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Agency of Administration

MEMORANDUM

TO: House Committee on Corrections and Institutions

FROM: Christopher Cole, Commissioner 
Jennifer M.V. Fitch P.E., Deputy Commissioner

DATE: January 9, 2018

SUBJECT: Department of Buildings and General Services Audit Response

The Department of Buildings and General Services (BGS) recently underwent an assessment of our project delivery process by the Office of the State Auditor (SAO) including review of ten BGS capital projects recommended by the Administration and appropriated by the Legislature between 2012 and 2016. As noted in the title of the report, the Auditor found that “projects consistently exceeded cost and schedule estimates; BGS’ Process Weaknesses Hinder Its Ability to Improve Capital Project Management.” Drawing on findings from project reviews, the reports cites several weaknesses resulting in actual project costs exceeding initial cost estimates, delayed projects, scope creep, and inability to monitor program performance. The report offers 17 recommendations to address these gap areas. Rather than address these recommendations independently, the following summarizes the ongoing and planned approach to creating a streamlined, reliable, and nimble project delivery process within BGS.

We thank the SAO and all the team members that contributed to this report and subsequent findings. It has proved to be a very valuable resource as we reevaluate our approach to delivering projects and retool our processes. Most findings validated our initial observations of the Department and helped prioritize improvement initiatives.

Project Delivery Process

Successfully delivering projects is much like any other process with a series of defined activities with known durations that must be accomplished in a particular and predictable order. Omitting an activity or conducting them in the wrong sequence generally causes project delays and increased project costs. Project development process is generally broken down into three distinct phases: planning, design, and construction. Each one of these phases has a distinct goal and outcome and, if completed properly, sets the next phase up for success. At BGS, each project manager has been managing projects independently utilizing their own method to maintain the project schedule and activities. While BGS Project Managers are successful at delivering projects, this approach does present challenges to maintaining consistency and expectations as it relates to project estimates and project schedules. In addition, as a Department we have not been able to clearly define the amount of time needed to deliver a project and often we overcommit agreeing to a schedule that is not achievable. Moreover, because we lack a consistent documented process for managing projects, we are unable to learn from both our successes and failures and use the lessons learned to improve our processes. To address these challenges, we have initiated two important initiatives that will set our Design and Construction (D&C) team up for success

ensuring consistency, reliability, and a method to incorporate lessons learned; a project delivery procedures manual and achievable project schedules. These are described in greater detail below:

Project Delivery Procedures Manual

As with any process, a procedures manual is essential to ensure a consistent approach by all employees, transparency, knowledge transfer, and succession planning. Procedures manuals are meant to be living documents that are periodically updated to reflect lessons learned and incorporate industry standards and best practices. While the D&C team does have an existing procedures manual, it has not been updated for many years and lacks a consistent structure and clarity. Over the past summer, the D&C team kicked off an effort to rewrite the BGS Project Delivery Procedures Manual with assistance from the other offices and divisions within BGS that maintain our facilities. To aid in this effort and hit the ground running, a query was sent to the National Association of State Facility Administrators (NASFA) requesting examples of procedures manual from other states around the country. BGS received 6 examples. The task team reviewed each example and, based on these examples, created a table of contents and format for the document. Since that time, the group has met to begin drafting the manual. In addition, procedures are often discussed during various meetings and when we identify that a new procedure is needed, we add it to our ongoing list. As new processes are developed, a procedure will be developed concurrently and added to the manual.

Project Schedules

As noted above, project schedules are essential to defining the sequence and duration of activities needed to reliably deliver projects and yet each project manager has been using their own methods resulting in activities that were accidentally overlooked or done in the incorrect sequence our inability to successfully monitor the progress of projects and the overall program performance, balance project assignments across all project managers, and accurately define how long it takes to deliver various types of projects. To tackle this gap in our process, Microsoft Project was purchased for all project managers in BGS and a training session on how to use the software was held over the summer. Since that time, the team developed three project templates with activities, durations, and sequence to reflect the size and complexity of our typical projects including Major Maintenance (MM) and Capital Bill line items projects. These project templates span the entire project delivery process including planning, design, and construction. At the onset of the project, the appropriate template will be selected by the project manager and then refined to reflect the specific project. Once the project schedule is finalized, it will be baselined (a process of saving the initial project schedule). These schedules will be updated on a weekly basis to reflect actual progress. At the beginning of each year or change in project phase, every project will be baselined again and used to report out on projects that will be advertised and/or completed that year. By referencing baselines (predicted) to actual progress, the project manager and management can easily and readily monitor progress and implement strategies to recover delayed projects and assist staff with overcoming barriers to successfully deliver projects. In addition, our initial durations for each activity are based on personal knowledge and experience. Once we have accumulated a few years of data, we will readjust durations for all activities accordingly. The templates will go into effect at the beginning of 2018. In addition, the D&C team has committed to using these project schedules to report out on a new key performance indicator (KPI) that 80% of all projects will be advertised within 30 days of the predicted advertising date (when comparing the baseline from the beginning of the year to the actual time the project was advertised). This KPI will be going into effect in 2018 as well.

Project Scope, Cost Estimates and Change Orders

Other gap areas identified by the Audit Report include what is commonly known as scope creep and actual costs that exceed project estimates. Scope creep is a term that describes uncontrolled changes or continuous growth in a project's scope, often occurring when the scope of a project is not properly defined, documented, or controlled. An underdefined scope and scope creep results in actual projects costs that often exceed initial cost estimates. Exacerbating this problem are the usual challenges encountered during project estimating for facilities. As opposed to other types of projects, like roads and bridges, where all project components are broken down into specific line items and quantities for bidding purposes, facility projects are often advertised as a lump sum bid making it much more difficult to record and document market trends for various commodities and trades and use this data to inform future project estimates. In addition, cost fluctuations in the facilities industry is a common occurrence given global, national, and local market trends, the rise and fall of commodity prices, and current industry demands for various trades. However, BGS has developed a comprehensive approach to controlling the scope of projects, reducing the occurrence and magnitude of change orders, and decreasing or eliminating the difference between our initial estimates and actual project costs as described below:

Project Scope

As noted above, the project development is comprised of three phases: planning, design, and construction. The success of a subsequent phase is usually based on successful completion of the previous phase. If one is overlooked or not given its due diligence, it often creates errors and omissions leading to scope creep, delayed projects, and cost overruns. Typically, the first phase of the project delivery, known as planning, is often underemphasized for its role in the process and the success or failure of a project. Yet, it is one of the most important as it defines the scope of the project including goals, project constraints, an initial cost estimate, and project delivery timeframe. It's human nature to want to jump into the design phase and begin to solve the problem without knowing all the potential barriers and conflicts that may arise. To provide a greater focus on, not only the planning, but all phases of project delivery, BGS reorganized in the spring of 2017 to create a Planning Section within the newly formed Planning and Property Management Division as well as a Design and Construction Division. Forming these new teams allows leadership within BGS to better allocate resources, create and ensure consistency, more easily identify opportunities to streamline the process, and monitor project and program performance.

In addition, BGS added a new line item in the FY18/19 Capital Bill called "Planning, Reuse, and Contingency." This line item will allow BGS to conduct feasibility studies. Simply stated, feasibility studies are preliminary studies used to define the scope of a project and includes initial programming to determine the needs of our clients and associated project requirements, identifies potential barriers that may be encountered during the design and construction phases, assesses various alternatives, and provides a recommended alternative along with an associated ballpark cost estimate and project delivery timeframe. In addition to this line item, BGS will identify specific feasibility studies in future Capital Bill appropriation requests. Finally, to contain the scope through all phases of design and construction, the Commissioner of BGS as well as the affected client(s), will sign off on a "Management Approval of Scope" (MAOS) form which will document the intent of the project and creates a mutual understanding and agreement of all project requirements. If additional requirements are requested by our customers in design and/or construction, this tool will allow BGS to reference our initial agreement and make more informed decisions about the best way to proceed and associated funding source. To

that end, a feasibility report template and MAOS form was developed and implemented during the summer of 2017.

Cost Estimates

As noted previously, cost estimating for building projects is extremely challenging and requires significant industry knowledge and experience. Challenges include the type of bid (lump sum vs. line item and quantity), the lapse of time between the initial estimate and actual construction, changing market trends for commodities and trades, and contractor/subcontractor availability (as the population in Vermont is relatively small in comparison to most other states, so is the pool of available building contractors and subcontractors). While estimating software is available, BGS has found the results to be inaccurate for our projects given the diversity of our building infrastructure including age, type, construction methods that were used at the time of construction, and location of the facility. Traditionally, BGS has used a square foot method at the initial stages of project delivery. With this method, project managers identify a similar structure that was recently constructed or renovated, divide the project cost by the square footage of the building, and then multiple the square footage of the newly proposed facility. In some cases, project managers will also multiply this number to account for numerous factors such as location (like urban area such a Chittenden County where prices are expected to be higher as compared to a rural region like Windsor County), time of year the facility will be constructed or renovated, and anticipated number of years between the initial cost estimate and actual construction to attempt to account for inflation. To counterbalance for these unknowns, engineers and architects often include a contingency on top of the initial cost estimates. In the preliminary stages of project development, it's common in the industry to use a contingency of 25% to 100%. However, previous leadership has encouraged using a small contingency so BGS could fund more projects. But this has only exacerbated the differential between initial cost estimates and actual project costs often resulting in requests for additional appropriations prior to and during the construction phase.

To improve our cost estimates, BGS has brainstormed several strategies and developed a planned approach that includes a series of initiatives. First to develop an accurate contingency percentage, BGS is undertaking an examination of previous projects completed over the past ten years. We have begun to pull together a database that will include the initial cost estimate, contract documents cost estimate, initial bid amount, and final project cost (inclusive of all change orders) as well as project type, location, and other project characteristics. Once the data is compiled, a statistical analysis will be performed to identify trends and provide recommendation for contingency amounts for distinct types of projects. For example, if the data revealed that for new build projects, that the difference between our initial cost estimate and actual project cost is 25% on average, then we would add 25% onto the initial cost estimate. In addition, BGS will research industry best practices for developing initial cost estimates and develop a procedure for all project managers. This will provide uniformity. Finally, BGS is developing a retainer contract to hire independent cost estimators. This will allow BGS to acquire independent cost estimates at any stage in the project development process and compare them to cost estimates developed internally and by consultants. The deliverable will include obtaining all calculations which can in turn be used internally to inform cost estimating techniques within BGS.

Change Orders

Change orders refer to an amendment to a construction contract and are a common occurrence in all types of construction projects including buildings, roads, and bridges. Change orders encompass a change in the work, a

change in the price, or a change in the schedule. Usually, there's changes to more than one, and often more than one change. Although change orders often have a negative connotation associated with them, they can also represent a positive change to the initial contract agreement such as value engineering, a term used to describe a proposed change from a contractor that results in a savings to them as well as the owner. As noted in the Audit findings, change orders are often derived from "code compliance, unforeseen site condition, and/or tenant or building owner requests." With an emphasis on planning and attaining customer acceptance of the agreed upon scope in the initial stages of project development, the number and severity of change orders is expected to decrease. In addition, BGS is going to reinstate a design review process at the end of schematic design and 90% complete construction documents to identify and correct plan errors and omissions. This will increase the quality of our plans sets and specifications prior to advertising and should also decrease the number of change orders. However, there is no way to eliminate them completely nor would we want to as in many cases the State receives a higher quality project due to the change order. Findings from the report also noted that "the department has not established and defined categories to be used to classify change orders. Lacking this guidance, project managers might use the same reason to describe dissimilar circumstances." To ensure consistency in both documenting all change order and maintaining a consistent language, BGS has been gathering requirements for a project development tracking system. It is intended that this system will track change orders and the reasons for the change order in a systematic format allowing leadership to easily identify opportunities for improvement. For example, if the data revealed that 25% of change orders are due to unforeseen site conditions, we may identify additional parameters that should be examined during the planning phase.

Documentation, Program Performance, and Incorporating Lessons Learned

The SAO noted a lack of project documentation throughout their findings making it difficult if not impossible to identify the root cause of many of their findings related to schedule delays and inaccurate cost estimates. In addition, without a project tracking system it is also challenging to monitor both project and program performance as well as readily identify opportunities for improvement and incorporate lessons learned. Leadership within BGS agrees with these findings and are establishing a list of requirements for a project tracking system that includes, but is not limited to, general project characteristics, funding source, project milestones, project estimates, actual project costs and change orders and the reasons for the change orders. This system will be used by all project managers within BGS and allow leadership to track project and program performance. In addition, to ensure uniformity across the department in project documentation and file storage, BGS has developed a proposed project file structure that will be housed either on our internal shared drive or on SharePoint. This will ensure that all project managers save all project documentation in the correct location that can be easily accessed by anyone in our department. In addition, there are often times when reviewing and referencing prior facility documentation helps inform the future planning, design, and construction projects for repairs and renovations. Finally, BGS plans to implement an "After Project Review" with the project manager, design team, and contractor. This roundtable discussion will allow the team to identify what worked well and what needs improvement. This will also help to incorporate lessons learned into our project development process as well as identify other opportunities for improvement both at the project and program level.

Contracting

While the central focus of the report was on the project development process, the Audit report did note some "procurement and contracting issues" related to a "failure to competitively bid" and a discrepancy with respect to

our project manager's ability to "bind the state." As is the case with sole source procurement and contract amendments, there are irrefutable reasons for utilizing these two contracting methods. As for sole source contracts, many of our building systems and types of facilities requires a specific skill or knowledge base to successfully repair or install new equipment. This is quite common in the industry when working with outdated systems as well as new innovative systems. In addition, facilities such as correctional facilities and mental health care facilities have strict requirements for when and how an outside vendor may work on these facilities due to the residing population and associated risks. In these situations, a sole source contract may be warranted. The Administration takes great care and scrutiny in reviewing and approving the use of sole source contracts. Contract amendments during the design and construction phases of project development are quite common for architecture and engineering services. At the onset of a project, it is very difficult for a firm to determine the full scope of services, associated activities, and hours without completing the previous phase of development. Therefore, design services are usually broken into the same phases as project development. In addition, it is far more efficient and cost effective for the same firm to provide architecture and engineering services throughout the life of the project given their level of familiarity with the project. When projects are competitively bid for each phase of planning, design, and construction, it would extend the project schedule and can add significant cost as a new firm has to come up to speed and often will redesign previous plan sets as firms like to utilize their own plan development process and do not want to accept the liability from the previous firm's design. The best and most cost-effective method is to retain the same firm assuming there are performing well on the project.

The Audit report noted: "BGS' processes for approval of contract change orders is not consistent with a requirement in statute, and the department's processes for modifications to construction contract provides a level of authority to project managers that contradicts state policy." As a result, BGS has reviewed and evaluated the referenced State statute (29 V.S.A. § 152(a)(3)(A)), Bulletin 3.3, Bulletin 3.5 and the general conditions in our construction contracts.

We do not believe our current contract change order process is in conflict with 29 V.S.A. § 152(a)(3)(A). That statute provides in relevant part: "Any change orders occurring under the contracts let as the result of actions previously mentioned in this section shall not be allowed unless they have the approval of the Secretary of Administration." That statute does not require the Secretary review every change order, but merely requires change orders "have the approval" of the Secretary. Secretary approval had traditionally been provided by operation of the BGS Contracting Waiver Plans that approved of BGS's change order process, when coupled with the general review and approval thresholds otherwise established in *Bulletin 3.5*. In addition, Bulletin 3.5, Part IX(A)(9) now specifically authorizes all State departments to establish a change order process in construction contracts, provided BGS/OPC template language is used (e.g. BGS general conditions change order language). No further Secretary review or approval is required unless there is: (1) a deviation from that approved process; or (2) a consolidation of change orders into a contract amendment that otherwise requires Secretary review and approval under Bulletin 3.5.

However, we agree that existing language in our construction contract general conditions could create the appearance of an improper delegation of authority inconsistent with Bulletin 3.3. But, due to the practical realities of managing construction contracts, project managers do need to have the ability to communicate the State's position and directions related to all contract work and to coordinate all change orders with the BGS Commissioner as deemed necessary. This is vital to the success of our projects. One example includes unidentified or misidentified underground utilities; if a municipal or private underground water main or sewage

pipe is damaged by a contractor, an immediate resolution must be overseen by the project manager consistent with the BGS Commissioner's direction. To ensure no improper delegation of authority, but also to address the practical realities of managing construction contracts, we will modify the project manager language in our existing contract general conditions as follows:

3.2.1 The State will identify a Project Manager for the Project. The Project Manager will be the sole point of contact between the Contractor and the State. The Project Manager ~~is~~ will be the State's representative ~~who has authority~~ authorized to bind the State with respect to all matters requiring the State's approval or authorization ~~communicate the State's position and directions related to all contract work and to coordinate all change orders with the Commissioner of Buildings and General Services as deemed necessary.~~

In addition to the above, BGS will also establish general guidelines to ensure uniformity in the approval process based on urgency, scope, and cost. The guidelines will also address proper notification.

Performance Measures

Throughout the report, the SOA points out that the Design and Construction Division lacks performance measures and key performance indicators (KPIs). Generally, KPIs place emphasis on various aspects of a program to define whether the program is successful and to help more easily identify areas for improvement. Over the summer of 2017, using PIVOT principles and RBA, all the office and divisions within BGS developed KPIs including D&C. They are as follows:

- Implement project scheduling software
- 80% of projects advertised within 30 days of the bid date
- Cost of change orders relative to the awarded contract cost
- Source of change orders:
 - a. Client
 - b. Unforeseen Conditions
 - c. BGS/Owner-initiated
- Implement plan review at different design phases

These will be instituted during 2018 and monitored on a quarterly basis. Each of these KPI's are intended to create credible schedules, initial construction estimates that more closely match actual project costs, and review plans before going out to bid.

Concluding Remarks

The new leadership team at BGS, because of our familiarity with project management, recognized several of the deficiencies identified in the SAO's report and had begun identifying continuous improvement opportunities for the Department prior to the release of the audit findings. The SAO report on the project development process confirmed some of our initial observations and provided a road map to create a better documented project development process that ensures efficiency and transparency into BGS project decision making.

Once again, we thank the SAO for their meaningful and thorough investigation and associated findings. It has reinforced our efforts and provided motivation and momentum for our project development team.