

Case Study

Project/Client Name: Arsalon Databank Pine Ridge

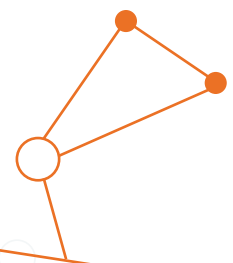
Location: Lenexa, KS

End Date: December 2014

Role: Design-Build

The Arsalon Technologies Pine Ridge Data Center presents the perfect case study of blending the SiTESPAN holistic approach to data center lifespan with the business strategies of a client. The client and facility represent the colocation offering of the data center world. It embodies the strategic need to build an asset before revenue is recognized. More importantly this business model demands a lifespan approach more than a point-in-time transaction.

The relationship between Arsalon and SiTESPAN began by selecting an existing building during the period when commercial properties were low in value and cost. The early team consisted of the client, designers, construction managers, and business strategy professionals. Our goal was to understand what the master-planned facility would look like at full occupancy, then tailor the first phase back to the basics. These basics would represent what was absolutely needed to provide a reliable product; a product Arsalon could offer to the market. Once a source of revenue and cash flow was developed, our team began looking at client trends and how that translated to demands on the facility. (By clients we mean the clients of Arsalon, the revenue stream of our client) Each of these subsequent phases, described as follows, were designed to match the cash flow and revenue growth of Arsalon. This allowed our client to operate within the parameters of their existing finance tools and business strategies.





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Phase I – Initial Build-out and Creation of Pine Ridge Data Center:

This project involved the transformation of an existing 33,000 square-foot office building into a master-planned hybrid Tier 2 and Tier 3 data center, encompassing office space and power and cooling distribution/support. Tim Everson, functioned as construction manager throughout design-build, mitigating project challenges associated with power generation and utility distribution.

This initial project provided Arsalon with a mixed Tier facility, with 3,500 square foot of raised floor designed in a POD configuration for ease of future expansion. Reliability of systems was weighed as the facility was designed and equipment procured. Initial cost was a primary focus, as it represented the largest risk for Arsalon as they expanded into this new facility. The management of cost increments was managed through the tried-and-true method of modular design and implementation.

Power Generation. Transformation of overhead to below ground power distribution, required foundation and structural manipulation to allow for mass excavation and conduit routing within existing building. A complex shoring system was designed to accommodate sequenced removal and large volume conduit installation requirements. A special TPO membrane roof was also installed, and coordinated utility efforts were required to accommodate the Raised Access Floor utility mass and open volume ratios.

Phase II – Expansion by building out Data Room 2 and increasing capacities:

This project involved the expansion of an existing data center for Arsalon Technologies. The expansion added a 3,500 S.F. data room (Data Room #2) with a 30 inch raised access floor and associated UPS, Fire/Life Safety, and Cooling

capacity. Additional cooling capacity was also added to the existing Data Room #1 and the existing electrical room.

This project was executed as Design-Build, led by Tim Everson of SiTESPAN, with Burns & McDonnell providing mechanical, electrical, and fire protection engineering services along with start-up and commissioning services for the project. Finally, Bell/Knott Architects handled the architecture and structural design for an integrated EPC project. Our team provided strategic budget reports and strategies for obtaining facility growth within existing cash flow capacities.

Phase III– Upgrading Emergency Generation Capacities:

The initial build-out of the facility during Phase I only provided for a single 500kW generator to handle the projected load demand within the first 12 months of operation. This project included the addition of two (2) 1.5MW Cummins generators with Cummins paralleling switchgear and integration with the existing facility BAS.

Phase IV– Expansion by building out Data Room 3 and increasing capacities:

This project was very similar to the expansion of Room 2, however this expansion represented completion of the final room. Unique aspects and approaches to this project are described as follows:

Utility Entrance: At the commencement of design, the facilities capacity demand against the existing utility feed and transformer was only 20% of capacity. However, the existing downstream switchgear DP2 was at available breaker capacity. Our team considered installing the second of three utility entrances and transformer, however with low demand the utility probably would not agree to burden the cost for installation. Our team came up with a unique solution to expand off of the



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existing DP1 gear and provide the next line-up of DP2 gear. We accommodated future cut-over concerns by installing a tie-breaker between the sets of DP gear. This would allow us to bring in a separate utility service, Main Distribution Panel and separate DP2 without any downtime to downstream power distribution and customer equipment on the Raised Floor. This accomplished saving unnecessary capital costs until facility could support those upgrades with client demand and associated revenue and cash flow. In addition, Arsalon would be able to avoid purchasing the future transformer and utility entrance by negotiating on a greater utility demand structure later on.

Increased Raised Floor Space: In the world of colocation, raised floor is revenue. Our team decided to delete the ramp accessing the raised floor space for a more space economical lift. The installation of this lift gained Arsalon enough area to add 10 additional customer racks. This was equivalent to a 6 month Return-on-Investment. (ROI)

Avoid Lost Opportunity Costs: At the inception of the Phase IV project and expansion of room 3, the colocation market was heating up. Arsalon was selling their available raised floor area at a rapid pace. This pace would put them on schedule for needing Room 3 before it was complete. Our team devised a plan to have Room 3 ready for sales and operational within 3 months. We accomplished this by borrowing from available power and cooling capacity on the recently completed room 2. We installed PDU's in Room 3 with side-car tie breakers and pulled temporary power from available circuits in the UDP panels from Room 2. The tie breakers were open transition capable. Once we were able to receive and install the new switchgear and UPS systems we were able to cut-over to permanent power feed without down time.

Phase V – Completion of a Data Center:

The reports, studies, and budgets cumulated into what our team labeled “The Logical Project”. Our analysis of the existing facility, and probable client growth within the facility, led our team to develop a logical expansion of the existing systems; an expansion that would best answer to future client growth. **Utility Entrance:** As mentioned in the Phase IV expansion; our team came up with a unique solution to expand off of the existing DP1 gear and provide the next line-up of DP2 gear. This new project included the entrance of a new separate utility service, Main Distribution Panel and connected to the already existing DP2 distribution gear. **Addition of Generation Capacity:** With load demand growth, the facility would first run out of N+1 generator capacity. Our analysis of facility growth showed an immediate need for the third 1.5MW generator, but showed a remote and only slight need for a future fourth generator. Our team moved forward with the recommended solution of only adding one more generator. **3rd Data Room UPS Capacity:** Given the recent trends of client power density, coupled by the fact that Room 3 was 30% larger, we projected that the 3rd room would run short on UPS capacity at 50% occupancy. The addition of a second UPS module, associated batteries, PDUs, and RPPs was included in the project. **Cooling:** With increased power, comes the demand for cooling. In the Phase IV project our team converted the entire facility CRAC units to the new variable speed ECM fan configuration. With these new efficiencies we were able to move forward with this project without the addition of CRAC units. We did elect to add another 200 ton air-cooled chiller to provide better redundancy and capacity for peak cooling demand.