Vision of Interoperability for Capital Facilities and Building Regulatory Process

This is the story of a Developer and how she uses Interoperable Information Technology systems to make her development, construction, occupancy and maintenance process more efficient in relation to the building regulatory process.

The Connected Developer has a property in downtown Manhattan that she is looking to develop through the construction of a 20 story commercial building. A preliminary design of the building envelop has been completed and she is in the process of finding tenant for the space. A biotechnology firm has expressed interest in the space. The Developer is interested in determining whether this is a viable tenant for her building.

The biotechnology firm provides specifications for its laboratory and an occupancy classification for the type of work that they will be doing. Using this occupancy classification, the Developer determines that the low hazard laboratory they are proposing is allowed in the zoning district in which the building is situated. In addition, the Developer determines that tax incentives are available for this type of facility. Based on the lab classification, she also notes that she can reduce her insurance cost by providing an independent HVAC system. Additional research determines that the marketability of the space is enhanced by installing a system that is HEPA 95 compliant. This information is incorporated into her financing models and design specifications.

The biotechnology firm provides her with preliminary CAD designs for the lab they are proposing. Based on these designs, she notes that controlled storage for some of their materials needs to be provided. Because these materials and storage requirements are classified and integrated into the design, she is able to determine that additional health and fire safety permits will be required. The Developer's architect incorporates electronic equipment specifications from a preferred manufacturer into the facility design.

As the architect makes modifications to the design, he submits the plans to the Buildings Department for preliminary review. Because the architect uses a standard CAD specification with material and equipment specifications, he is able to get immediate feedback via automated review. Beyond some additional specifications regarding separations between two of the proposed tenant areas, the review has provided him with an estimated fee and a list of requirements that must be fulfilled prior to plan approval, permit issuance, and certificate of occupancy. When the architect submits the plans for permit, he is confident that it will be approved because of the preliminary reviews that have been done and all of the required documentation provided. In fact, even though the plans are selected for manual review by a plan examiner because of the controlled materials storage, they are approved quickly and without problem because the examiner is able to focus the review on areas of concern and communicate with the architect electronically.

Although the listed HVAC system used in the design is approved, the local building code requires that the fire dampers used in the system must be certified by a professional engineer or registered architect upon installation. As the construction manager incorporates this into his schedule, he learns that the architect's schedule does not allow for inspection when the work will be completed. Unfortunately, because the architectural firm is small, there are no other qualified individuals to perform the inspection. Using his new project planning and scheduling service, the construction manager is able to modify the order, shipment and installation of the HVAC system to a

later date and use staff that would be otherwise dedicated to other areas. The construction manager appreciates this because of the tight crane schedule during that week and the Developer appreciates this because she is able to get some additional return on the cash she is floating.

Unfortunately, due to some bottlenecks in the supply chain (a strike at the Kuala Lumpur sea port) delivery of sheet metal has delayed delivery of the HVAC system. Fortunately, the manufacturer is able to notify the construction manager 6 weeks prior to delivery through an automatic update to the scheduling system. The construction manager is notified of a conflict with the preferred architect, but is able to identify another qualified engineer who is available at that time and adjust the schedule. The schedule adjustment is not a problem, because a new tenant has been selected for another floor and modifications to the plans will require additional time from the crew doing the installation. During installation, the engineer completes her controlled inspection and submits it electronically to the buildings department and copies the construction manager.

These delays have caused the Developer concern. Based on her experience, she knows that final inspections are hard to schedule during the late summer when many projects are being completed, and additional delays may be possible. However, the construction manager is confident because he knows that as the scheduling service is updated with the expected timeframes for inspections to be scheduled and Buildings Department notification is incorporated into the project plan. He knows this because as the project timeline has changed, he has been able to schedule inspections for all of the trades (cranes, electrical, plumbing, elevator, etc.) when they are needed, not significantly before or after the work is completed.

As modifications are made in the field during construction, the architect has updated the plan filed with the Buildings Department. Because the modifications were filed electronically, he is able to determine immediately whether the changes require a review and if additional permit fees are required. Where reviews are required (such as the change in occupancy on the upper floor), the architect is able to obtain them quickly because the modification is highlighted in the overlay of the submitted plans. Best of all, proper materials are delivered on time, work crews have up-to-date plans, and inspectors arrive to the job site with the most recently approved plans. When the final inspection is conducted, the inspector is able to review the "as built" plans and determine that all of the requirements have been satisfied. Tenants were able to schedule their move-in date weeks in advance of the inspection. This has allowed the Developer to convert her construction loan financing to mortgage financing much faster than ever before and save a significant amount of money.

When the construction manager turns over the as built plans to the facilities manager, it comes with a schedule for the inspection and maintenance of the equipment, such as the HVAC system. This allows the facilities manager to schedule inspections months in advance and negotiate better rates with maintenance contractors. In addition, when regular maintenance on equipment occurs within a defined timeframe, the maintenance contractor is able to complete the required inspections and file the results with the Buildings Department without making additional field visits. Besides providing these required periodic inspection reports, he is also participating in a pilot program where he provides maintenance history to both the manufacturer and the Buildings Department. Recently, data from this program was used to extend the periodic inspection requirements from annual to bi-annual for the HVAC system based on the age of the system and past maintenance history.

More importantly, availability of these as built designs have helped with emergency response to the facility. When a waste basket caught fire in one of the offices, it triggered the alarm system. Because of the lab, the Hazardous Materials unit was alerted. When the first response team arrived at the scene, the fire safety director was able to provide information regarding where the fire was in relation to the lab and confirm that the fire dampers were effectively deployed. Based on this information, the captain on the scene was able to call off the HazMat team and deploy his squad to the office where the waste basket was located without incident.

Besides saving lives and money through effective emergency response, the city has utilized the occupancy information for land use planning, economic development and tax assessment. This has helped other agencies determine where to focus scarce resources and more accurately assess its taxes.