

What Do You Do When You Find A 500 Year Old Ship?

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Introduction

In September of 2004, safely tucked away in a cottage in the back woods of South Carolina my family and I watched the eye of Hurricane Ivan pass within a few miles of our waterfront home. As soon as our neighbor gave me the damage report over her cell phone with a rapidly fading battery, I hugged my wife and my kids and got on the road to Pensacola. At every major and minor city along the way I stopped at Home Depot and Lowes, collecting key supplies along the way. At one stop in Augusta, Georgia the cashier at the contractor's desk asked "How can you live in a place like that?!" It did not take me a second to reply. As every school kid in the pan handle knows, Pensacola was the first settlement in Florida, but not the first permanent one. "This hasn't happened since De Luna got wiped out by a hurricane in the 1500's. The way I figure, we haven't got to worry about a season like this for another 450 years." The cashier looked at me like I was nuts.

A year and half later Dick Corporation and I were poised to have a close brush with De Luna's ill fated settlement as we were re-building from the most recent obliteration of Pensacola.

Pensacola: The Early Days

In the years following Columbus' initial voyages the Florida Panhandle was only occasionally visited by the early explorers. Most of the action was farther to the south and west in Mexico, where the Spaniards were hauling away all the gold their ships could carry.

In 1510 Ponce De Leon was one of earliest and most prominent visitors mapping large portions of the land he called La Florida. (Bowden, Simons, Johnson, 1989, p. 11) Other lesser known explorers traversed the area contributing bits and pieces to the Spanish knowledge of the panhandle region.

Once Hernando De Soto finished with Peru he turned his attention north to the Gulf Coast of Florida. In 1539 Captain Francisco De Moldanado deposited De Soto in the Tampa Bay Area with orders to pick him up the next year at Ochuse, what is now Pensacola, Bay. The good Captain became one of the Beaches first regular tourists, returning for the summer of 1540 and periodically thereafter until 1542. Around that time the remnants of De Soto's expedition turned up in Mexico, without the intrepid Conquistador who died on the Mississippi River. (Bowden, Simons, Johnson, 1989, p. 13-14) Survivors insisted they were not lost and meant to traipse all over Florida, the Carolinas, Alabama, Mississippi and Texas.

By the latter part of the next decade the competition for colonies in the New World drove the Spaniards to assemble an expedition to establish a new settlement in the Florida panhandle and tapped Tristan de Luna y Arellano to lead a group of 540 soldiers and another 1000 settlers to establish a settlement at Ochuse. De Luna arrived in eleven ships with a year's worth of supplies at the appointed site on August 14, 1559, the peak of the yet to be discovered hurricane season. In order to keep the supplies safe from predators and hostile natives the bulk of the supplies remained on the ships. On September 19-20 De Luna's fleet was nearly wiped out by a violent hurricane. Only four of his ships remained serviceable. One of them, a galleon, was only serviceable because he had sent it on a mission to Mexico. The other seven became the first recorded shipwrecks in Pensacola Bay. (Bowden, Simons, Johnson, 1989, p. 16-18) The settlement survived for about six months before it was abandoned. The failure of the settlement left De Luna nearly destitute, making him the first Florida land developer to declare bankruptcy.

One hundred and thirty years later, with the pressure of the French expanding up the Mississippi Valley, the Spanish made their next attempt to settle Pensacola Bay. In 1698 Santa Maria De Galve was established by approximately 100 forcibly resettled colonists. The town was established around Fort San Carlos de Austria, located at the current site of the Naval Air Station. Over the period from 1698 through the early 1700's hurricanes pitched Spanish ships up on the beach every five to seven years littering the bay with wrecks. In 1719-1722 during a brief war between France and Spain the settlement changed hands from the Spanish to French and back again as a series of small naval battles scattered another half dozen wrecks around the lower Pensacola Bay. (Bowden, Simons, Johnson, 1989, p. 51)

Shortly after Andrew Jackson seized Pensacola in 1821 the young United States began fortifying the area and establishing a Naval Shipyard.¹ By the time the Civil War broke out there were ample facilities for the parties to fight over and the Union and the Confederate armies spent the better part of the war lobbing shells at each from Fort Barrancas and Fort Pickens. As is common with military and industrial facilities that have existed for centuries there has also been a negative impact on the environment in the area. At various times there have been as many as four active Superfund sites in the area and numerous other minor sources of contamination around the bay. Artesian wells are also relatively common.

The confluence of the above factors ensures that any time you dig a hole deeper than three feet on NAS Pensacola you will almost certainly find water, contaminated soil, historically significant artifacts or all of the above at once.

Ivan the Terrible: The Storm and Its Consequences

The entrance to Pensacola Bay is known by local mariners as “The Cut”. The Cut is a north-south channel approximately a quarter mile wide at its narrowest point, considerably narrower for deep draft vessels that call at the Port of Pensacola. In Figure 1 the cut can be seen just to the right of the northern tip of the 130 MPH wind zone. The Pensacola Naval Air Station (NAS) occupies the peninsula just north of the cut, bounded on the north by Bayou Grande, the east by Pensacola Bay and the south by Grande Lagoon. In Figure 1 the two blue arrows just north of The Cut indicate the location of the NAS.

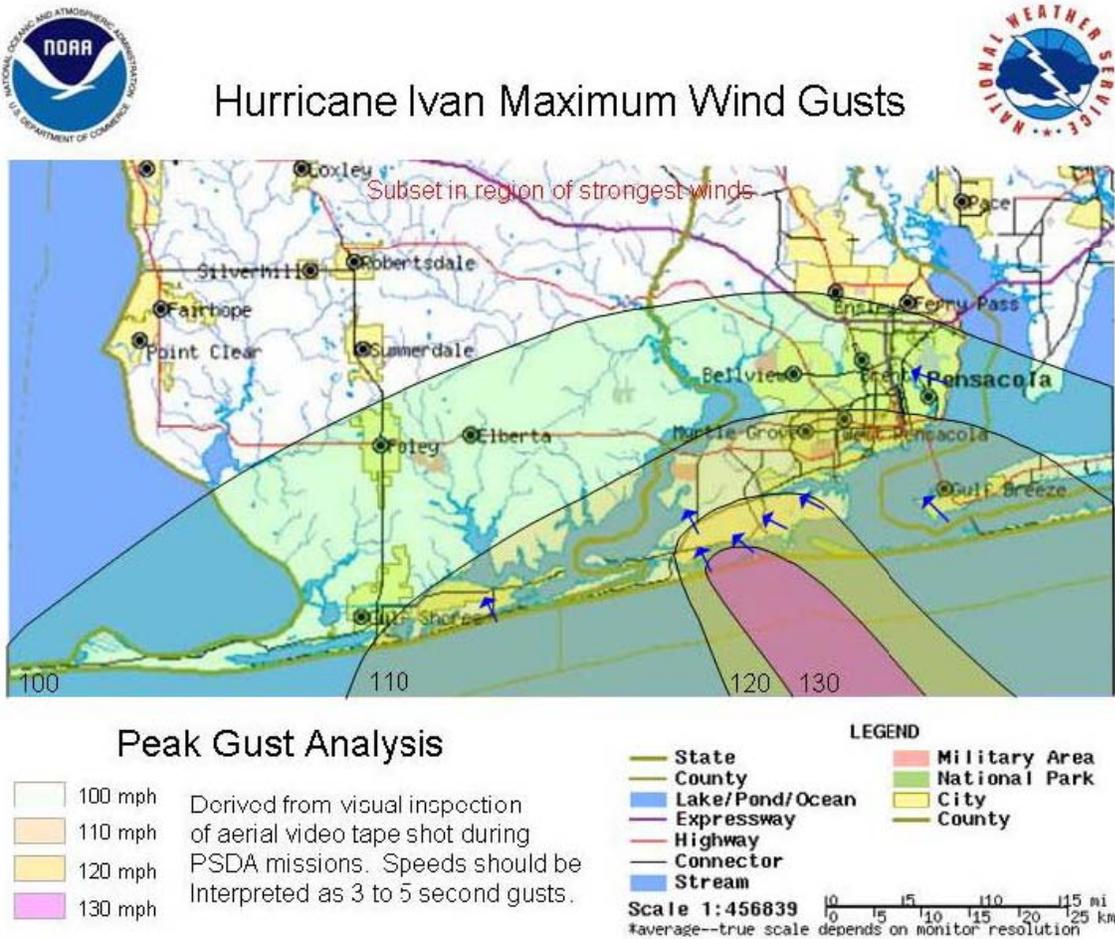


Figure 1 Wind Map of Hurricane Ivan at landfall.

Nearly 445 years to the day after De Luna had his fateful rendezvous with a killer hurricane, Ivan roared ashore over the night of September 15-16. Reminiscent of the De Luna Experience, the City of Pensacola and the Naval Air Station were decimated. In addition to the devastating winds illustrated in Figure 1, the storm surge associated with the hurricane exceeded 15 feet. The surge in particular scattered vessels and debris over many square miles of Escambia County. Liquor bottles with special tax stamps from the venerable Florabama Bar were found on Inerarity Island and the shore of Perdido Bay (they were promptly put up for auction on E-bay). A sign warning swimmers not to enter the pool unless a lifeguard was present, was found in the Pensacola Yacht Club pool. The back of the sign identified it as U.S. Park Service property from Fort Pickens, more than 6 miles away!



Figure 2 NOAA Satellite Imagery annotated by the author.

In the immediate aftermath of the storm many deficiencies in the Naval Air Station Facility layout planning were illuminated. Issues, such as the unfortunate location of the most historic structures, could not be corrected. Other issues, such as the vulnerability of student housing and the location of the McDonalds Restaurant could be remedied. In the following weeks the base facilities were assessed and inventoried. There were buildings which came through largely undamaged and others that could not be found. The needs of the current tenants were prioritized and matched up with the available facilities. Some short term needs were met with temporary trailers, with reconstruction providing the long term remedy,

Figure 2 illustrates a microcosm of the damage sustained around the Pensacola area. This image has not been corrected for the angle of the satellite, as the coast line in this area follows a more east-west axis than depicted in the image. The Coast Guard Station at the extreme left edge of the figure is strategically located to have a panoramic view of The Cut. The red outlined area in the figure is located less than a half mile from the Coast Guard Station. While the storm surge at least had to top the barrier islands in most sections, in this area it poured through The Cut unabated. The buildings enclosed in the red box included the base McDonalds Restaurant, Gasolino's All Hands Club, a de-commissioned power plant, the Physical Fitness Center and five 1970's vintage three storey barracks buildings. None had any historical value and only minimal sentimental value in the case of Gasolino's. These buildings were among the first to be demolished, with little discussion or remorse.

While the re-planning of the base facilities was taking place the Navy was facing the challenge of finding companies that had the resources to undertake the re-construction of the base. Pensacola is an economic island with a capable, but small industrial base. Local resources were ferociously overmatched by the challenge. In order to attract national companies that could mobilize out of area resources the Navy bundled medium and large construction projects in to omnibus contracts that would justify the commitment national contractors would have to make to work in the area.

It was under these conditions that Dick Corporation was awarded a contract for \$79 million to construct a series of buildings. These include two complexes of visitor quarters, a physical fitness center and an Aviation Rescue Swimmer School (ARSS). Liquidated damages were steep, by local standards and were allocated by structure. The contract also included the Unified Facilities General Specification (UFGS) for Network Schedules as modified for Navy Design Build contracts. These two factors made the Critical Path Schedule a key tool in managing the Contractors risk. The contract also required a single schedule for the four distinct sites be provided, with the four sites segregated within the schedule. Contract Completion date for the ARSS was set for 13 December 2006.

For reasons sited earlier in this paper, the contract required an archeologist be retained to provide support during site work to guard any artifacts that might be encountered. Should artifacts be encountered, the archeologists would provide guidance as how to proceed with excavation in order to facilitate completion of the project while safe guarding the objects. These services were provided by New South Associates, Stone Mountain, Georgia.

A New Aviation Rescue Swimmer School (ARSS)

Dick Corporation has an extensive portfolio of successfully completed projects employing many of the best practices available in construction scheduling. The culture of the company actively supports rigorous planning efforts from the highest levels of the corporation to the Superintendents and Project Engineers. Consequently, network planning and schedule development began in the very early stages of the design process.

The Dick Corporation project manager who would shepherd this project from start to finish, Mr. Shelby Gardner, drafted the initial schedule during the design phase of the project. This schedule was developed to the level of detail that would be required at mobilization and reflected his scheduling style and construction philosophies. While it was developed with the Navy's rigorous specification in mind, it remained a Dick Corporation document that was designed to meet their own demanding standards first.

As the mobilization date of December 2005 approached, Shelby did not have the time to personally maintain the schedule and was prepared to hand the schedule over to one of Dick Corporations full time schedulers. During this period the Katrina Effect, depleting the area of every category of skilled labor and knowledge workers, built to full force on the Gulf Coast. Prior to the storm, qualified practitioners of the Critical Path Method were thin on the ground, with most of the experts servicing the Pensacola area coming from Birmingham, Atlanta or Tampa. Post storms, available skilled planning and scheduling talent were virtually non-existent and internally no Dick Corporation schedulers were available. It was in this time period that Critical Path Mechanics had just completed an engagement at an Alabama chemical plant and the author joined the Dick Corporation team on an interim basis.

In early December of 2005 Shelby had set up shop on NAS Pensacola and his management team was beginning to assemble. Several issues relating to the schedule had to be dealt with. First, while the design was predominantly the same as when the schedule was first prepared, there were changes that had to be accounted for in the schedule. Second, the philosophies and preferences of the Senior Superintendent would have to be accounted for. In the Dick Corporation culture the Senior Superintendent is principally responsible for executing the plan that would result in timely completion. In this instance it was John Hodgson, a first rate Superintendent with a vast catalog of experience to draw upon as we finalized on the schedule. Third, the schedule needed tailoring to meet the requirements of the Navy's specification. Fourth and last, the schedule needed to go on a diet. The schedule, which

included the activities for four separate sites, contained more than 3500 activities. Based on the minimal complexity in the bulk of the construction the Project Manager felt the number of activities could be substantially reduced.

As is often the case with Design-Build projects the final activities of the design phase heavily overlapped the early site work. John Hodgson was forced to split his time between schedule development and chasing down contractors to begin work. By late January we were able to get an approved baseline from the Navy, with a handful of activities underway or completed. The critical shortage of site contractors that has afflicted the pan handle for a number of years ensured the actual start of excavation was delayed until the schedule was complete. The schedule at that point contained a little over 2800 activities. Two hundred and twenty of those activities comprised the schedule for the ARSS.

The blue filled boxes in Figure 2 indicate the approximate location of two of the buildings under the contract. The new buildings would have steel structure with a pre-cast concrete shell. This building system performed quite well in the area around Port Charlotte during Hurricane Charlie. The western box shows the location of the ARSS and eastern box depicts the location of the new fitness center. The replacement buildings for the lost housing stock would be moved to higher ground and further inland.

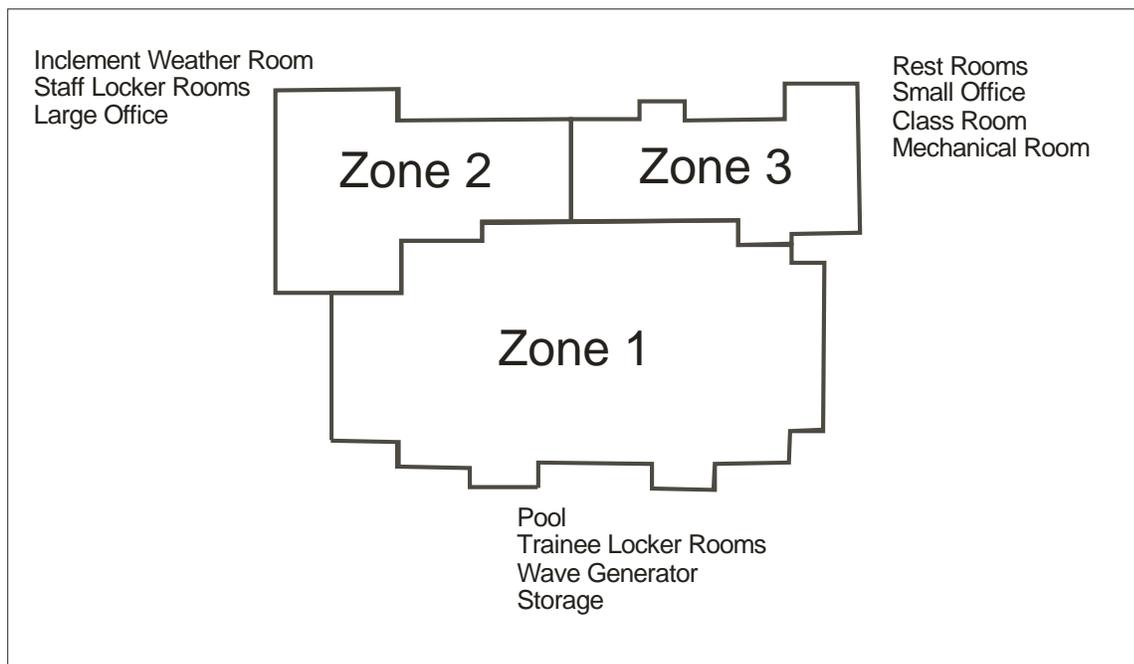


Figure 3 ARSS Key Plan

For planning and execution purposes the ARSS design was broken in to three zones as depicted in Figure 3. The pool in Zone 1 is exceptional in both its dimensions and its accessories. The depth of the pool would require excavations to a depth in excess of 20 feet to form and pour the floor of the pool. The pool also includes wave generators which require very large bore pipe feeding diffusers in the pool. These features dictated that the construction sequence would start with Zone 1's foundation walls. The manner in which the pre-cast panels interconnected influenced the remainder of the construction sequence completing footings for Zone 2 and then Zone 3.

Exhibit Nr 1 shows the ARSS portion of the Precedence Diagram. For the benefit of the reader the network which, contains over 200 activities, has the major paths outlined. In the upper left hand corner of the exhibit is the site work necessary to begin placing foundations. This portion of the network includes activities to set up a de-watering system. In this area the close proximity of the bay and the significant hydraulic pressure associated with the superfluous aquifer make effective de-watering a constant companion to all but the shallowest excavations.

The activities associated with the three zones are outlined and labeled in the exhibit. From the network it is readily apparent that the zones can proceed more or less independently once the pre-cast walls are stood up. The few dependencies that cross between the zones tie together milestones and commissioning efforts. This network is from the February update just prior to encountering the first delays, hence the progressed activities in the Site Work region of the network.

The Early Delays, and the First Change Order

The adventure began with the installation of the de-watering system (Install Dewatering System – ARSS, Activity #10035 in Exhibit #1). The de-watering wells were being installed using a water jet to cut through the sand and the backwash from the water jet was monitored at the surface. It was during the first few days of this process, in the first week of February, that chunks of wood came up in the backwash. This wood had horse hair and canvas attached to it and showed signs of being attached to other parts with iron hardware. The strange items were immediately forwarded reported to the Navy and forwarded to the Archeologist for evaluation. Installation of the wells continued with some wells unable to be completed due to an obstruction that could not be penetrated by the water jet.

Excavation of the building foundations (Excavate building foundation –ARSS-1, Activity #10040 in Exhibit #1) had been started on 16 January in anticipation of the de-watering system being in place in time to support the deeper excavation. The de-watering plan called for the water to be held on site in a retention pond during excavation. As the excavation progressed it was evident that the dewatering system was removing considerably more water than anticipated and still not keeping up with ground water entering the excavation. A retention pond was added along with several more wells. The de-watering system was now able to keep up, but was in danger of overflowing the second pond as well. Dick Corporation tested the water in preparation to request to overflow the ponds to the storm drains.

Due the history of contaminated soil on the base the Navy initially balked at allowing the discharge of any water from an excavation in to the storm system. After a series of tests and the establishment of proper safeguards to allow the discharge of the water, the Navy permitted the water to be discharged. Rather remarkably the water was not even brackish. This close to the saltwater bay the expectation was that the salinity would be too high to allow the water to go to the treatment plant, a testament to the high gradients observed in the ground water around Pensacola Bay.

These delays manifested themselves in the extended duration of the installation of the de-watering system, planned for 5 days with an actual duration of 32 days. The duration of the excavation was also impacted, planned for 10 days and to this point out to more than 20 days duration and not nearly complete by mid February.

Concurrent with the ongoing excavation, the artifact had stirred enough interest to prompt as survey of the area with Ground Penetrating Radar (GPS), in the area where the wells had been installed and the object of interest was discovered. This object was more than 14 feet down and approximately eighty feet long. It also extended well in to the boundaries of the excavation for the pool. The archeologists immediately issued guidance on how to proceed with the excavation when the excavation reached a depth where the object could be encountered. In short, when this depth was reached machine tools would give way to exploratory hand excavation.

By the first week in March the issues relating to the dumping of the over flow in to the storm drains had been resolved and the excavation had reached the depth where the contractor shifted to hand excavation. Almost immediately an object of extreme interest was uncovered.



Figure 4 Hand Excavation at the time of discovery, photos Courtesy of Dick Corporation.

The Navy followed the discovery of the presumed wreck with Change Order #P0006 which defined how the contractor should proceed now that an historic artifact had been encountered. The change granted ten days of relief altering the Contract Completion date to 23 December 2006. The change further directed the Contractor to support the archeologists in performing a ten day investigation to determine if the object was worthy of being recorded as an historic site.

Exhibit #2 shows the fragnet (highlighted in light blue) which was added to model the events associated with the discovery of the object. The added activities have a prefix of I005 with the three digits following the prefix uniquely identifying the activity. Activity #I005010, Contract Modification #P0006 Issued, starts the sequence. To the extent that they were able, Dick corporation continued work on the site without disturbing the area of interest. Wells were added (Activity #I005020, in Exhibit #2) enhance the control of ground water around the artifact. Once the modified de-watering system was operational the investigation began on 13 March.

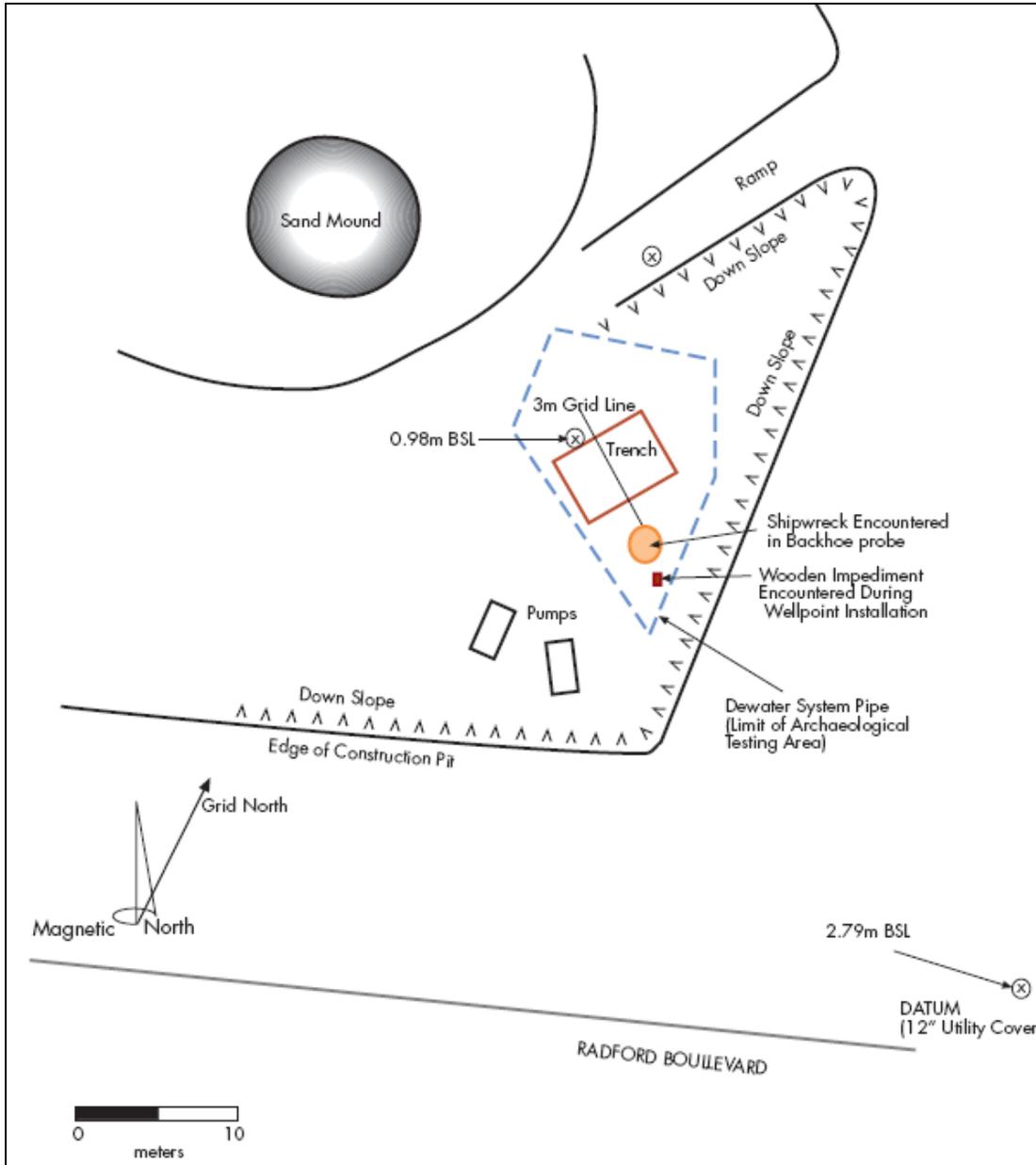


Figure 5 Plan View of Test Area from “Phase II Historical and Archaeological Investigations of a Shipwreck Site (8ES2940), ARSS Training Site, NAS Pensacola,” New South Associates, September 1,2006.

Figure 5 shows the layout of the site. It did not take long for the Navy to recognize they were not going to be able to finish the building on this site, issuing a stop work order on 14 March (Activity #I005040, in Exhibit #2). While many issues relating to the final disposition of the site remained to be resolved the Navy issued a Request for Proposal (RFP) to re-locate the building (Activity #I005050 in Exhibit #2). The day after issuing the RFP they directed the site of the wreck be covered with the sand from the excavation, based on the recommendation of the archeologists. The investigation would eventually confirm that the wreck extends southeast, nearly to Radford Blvd. In order to advance this “dig” would require a significant engineering effort that would include a de-watering plan to take excavation below 20 feet, and a civil plan to re-route traffic on Radford Blvd, or stabilize the south boundary in some manner to go down another ten feet without maintaining the required slope.

Two activities were added at the request of the Dick Corporation Project Manager in order to provide a running tally of the magnitude of the construction delay. A hammock named “Construction Delay” (Activity #I005045, in Exhibit #2) was added and linked ‘finish to finish’ with “Resume Construction” (Activity #I005047, in Exhibit #2), a Finish Milestone. The intent was that as the Data Date was advanced the hammock would grow and provide a self updating tally of the days of construction delay to that point. Once a fragnet defining the process going forward was agreed upon, it would replace these two activities.

So How Old Is This Thing Anyway?

In instances such as this it is best to go straight to the experts. Below is an excerpt from the Conclusion section of New South Associates final report.

“...The exposed vessel section represents a portion of the bow and includes the stem, parts of the starboard hull, hull sheathing, and framing. Although the ship’s identity and chronology were not conclusively determined during this project, construction elements, along with artifacts recovered from the site and archival sources, suggest possible dates.

The historical research for this project indicated only two events—the 1559 hurricane that wrecked de Luna’s fleet and the 1719 French-Spanish naval battle—that produced shipwrecks in the project vicinity. Obviously, unrecorded events could have also resulted in shipwrecks in the area. Historical maps suggest that the site was buried under beach deposits by the early to mid-1800s, which provides a *terminus ante quem* for the wreck and suggests that it dates no later than the turn of the nineteenth century.

Remains of the ship were inconclusive as to chronology. The excavated bow section exhibited extensive use of iron bolts to attach the hull, frames, riders, and ceiling. If the ship dated to the 1550s de Luna expedition, then it would be expected to include mostly wooden fastenings. The finding of extensive metal fasteners thus suggested an eighteenth-century or later date, which would be more consistent with the 1719 naval battle. On the other hand, instances of the iron fasteners have been found on ships of the 1500s, such as the 1554 wreck of the *San Esteban* (Smith 1993:80). At this point in the analysis of 8ES2940, it is unclear if the use of metal fasteners provides clear information about chronology.

The presence of burned wood on the site also supported the possibility of a ship set afire during battle, thus pointing to the 1719 date. But here again the evidence is not conclusive. Wrecked ships might be burned to the water line in order to give salvage crews access to the cargo holds (Florida Division of Historic Resources, Bureau of Archaeological Research 2005). Thus, it remains possible that the ship might relate to de Luna’s fleet or an undocumented wreck.” (Phase II Historical and Archaeological Investigations of a Shipwreck Site (8ES2940), ARSS Training Site, NAS Pensacola,” New South Associates, September 1,2006)

I could not say it better my self, so I did not even try. Below is one more photo, just to tantalize the audience.



Photograph from "Phase II Historical and Archaeological Investigations of a Shipwreck Site (8ES2940), ARSS Training Site, NAS Pensacola," New South Associates, September 1, 2006.

You Move the Building Of Course

"Oh, we'll just move the building," sounds easy until you sit down and try and plan it and address all the tertiary affects. The building addresses an urgent mission need, otherwise it would not have been among the first constructed. Side by side with the additional cost, the new delivery date is a dominant concern. Removing the artifact and keeping the current location was discarded almost immediately. The remaining options were to re-locate the building within the boundaries of the current site, or move to another site entirely. Intuitively, it appeared re-locating on the existing site would be the preferred option. Then the feasibility of re-locating and/or re-orienting the building came in to play. None of these things could be instantaneously resolved as the RFP was issued by the Navy on the 23rd of March.

It was recognized quickly by the Dick Corporation/Navy team that planning and re-design effort constituted a process by itself. Subsequently, the fragnet was developed in a separate file until the process was fully

defined and could be tracked. Exhibit #3 is the completed fragnet prior to insertion in to the master schedule. The progressed original fragnet was used to anchor the left hand side of the network and allow the computing of reliable dates using the forward pass algorithm. Outside the original fragnet are six progressed activities. A group of four activities represent the effort associated with performing and reviewing the engineering analysis that would determine the new site, and the effort to prepare and approve the proposal to re-locate (I005080, I005090, I006010 and I006020).

As is often the case among engineers, there was a considerable difference of opinion on how long it would take to produce the new set of drawings to affect the re-location. Each party, depending on their point of review, wanted more or less time. The design firm for the project and representatives from the Navy negotiated the durations and the steps in the process to arrive at a total duration of 126 days. This Re-design process is replicated in the activities contained within the box of the same name in Exhibit #3. Two activities which are indicated as started, "Re-locate Sand Piles" and "Backfill Abandoned Excavation" were performed prior to completing the design as a matter of safety and in to facilitate the next construction phase of the project.

Once the new location was identified it became readily apparent that started construction activities that had not yet been completed, and some that had, would have to be abandoned. These activities were annotated with the letters "ABN" in the master schedule. For each one of these activities a new activity was created in the fragnet with an Activity Identification beginning with "I006" to differentiate them from the abandoned duplicates. These activities are outlined in the box in Exhibit #3 named "Replacement Activities"

Once the negotiations were complete the new portions of the fragnet in Exhibit #3 could be inserted in the master schedule and replace the hammock activity previously described. The dependencies from the original fragnet to new activities would be replicated as in exhibit #3. Replacement activities would take on the corresponding successors of the abandoned activities. The abandoned activities successors were replaced with ties to activity I006025, "NAVY - NTP With Re-location of Building," as a housekeeping measure and to stay in compliance with the Navy specification.

Exhibit #4 is a portion of the PDM from the September Schedule Update, which actually reflects progress through the end of August. Elements of the fragnets demonstrate the delay are highlighted in colors contrasting with Primavera Project Planner's[®] trademark yellow boxes. Working from left to right we can see only a handful of activities were not impacted by the discovery of the wreck. The original fragnet showing the actions resulting from the issuance of change order #P0006 are highlighted in green. This change modified the Contract Delivery Date changing it from 13 December 2006 to 23 December of the same year. The light blue activity activities are the elements pasted in from the separately developed fragnet. Insertion of the separately developed fragment "strands" a group of affected activities that cannot be completed or must be "re-done". These activities are highlighted in red. These activities were annotated with the letters (ABN) as previously discussed.

Once the activities, their dependencies and the associated durations have been agreed to, the network conclusively demonstrates the presence of the delay on the critical path. Durations are more variable, and can vary greatly from the planned values. For that reason the Navy did not actively dispute the new projected Substantial Completion date of July 27,2007. They participated in the determination of the redesign timeline and had responsibilities for reviews within that process. So while they did issues a Notice to Proceed they did not finalize the completion date at that time on 17 May 2006.

By of the September update, the design process was complete and construction of the new site was beginning in earnest, the project Substantial completion was still sitting at July 27,2007. During this period local economic conditions were changing rapidly. Some contractors had to de-mobilize due to the delay and could no longer commit to the new construction dates. Consequently, some of the work had to be re-bid, taking longer than expected to negotiate a price for the modification. At this writing, the contract modification for the changes associated with the discovery of the wreck have not been definitized. However, the Contracting Officer has directed the schedule be changed to reflect a July 27 completion date. This effectively acknowledges a delay of 216 days!

In the month of September the Pensacola area experienced an extended period of dry weather, allowing site work to go forward unfettered. A change in site contractor seems to have also resulted in a gain in productivity. These two factors account for the projected Substantial Completion Date setting at July 17 in the October update.

Resolution Without Litigation

Frequently, a delay of the magnitude experienced on ARSS project would be ripe for litigation. With the delay fully documented by a Time Impact Analysis and the likely prospect of a bilateral modification of the contract codifying the July 27 delivery date, litigation is unlikely.

This outcome could not be achieved without a number of conditions being present that facilitated the outcome.

- A company with a culture that supports sound planning and the use of a Critical Path Schedule as a management tool. From top to bottom the Dick Corporation has a culture that actively supports the development and maintenance of sound construction schedules. Throughout the process Shelby Garner and John Hodgson ensured that planning and scheduling efforts were actively supported.
- A rigorous scheduling specification was in place. Specifications as demanding as the UFGS Network Schedule specification are often perceived as an onerous and unnecessary burden by contractors. While portions of the deliverables are redundant and voluminous, the requirement for fully defined networks and Time Impact Analysis sets in place protections for both the Owner and the Contractor. Periodic updates also give the contractor the opportunity to “tell the storey” of the project.
- Well maintained daily logs. All of Dick Corporations Superintendents and Project Engineers maintain good to excellent daily logs. As events are evolving it is not always possible to recognize what dates and times will be important later. Well maintained daily logs can be a great source by themselves to go back and find these pieces of data. They can also give you a time reference to search for other documents such as Quality Control Reports, E-mails and receipts. Overlapping logs by multiple project participants can also close holes in re-collection that might otherwise go unresolved.
- A bias on the part of all parties to resolve the issues relating to the delay contemporaneously. Bad news does not get better with age. As time passes essential data disintegrates, or becomes more difficult to sift from the sea of documents generated by a capital project. Human re-collections become distorted as people rationalize their actions over time, or just plain forget. Getting the sequence of events firmly fixed in an objective format as events unfold, anchors the discussions in reality as nearly as possible once negotiations begin.

Then There Are Others...

Certainly capital projects get done employing less rigorous methods and a contractor may wonder if the additional effort is justified. In just such an instance one of the more entertaining decisions was handed down in 1997 in *J.A.Jones v. The Army Corp of Engineers*, in which J.A.Jones was attempting to recover more than \$1.5 million in damages. Jones failed to contemporaneously maintain the schedule and produced an as-built schedule more than two years after completion that of the project. Jones lost in an opinion that can only be described as scathing. In part the judge opined:

“Appellant's contemporaneous and consistent assessment of the delays occurring at the project in its updated schedules and its contemporaneous actions as the project progressed are given great weight by this Board over the mere allegations expressed by Appellant after the battle is joined...”

The Judge went further:

“In its reply brief, Appellant asserts that the "Project NAS simply does not have sufficient detail" and that "a project schedule is of little or no value to evaluate delay" If so, one may wonder why a critical path analysis and updates are required. The Board in the past and in the present appeal finds such schedule analysis useful, *inter alia*, for not only for what was on, but what was left off the critical path...”

Failure to contemporaneously employ Time Impact Analysis and use the Critical Path Method schedule as a management tool can cut both ways. As the Navy and Dick Corporation were working through the delay described above Judge Kienlen of the Armed Services Board of Contract Appeals was putting the finishing touches on his opinion in the Appeals *Whitesell-Green, Inc ASBCA Numbers 53938,5393 and 54135*, dated 23 June 2006.

This action stemmed from a contract Whitesell-Green had with the US Navy on NAS Pensacola to renovate the Bachelor Officer Quarters, Building 3251, with options to renovate adjacent Buildings 600 and 600A. The contract required a Preliminary Schedule within 30 days of the Notice of Award, detailing the first 90 days of construction. The complete approved schedule was to be submitted no later than 50 days after the Notice of Award. An updated schedule was to be submitted with each pay application and was to be the basis for payment. The Contracting

Officer, Ms. B.J. Anderson, has a vivid recollection of the Mr. Bill Whitesell, the owner, questioning the very need for a CPM schedule at the Pre-Construction Brief conducted just prior to mobilization.

Two prominent features of the Network Analysis Schedule specification later played decisive rolls in Judge Kienlen's decision. The schedule was to be jointly progressed weekly by the Contractor and representatives of the Navy. Any request for time extensions was to be supported by a narrative and accompanying Time Impact Analysis.

Notice of Award for Building 3251 was in November 1996 with a period of performance of 375 days and Contract Completion Date of 17 December 1997. The Contractor mobilized and commenced work on 7 December 1996. The option for the two adjacent buildings was awarded in March 1997 with the option to be complete by 23 August of the same year. The total contract value was \$10,988,000 once all the option was exercised.

The scope of the work included a redesign of the interior arrangement of the rooms and remediation of known locations of asbestos in specified quantities. The installed fire alarm system was to be used in the new design. The HVAC system was also to remain in place with the installation of additional chill water control valves and dampers.

On April 3, 1997 the Navy Project Manager inquires as to the status of the schedule that should have been submitted in January and the later schedule that should have submitted and approved two months earlier. The earliest available schedule of any type for the project was from May 1997. The schedule was revised and updated on a random basis through the original period of construction. Needless to the weekly joint progressing never took place.

Over the course of the contract repeated instances of government responsible delay occurred and were documented by means other than the schedule. Below is a synopsis of the major drivers that resulted in delay of the project completion. Many more delay events occurred on this project beyond those cited below.

- In February 1997 previously un-disclosed asbestos was discovered in chases throughout the building. This prevented rough-in and drywall activities to be suspended in the vicinity of these chases. In January 1998 the change order was issued granting 109 days delay resolving this asbestos issue and a related issue of re-orienting ventilation components that were found to interfere with the new room arrangement. No schedule update or time impact analysis were performed in conjunction with this contract modification.
- In March 1977 the Mechanical Subcontractor reported a concern that there was not sufficient return air runs in the design. Adding runs would delay framing, drywall and finishing activities. The debate also delayed these activities until August 5th when the Navy authorized the additional returns. This was only the first of a series ventilation related issues including failure by the Navy to provide adequate Chill water for testing resulting in changes to the Test and Balance procedure which made the results unacceptable to the Navy. Test results correctly indicated that there was an insufficient supply of make-up air resulting in additional delays and change orders. This series of events resulted in change order being issued well past May 1998.
- The re-design of the rooms included installation of Navy procured Kitchenettes manufactured by Cervitor. On April 10 1997 the contractor issued a Request for Information (RFI) for information on the Mechanical, Electrical and Plumbing (MEP) interface, with a reply needed by 15 April. The contract pressed the Navy for answers throughout the summer. The closest thing to a reply to the RFI was a statement from the Navy that the Cervitors would be connected through a proprietary box (June 1997). A single exemplar arrived in late June, with additional boxes arriving erratically until January 1998. The boxes required framing and other modifications to the MEP arrangement in order to be installed. The units themselves started arriving in March 1998, six months after their required delivery date as expressed in the preliminary schedule. The units did not come assembled, as described in the "cut sheet" provided to the contractor. Assembly resulted in a constructive change of scope and additional delay. By the time the last Cervitor arrived the project completion date for the renovation of Building 3251 had pushed out to June 1998.
- Asbestos remediation was on the first actions to be taken in the renovation of Building 600 and was a well defined part of the scope. By 21 April the Abatement Subcontractor had determined that he would far exceed the quantities of asbestos abatement described in the specification. The contractor also reported varying site conditions in the form of a botched attempt by unknown party to previously remediate the utility trunk they were trying to clear. The Abatement Subcontractor reached the limit of his scope in October 1997. The Navy would not arrive at a course of action for completing the remediation until the following summer, bringing the renovation to a near halt on Building 600. The Navy did summarily grant an extension in October of 80 days for Building 600A and 69 days for Building 600, not knowing how they were going to proceed with the asbestos abatement. On 30

September 1998 the Navy informed Whitesell-Green that they would self perform and encapsulation of the remaining asbestos. On November 2nd the Contractor was notified it was safe to proceed.

The original Navy Project Manager requested schedule updates in August 1997 and again in September. The first updated schedule with an accompanying narrative was submitted with the October 1997 pay application. It was shortly after this that the Navy Project Manager took another position in the Government and the Whitesell-Green Project Manager left for a position at another company. Mr. Bill Cooper, the Resident Engineer took over most of the project management duties. Mr. Cooper immediately attempted to enforce the contract provisions with regard to schedule. He was fortunate that his new counterpart was Mr. Randy Gibson, a manager who understands the need and uses of a good Critical Path schedule.

From November 1998 forward the schedule updates with narrative were submitted monthly. The joint progressing sessions never did take hold. To the chagrin of the Navy the schedule updates demonstrated more government responsible delay related to design changes in the Lobby area. The project eventually wound down to completion in July 1999, a year and half after the original contract date.

The available documentation places a heavy burden on the Navy to refute. While the Navy readily admitted they owed the contractor time, the dispute was in what amount. In the absence of the documentation supporting the delay they convinced themselves they were fully justified in assessing the contractor 194 days of liquidated damages at \$2704/day for Building 600A and 62 days at \$11,440 for Building 3251.

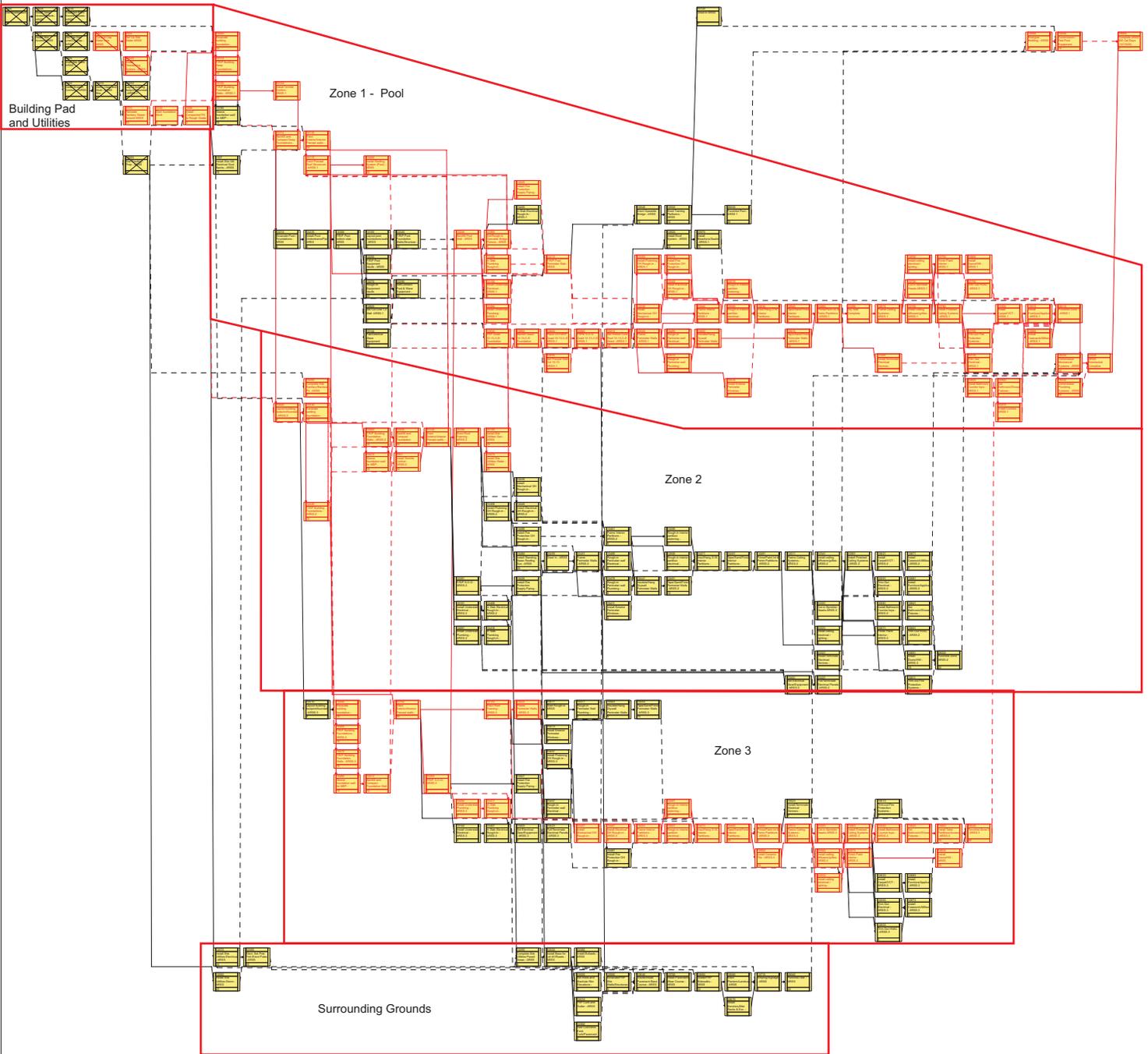
Predictably, the contractor filed suit to recover the liquidated damages and was eventually awarded more than \$1.2 million. This included retained liquidated damages. Notably, the Contractor asked for more than \$90K in damages, the amount they spent preparing their Critical Path Schedules. This amount was denied by Judge Kienlen. It took the contractor more than five years to recover these costs, which did not include any money for their legal costs. In Judge Kienlen's opinion the Navy lost because they abandoned their own specification calling for Time Impact Analysis and granted early time extensions without referring to the schedule. Navy Officials close to case contend to this day that Judge Keinlen has to disregard a considerable body of case law to arrive at his decision. After a dispassionate review of the available documentation, this author must agree.

In the case of Whitesell-Greene, early on the Contractor likely thought he was being relieved of a burden by not having to produce the analysis, or even the schedule. In Mr. Whitesell's defense, the attitude he displayed at the Pre-Contraction Brief is common across a wide swath of the industry, and in particular on the panhandle of Florida. The Government Project Manager implied in his testimony he was only trying to be fair in granting the time extensions. By the time Mr. Cooper and Mr. Gibson arrive on the scene these two honorable men are confronted with unrecoverable disasters for their respective organizations. They take the evidence they have at hand and make their best case. In the end both parties lost something in the process of litigating the dispute. One can only wonder how the results would have been different if the contractor had been more meticulous in the maintenance of their schedule. Had all the Time Impact Analysis been completed, what would the causative action been? Could the building have been delivered earlier?

Neither of the cases cited above established precedent. They simply re-enforced long held beliefs about the role of a Critical Path Method schedule in construction projects. We know that in the case of the ARSS we have good working relationships and a very limited chance of litigation going forward. With good weather and some luck, the building may come in earlier than currently projected.

In the case first lawsuit, J.A. Jones is long gone, not solely because of the court decision cited above. But the failure of their company to embrace the virtues cited in this paper lead to bigger losses on other projects that doomed them to their fate. In the case of Whitesell-Green, Inc, acrimony remains on both sides and the Contractor still had thousands of dollars in legal fees to pay out of pocket.

All things considered, who would you rather be?



Sheet No.	000000
Scale	1"=100'
Date	11/14/14
Author	JK
Checker	JK
Appr.	JK
Rev.	
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Color	Yellow
Line Type	Dotted relationship
Line Type	Nonbinding relationship
Line Type	Actual color

Zone 1 - Pool

Site work

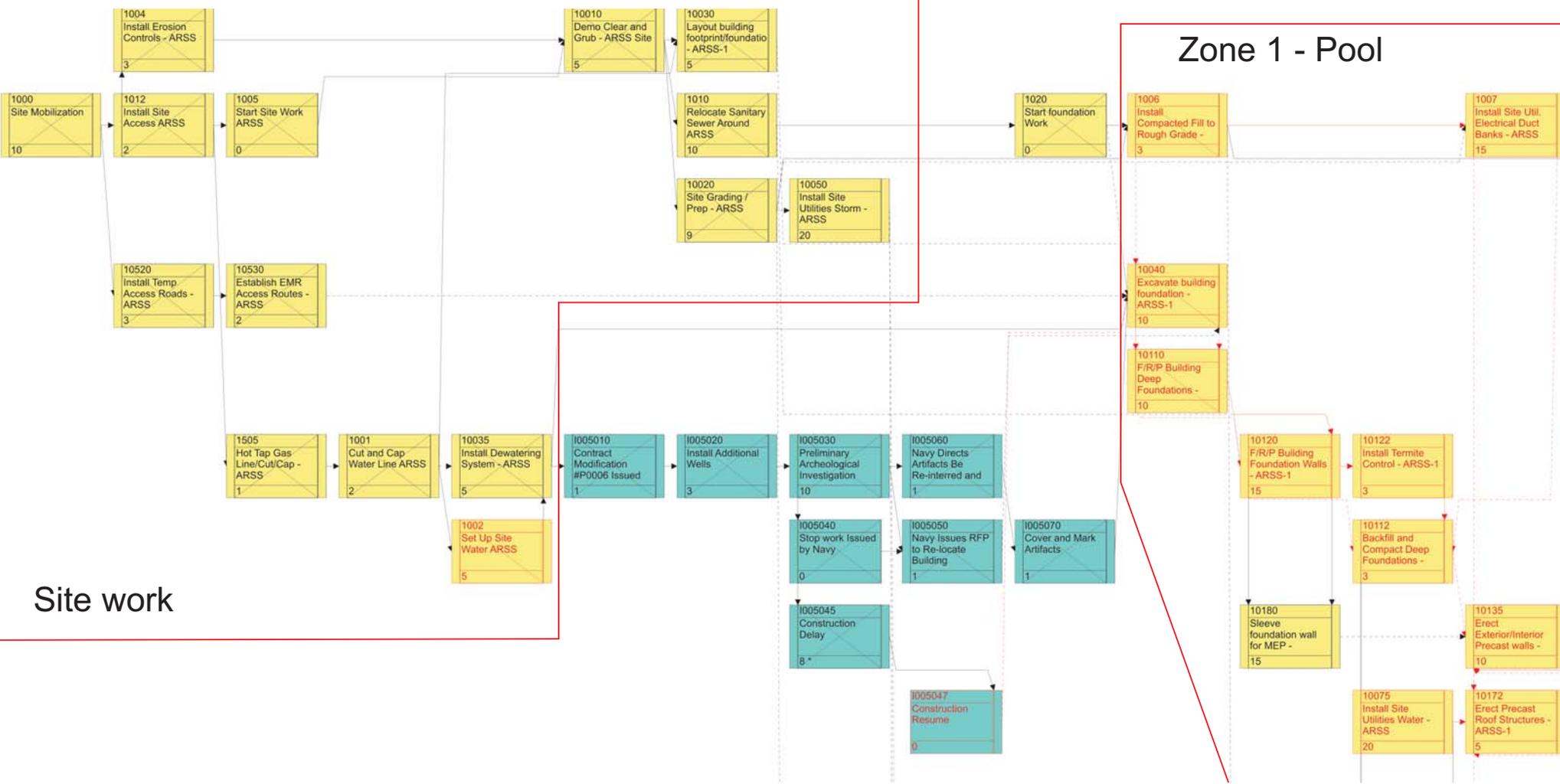
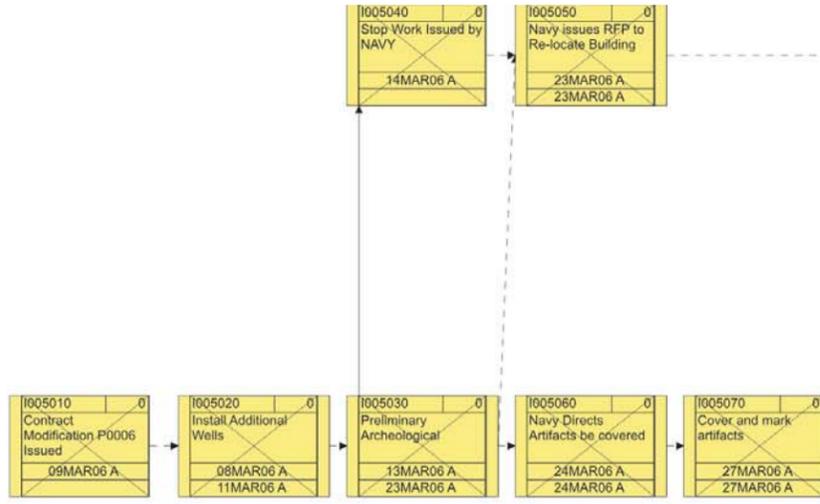


Exhibit #3

Original Fragnet for P0006

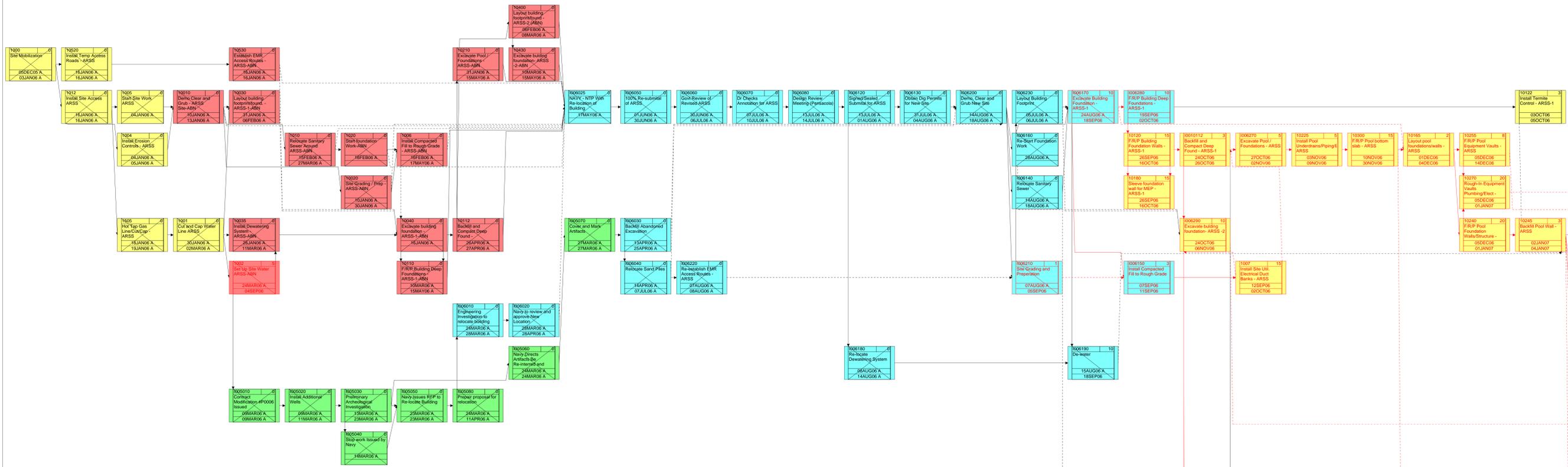


Re-Design



Replacement Activities





Start date 01MAY06
 Finish date 23JUL07
 Data date 29AUG06
 Run date 19OCT06
 Page number 1A

NET
 BLUE
 GREEN
 YELLOW
 RED
 --- Driving relationship
 - - - - - Non-driving relationship
 Critical color