

SECTION 4 – COST AND SCHEDULE CONTROL

Based on the information herein provide your opinion of anticipated overall duration of construction for this project. Provide associated development details regarding anticipated major milestones, critical path, and avoidance of conflicts between subcontractors. For schedule considerations, Applicants can assume that Sanford Dam, Upper Lake Dam, and Pine Lake Dam can be constructed concurrently. The closure of East Boiling Spring Road atop North Lake Dam is not allowed until Alton Lennon Road atop Sanford Dam has been reconstructed and opened. More details regarding potential maintenance of traffic routes for this project can be found in the Industry Day presentation on the City's website. The Applicant's opinion of anticipated construction duration will not affect consideration for prequalification.

The reconstruction of the four dams presents many schedule challenges and opportunities. With work occurring at four separate locations, the duration of the job will largely depend on the amount of resources applied to the work and the availability of satisfactory material for embankment.

Kiewit has a wide range of experience in managing multiple job sites as part of larger project. For the Mountain Run Dams Project, two separate dam spillways were being replaced concurrently in the town of Culpepper, VA. Depending on the needs of the schedule, resources like equipment, craft labor, formwork, and materials could be shuffled between the two separate locations to keep the project progressing and on schedule. When the demands of the schedule increase, Kiewit also has the nationwide presence to bring the bear whatever resources are needed to meet a deadline. When damage occurred at Oroville Dam, prompting the evacuation of thousands of people living downstream, Kiewit was able to quickly mobilize hundreds of pieces of equipment and an experienced staff to perform an emergency repair of the spillway.

For this project, there is opportunity in the fact that the only schedule restriction is that the work at Sanford dam must be completed prior to the work starting at North Lake Dam. This allows for work to be progressed concurrently at Sanford, Upper Lake, and Pine Lake Dams. If enough resources are committed to progress all these sites concurrently, the total duration of the job could be drastically reduced.

The desired schedule duration will greatly affect the price of bids. The allocation of additional resources to progress the work at three dam locations concurrently will increase the overall cost of the project. If the goal is to restore the dams, roadways, and utilities as quickly as possible, it suggested a Cost Plus Time or A+B bid structure be developed for this project. This would provide an incentive for contractors to include enough resources in their bids to progress the work in the fastest manner possible. If procured under a low bid type means, a project of this magnitude would go to a contractor who allocates minimal resources to advance work at once location at a time. With the four locations, this project being built in that manner could easily stretch to over four years. With the application of adequate resources, that duration could be slashed by as much as half.

With the appropriate bid structure, Kiewit would develop a bid to complete the work in the shortest timeframe possible. The resources available within the company and outside would help drive down the schedule duration. For example, Kiewit has an internal group that self performs a wide range of foundations work including cutoff walls. This group would be utilized to perform the bulk of the foundation work and be supplemented with subcontractors to drive the schedule. The concrete work is another opportunity to apply Kiewit's resources from around the country to shorten the duration of the job. Additional crews and can be brought in to progress several headings concurrently.

Another driver of the schedule will be the embankment of the new dams. Kiewit will work with the designer and area suppliers to include a suitable import material to be utilized in the new dam embankment. This will allow for consistent fill material with the appropriate moisture content to be available for embankment year-round. Kiewit can provide any amount of equipment and personnel resources needed, but what will drive the embankment schedule will be having good material to place year-round.

In review of the initial concepts and designs, each dam would have a relatively similar and linear critical path at each location with several major milestones. Work would start with the removal or relocation of any utilities still present, followed by the installation of any bypasses, water management devices, and cofferdams. After those controls have been installed, the excavation work would begin and be followed by the foundations work. Following the completion of the foundations, embankment would begin along with the installation of the concrete structures. Once the embankment is complete, the roadway and finishing work can be completed and the traffic patterns will be restored. Kiewit has the capability to self-perform many of these operations to minimize conflicts between subcontractors and can schedule the work at the various sites to provide consistent work for any key subcontractors that are utilized.

The schedule opinions provided herein are preliminary and will evolve as more information comes available through working with all project stakeholders. Overall the schedule of the project is driven by the incentive to provide enough resources to progress the work at all locations as quickly as possible.