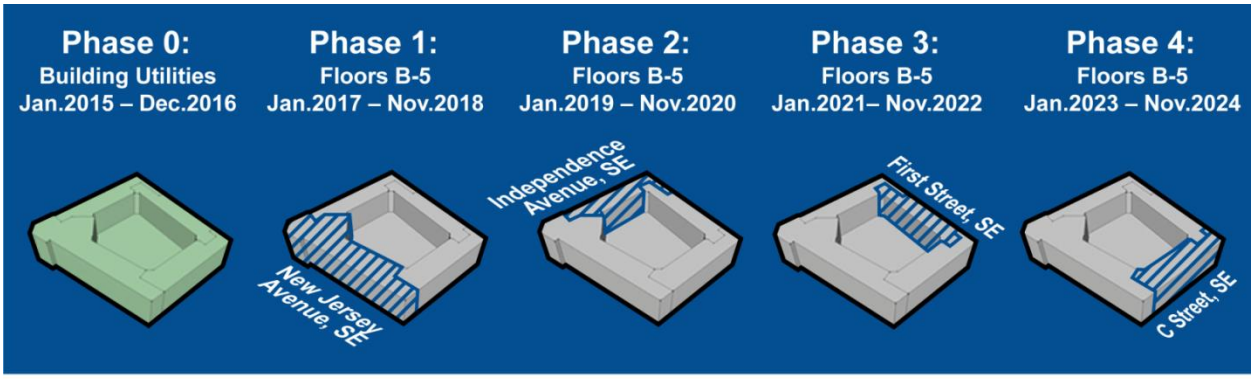
AOC Has Completed Two of Five Phases of the 10-Year Cannon Project

Currently, AOC has substantially completed Phase 0 and Phase 1 of the five phases planned for the Cannon project and is progressing with work on Phase 2, which it expects to complete in November 2020. (See fig. 2.)

[2]We are not providing details on project costs because some costs relate to open contracts, and information about contract costs is procurement sensitive.

[3]A guaranteed-maximum-price contract sets the maximum price (GMP) that the AOC will pay the CMc for work associated with the Cannon project. The GMP does not include changes to the project's scope that require modifications to the design and an upward or downward price adjustment. For example, if the A/E modifies the design, the AOC negotiates the cost of changes in the project's scope with the CMc.

Figure 2: Planned Cannon Office Building Renewal Phases



Source: GAO. | GAO-19-712T

AOC completed Phase 0, as planned and under its budget estimate, from January 2015 through December 2016. This work primarily included the construction contractor's replacement of the utility infrastructure and distribution systems in the basement, garage, and courtyard. During this time, AOC also managed the work of its Construction Division to build 31 additional Member Suites to offset the suites that would be inaccessible when sections of the building were under construction.

From January 2017 through December 2018, AOC managed the renovation of the first of four building sections, consisting of the building's West side (facing New Jersey Avenue) and Rotunda (Phase 1). AOC substantially completed Phase 1 to enable occupancy of the building section, as planned, on January 3, 2019, at the start of the 116th Congress. However, it is continuing to address "punch-list" items of incomplete or corrective work from Phase 1. AOC expects to complete the punch-list items by December 2019. Further, AOC encountered several issues during the Phase 1 renovation that have prevented it from settling the costs for this phase and that will affect the cost of the project's later phases. According to AOC's most current (July 2019) *Executive Summary*, unforeseen conditions, design issues, and scope changes have increased both the estimated cost for Phase 1 and the project's three remaining phases. For example, AOC found that more extensive exterior stone restoration was needed than planned and encountered some unforeseen asbestos-containing materials in the roof that it needed to mitigate. Further, AOC needed to provide additional security features to address U.S. Capitol Police requests. Collectively, these issues are creating cost pressures that have caused AOC to reassess the cost to complete the project. We discuss the project's costs in greater detail later in this testimony.

AOC is currently progressing, as planned, in renovating the north side of the building (facing Independence Avenue), which is the second of the four building sections to be renovated (Phase 2). Because the work in this phase and the Cannon project's remaining phases is similar to work completed in Phase 1, AOC expects to benefit from its application of lessons learned. For example, AOC reported that its construction contractor experienced challenges installing the temporary roof enclosure that it used in Phase 1. Based on this experience, AOC officials told us that the contractor developed a new design for the temporary roof enclosure that the contractor expects to install more rapidly in the project's remaining phases than in Phase 1.[4] Further, because the materials in Phases 2 through 4 are the same as in Phase 1, AOC officials expect that the process of approving the construction contractor's use of these materials should proceed faster in these later phases and enable construction to progress more efficiently.

AOC Had Consistently Estimated the Cannon Project Cost to be $753 Million, But Recently Increased Its Estimate

In 2009, we reported that AOC expected to request approximately $753 million for the Cannon project.[5] At the time, AOC expected the project to be in five phases over 5 years. Because the project was in an early development stage at that time, we said:

- that AOC's estimate should not be considered sufficiently accurate for funding purposes,
- that the cost and scope were likely to change, and
- that it would be important for AOC to continue to refine the project's scope and cost estimate to provide Congress with the information it needed to make decisions about the project.

When we next reported on the Cannon project in 2014, AOC had completed most of the planning and design and was preparing to award the contract for construction, which was to

[4]In Phase 1 of the Cannon project, the contractor's approach was to anchor the temporary roof enclosure to the building, a process that necessitated a lengthy engineering analysis to determine the amount and location of anchor points. In Phase 2 of the project, the contractor intends to anchor the temporary roof enclosure to the scaffolding placed adjacent to the building. The contractor expects that the engineering analysis to determine how to anchor the roof enclosure to the scaffolding will be comparatively simpler and take less time.

[5]GAO-09-673T.

begin in January 2015.[6] As part of our 2014 review of AOC's cost estimating policies and guidance, we compared AOC's cost estimate for the Cannon project—still $753 million—to our leading practices for developing high-quality, reliable cost estimates.[7] We found the AOC's cost estimate reflected several, but not all, of our leading practices. In particular, we found that AOC's estimate included ground rules and assumptions; provided a reasonable explanation of the basic estimation methodologies; and integrated separately produced estimates from AOC's architect, construction manager, and construction contractor to enable a reasonably accurate assessment of estimated costs. Further, we found AOC had conducted a cost risk and uncertainty analysis in accordance with a key leading practice.[8] This analysis concluded that based on AOC's inputs and assumptions, there was a high probability (over 90 percent) that actual costs would be equal to or less than AOC's $753 million estimate.[9] This estimate included contingency factors to account for risks and uncertainties. However, our review of AOC's guidance for developing cost estimates found that the guidance did not provide documented reasons explaining how the actual contingency amounts were developed. In addition, we found that the method AOC used to model the project's risks in its cost risk and uncertainty analysis (1) resulted in an unusually narrow range of estimated costs and (2) provided managers limited ability to understand the effects of individual risks. We recommended that AOC improve its cost-estimating process, such as by incorporating leading practices we identified as lacking for cost estimating into its cost-estimating guidance and policies. AOC has since implemented our recommendations.

In January 2018, while Phase 1 of the Cannon project was in progress, AOC updated its analysis of risks by undertaking a study (termed an integrated cost-schedule risk analysis) to

[6]GAO-14-333.

[7]GAO-09-3SP.

[8]AOC, *Cannon House Office Building Renewal: Cost Risk and Uncertainty Analysis; Sensitivity Analysis* (Jan. 17, 2014 – Draft).

[9]The probability of an estimate's likelihood of occurrence can be used to establish confidence levels for budgeting purposes. While no specific confidence level is considered a best practice, experts agree that cost estimates should be budgeted to at least the 50 percent confidence level, but budgeting to a higher level (for example, 70 percent to 80 percent, or the mean) is common practice. Moreover, experts stress that contingency reserves are necessary to cover increased costs resulting from unexpected design complexity and incomplete requirements, among other factors. (See GAO-09-3SP).

determine the potential effects of these risks on the project's cost and schedule.[10] Updating risk analyses and their effect on project cost estimates is consistent with leading practices for developing both a high-quality, reliable cost estimate and schedule.[11] AOC's 2018 analysis arrived at the same conclusion as its 2014 analysis—that the estimated $753 million total project cost was adequate and that there was a high probability (over 80 percent) that actual costs would be equal to or less than the $753 million estimate. However, this analysis was qualified on the assumption that AOC and project stakeholders are able to adequately mitigate risks identified through the analysis. Additionally, the analysis indicated that inaccurate estimates of costs for risk mitigations, currently unknown risks, and optimistic assumptions about the impact of risk mitigations on the project's cost and schedule could affect the project's total cost.

As noted previously, the project is experiencing cost pressures from the greater-than-anticipated risks and ineffective mitigations stemming from unforeseen conditions, design issues, and scope changes. In June 2019, AOC reported that it expects that the cost to complete the Cannon project will increase by 10 to 15 percent over its initial estimate of $753 million, resulting in a final cost between approximately $828 million and $866 million.[12] AOC reported that the following key factors affect the project's cost:

- Phase 1 completion costs. While Phase 1 work has been substantially completed, AOC has yet to settle all outstanding change proposals. AOC reported that the cost to complete Phase 1 is greater than it initially planned and that it will not know the final cost for this phase until it completes negotiations of the cost of unsettled change proposals.
- Phase 2 modifications. While Phase 2 work has begun, AOC is awaiting the contractor's proposal on the costs to address the requirements outlined in four "design bulletins" issued by AOC that, in part, describe changes to the project's scope based on lessons learned in Phase 1. AOC estimates that the contract modifications described by the design bulletins will increase the cost of Phase 2.

[10]AOC, *Cannon House Office Building Renewal: Integrated Cost-Schedule Risk Analysis 2017* (Jan. 2018 – Prefinal Draft).

[11] GAO-09-3SP and *Schedule Assessment Guide: Best Practices for Project Schedules*, GAO-16-89G (Washington, D. C.: Dec. 22, 2015).

[12]AOC, *Program Budget Review* (June 30, 2019 Draft).

- Phase 3 and 4 modifications. AOC expects that it will award these future phases of the project at higher amounts than it initially planned based, in part, on the estimated cost of incorporating the additional work described in the design bulletins.

In August 2019, AOC began updating its integrated cost-schedule risk analysis, with the aim of more accurately determining the extent to which the project's costs are increasing and its estimated cost at completion. By updating the analysis, AOC should be better able to make informed decisions as construction progresses. Further, updating the analysis should enable AOC to more precisely estimate the Cannon project's cost at completion and better position AOC to make a more accurate budget request to Congress for remaining costs.

Chairperson Lofgren, Ranking Member Davis, and Members of the Committee, this concludes my prepared statement. I would be pleased to respond to any questions that you may have at this time

GAO Contacts and Staff Acknowledgments

If you or your staff has any questions concerning this testimony, please contact Terrell Dorn at (202) 512-6923 or dornt@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement. In addition to the contacts named above: Michael Armes (Assistant Director); George Depaoli (Analyst-in-Charge); Geoffrey Hamilton; Malika Rice; Kelly Rubin, Steve Schluth, and Amelia Michelle Weathers made key contributions to the testimony. Other staff who made contributions to the reports cited in the testimony are identified in the source products.

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