United States

Department of the Interior

Cafeteria Modernization

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Construction Management

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Department of the Interior Cafeteria Modernization

1849 C Street NW, Washington D.C.

October 4, 2010

Technical Report

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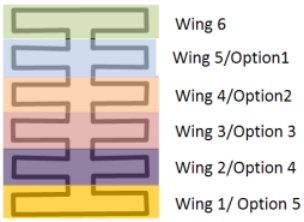
Executive Summary

Technical Assignment 1 is a detailed report that will analyze the existing conditions and all construction considerations for the Department of Interior Cafeteria Modernization Project. This report will take a preliminary look into the schedule, cost, and building site plan for this project. Background information on the building's systems, local conditions, client information, project delivery method and staffing plan will be also provided.



The Department of the Interior building is located at 1849 C Street Northwest in Washington D.C.. It was constructed in 1936 under the New Deal, and featured some of the most state of the art features in the building industry, such as air conditioning and fire protection. In the mid 90's, plans for the modernization of the Department of the Interior building began coming into discussion. In 2001, Grunley Construction Company was awarded the contract to the modernization of Wing 6. The contract for the modernization of each additional wing has been has added as an amendment or "Option" to the original contract. The cafeteria for the Department of the Interior is located on the basement level of Wing 3 and Wing 4. It has been contracted as a change order for the modernization of Wing 3.

The Deparment of Interior Cafeteria Modernization project began construction February 6, 2009. The cafeteria project included the renovation of a multiple spaces all for the purpose of providing the Department of Interiorand it's employees with upgrade facilities for their day to day work. The project renovation scope includes a dining area, post office, Interior Department Recreation Association Office, credit union, two conference rooms, a barber shop, kitchen area, servery area, locker room, 3 walk in coolers, mechanical room, electrical room and elevator. Renovations to the building's structure (steel frame encased in concrete) would include a new skylight system for the dining area, and slab replacement in the kitchen. The orginal schedule had called for completetion in March of 2010, but did not actually occur until July 29th.

Just as with the schedule, the original estimate did not come in on budget either. The original proposal from the general contractor came to $7,888,275. Although the final cost are still being comprised, the actual cost is predicted to be between $9 Million to $11 Million dollars.. The cafeteria modernization was given notice to proceed with a Price to be Determined Later (PDL) agreement. Upon completion, all parties will have a meeting to sort out who is responsible to pay for areas where the project went over budget. Although time and money may have exceded expected values, all parties were satisfied with their final product.On August 4, 2010, a grand opening was held where cafeteria modernization had received rave reviews by the Department of Interior employees.

Project Schedule Summary

The Department of the Interior Cafeteria Modernization received the Construction Notice to Proceed on February 6, 2009. The first actual construction to take place was the abatement of lead, asbestos, and any other harmful construction material that was present in the site. To avoid endangering any of the buildings occupants, all abatement took place during night shifts. After abatement was completed selective demolition began throughout the cafeteria space. Demolition would run slower than usual due to the preservation of many of the original construction materials (ie. Ceramic tiles, murals, stone transitions, stone bases, etc.).

A major scheduling obstacle, laid in the completion of the new skylight system. Due to lack of as-builts, the contractors were unable to approximate the correct scheduling time for the removal of original roofing membrane. This would not be the last major delay to the schedule. Perhaps the largest delay came after the completion of demolition in the kitchen area. The utility trenches under the kitchen were in far worse condition then previously planned for. Replacing dilapidated utility lines, filling the trench with aggregate, and placing a 4" concrete slab over the trenches held up the original schedule by more than a month.

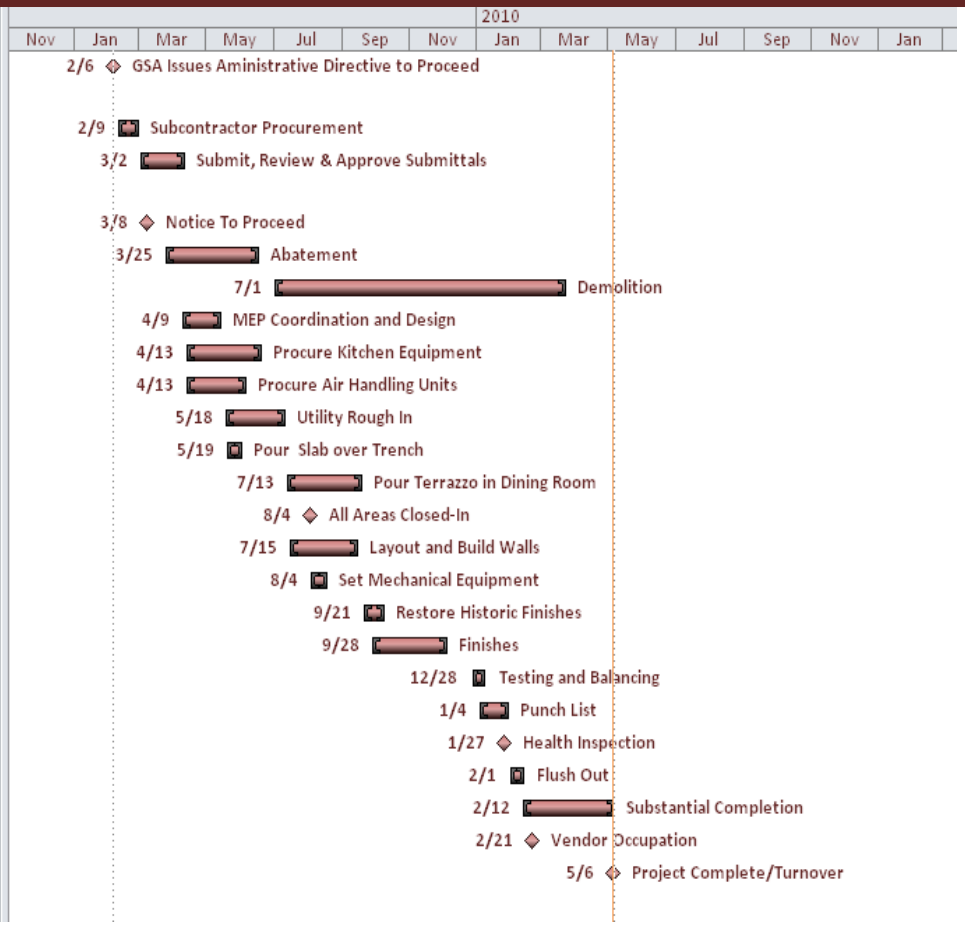
After the skylight system was completed and the utility trench sorted out, the framing of walls and installation of mechanical and electrical systems began. Due to the cafeteria's tie-in to the rest of the building's utilities, coordination was deemed critical to the schedule. BIM modeling was used to design and coordinate all MEP to prevent conflicts from scheduling delays.

In the construction of spaces like a cafeteria, there is a significant focus on finishes. Not only did finishes take longer than scheduled, but the punch list process dragged out due to the lack of quality control and supervision of finish contractors. The cafeteria punch list compiled more than 1600 items, and even after the occupation of the vendor, over 100 items were still open. The drawn out punch list process pushed back the LEED Flush out to the point where it could not be completed prior to vendor occupation and thus loss of that LEED credit.

THE DEPARTMENT OF THE INTERIOR CAFETERIA MODERNIZATION PROJECT

PROJECT SCHEDULE SUMMARY

	Task Name	Duration	Start	Finish
1	GSA Issues Aministrative Directive to Proceed	0 days	Fri 2/6/09	Fri 2/6/09
2	Subcontractor Procurement	15 days	Mon 2/9/09	Fri 2/27/09
3	Submit, Review & Approve Submittals	30 days	Mon 3/2/09	Fri 4/10/09
4	Notice To Proceed	0 days	Sun 3/8/09	Sun 3/8/09
5	Abatement	60 days	Wed 3/25/09	Tue 6/16/09
6	Demolition	189 days	Wed 7/1/09	Mon 3/22/10
7	MEP Coordination and Design	25 days	Thu 4/9/09	Wed 5/13/09
8	Procure Kitchen Equipment	50 days	Mon 4/13/09	Fri 6/19/09
9	Procure Air Handling Units	40 days	Mon 4/13/09	Fri 6/5/09
10	Utility Rough In	40 days	Mon 5/18/09	Fri 7/10/09
11	Pour Slab over Trench	10 days	Tue 5/19/09	Mon 6/1/09
12	Pour Terrazzo in Dining Room	50 days	Mon 7/13/09	Fri 9/18/09
13	All Areas Closed-In	0 days	Tue 8/4/09	Tue 8/4/09
14	Layout and Build Walls	45 days	Wed 7/15/09	Tue 9/15/09
15	Set Mechanical Equipment	10 days	Tue 8/4/09	Mon 8/17/09
16	Restore Historic Finishes	15 days	Mon 9/21/09	Fri 10/9/09
17	Finishes	50 days	Mon 9/28/09	Fri 12/4/09
18	Testing and Balancing	10 days	Mon 12/28/09	Fri 1/8/10
19	Punch List	20 days	Mon 1/4/10	Fri 1/29/10
20	Health Inspection	0 days	Wed 1/27/10	Wed 1/27/10
21	Flush Out	10 days	Mon 2/1/10	Fri 2/12/10
22	Substantial Completion	60 days	Fri 2/12/10	Thu 5/6/10
23	Vendor Occupation	0 days	Sun 2/21/10	Sun 2/21/10
24	Project Complete/Turnover	0 days	Thu 5/6/10	Thu 5/6/10
25				



MILESTONE

DURATION

Yes	No	Work Scope
X		Demolition
X		Structural Steel Frame
	X	Precast Concrete
X		Cast In Place Concrete
X		Mechanical System
X		Electrical System
	X	Masonry
	X	Curtain Wall
	X	Support of Excavation
X		LEED Certification

Demolition

Demolition was the first phase of construction in the modernization of the cafeteria. The original cafeteria was laden with dilapidated carpet, flooring, equipment etc.. Fortunately, the cafeteria also had some historic pieces that were to be incorporated with the new design in order to pay homage to its history. Removing original ceramic tiles, stone flooring transitions, and stone bases requires a significant amount of time and care. In addition to removing and refinishing those materials, there were various murals painted in the cafeteria that needed proper protection. At one a contractor working on the opposite side of a wall mural punctured the wall and disturbed the mural. Fortunately this was the only incident throughout the construction. Before any of the above can take place, the site must first be declared free from hazardous materials.

Abatement of hazardous materials was a concern throughout modernization of the entire Department of the Interior Building. The cafeteria was no exception. Asbestos could be found all over the site from the glue on flooring tiles, to the insulation of piping. In addition to asbestos, lead paint needed to be removed from all surfaces as well. This abatement period was scheduled to occur during night time shifts. All abatement work was done by the contractor Aceco, and daily air quality monitoring performed by Mactec.

Before Demolition

After Demolition

Structural Steel/ Cast In Place

Column Layout

The Department of the Interior Building structure consist of a steel frame encased in cast in concrete. The building was designed in the 1930's to be an example to the rest of the country by having the most advanced mechanical, electrical, communication and fire proofing systems. Encasing steel in concrete was consider the best fire proofing possible at the time. In addition to fireproofing, encasing steel in concrete led to greater spacing for columns and thus making wider corridors and common areas possible. Most of the structure was left untouched in the modernization of the cafeteria.

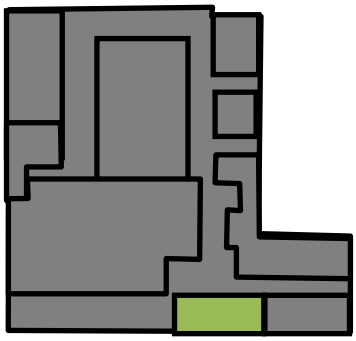
The largest structural feature on this project lies in the new skylight system for the dining room roof. The Dining room roof, lies between Wing 4 and Wing 3, and is one story above grade. The roof is held up by eight main girders that span the entire dining area from north to south. In the original skylight system the roof was completely flat. The new proposed skylights consist of seven pyramid-like skylights that rest on a one foot high cast-in-place curb. The new skylight system adds a significant amount of load to the original roof. After a structural review by Thornton Tomassetti, it was decided that the original steel encased in concrete roof structure could support the load.

New Skylights

Mechanical System

The mechanical system was designed under the following circumstances:

- Summer outdoor design conditions: 91˚F dry bulb, 77˚F wet bulb.
- Winter outdoor design conditions: 17˚F dry bulb.
- Indoor design conditions: 75˚F, 50%RH cooling; 70F heating
- R-19 Walls
- U-0.95 Windows
- R-12.5 Roof
- ASHRAE 62.1 Ventilation Requirements

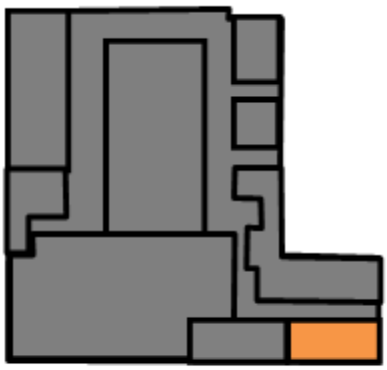


Mechanical Room

The system's cooling is provided by chilled water cooling coils in each of the new air handlers. This chilled water comes from the existing base-building cooling plant. The system's heating is provided from multiple sources. Each air handler receives hot- water from the base-building plant. Reheat coils are furnished in each VAV box with exterior exposure. In addition, electric baseboard heaters are located under every tall window. The dining room, kitchen, IDRA, post office, and two conference rooms each have their own air handling unit that is controlled by individual wall mounted thermostats. The kitchen's air handling unit is a Variable Air Volume unit so as to handle the multiple zones in the kitchen. The entire cafeteria is covered with a dry stand pipe sprinkler system.

Electrical System

The cafeteria project contains a complex electrical system. Between the lighting controls in the dining room, the electric heating, and the multitude of kitchen equipment the electrical system has many different loads to account for. The system brings in power at both 480Y/277 and 208Y/120 due to the different demands for voltage. All existing panel boards and wiring were removed during demolition and replaced by new ones. The power is supplied from the base building's power system and is also backed up by the main building's generator. The IDRA, post office, credit union, and barber shop all have their own panel.



Electrical Room

Electrical Room

LEED Certification

The cafeteria modernization project is working towards achieving a Silver Certification for LEED for Commercial Construction v2.0. The initial design analysis called out 30 "probable" and 17 "possible" points. The construction management process would prove to be vital in this certification due to a significant focus in points through waste recycling, restoration of original materials, material selection from local manufacturers, as well as indoor air quality during construction. A LEED consultant was hired on this project during the design phase and retained throughout the construction period.

Dining Room Planter

Cost Comparision

The following cost information is taken from the general contractor′ s proposal estimate. The final value of their estimate was $7,888,275. At the end of construction, the final cost for the cafetiera modernization was estimated to be between 9 and 11 Million dollars. The escalation from the original price came from a few different factors. The largest factor in the original budget was due to lack of As-Build drawings. Demolition, and Structural cost ran much higher than their original estimated value, due to issues brought to attention during demolition. The GC also placed a lot of the blame in the missed budget, on poor quality drawings. There was a large number of RFIs, change orders, and non-compliance issues do to lack of communication between the architect and the general contractor.

For the D4 Parametric Comparision two projects were taken into account. The first project is the Dogwood Center of Performing Arts in Missouri. This project was 28,000 square feet and cost $5,780,169 (adjusted for location). It was in similar range for size and cost, as well as similar in type of construction because of the importance of finishes. The second project used for comparision was the Main Cafeteria for the Naval Supply Center in San Francisco. Although at 9,400 square feet and $670,494 in total cost, it is much smaller then the cafeteria project, the square foot cost was comparable. In general, it is hard to draw comparison to the cafeteria modernization project. Multi-use space, basement location, high quality kitchen, no fascade, and historic renovation are all factors that drive cost but are project specific.

The last comparison was taken using R.S. Means online. R.S. Means is not a good tool for estimating a renovation that is almost fully enclosed by another structure. This estimate proved to be the least useful because of this reason. The amount of demolition, abatement, kitchen equipment, high quality Mechanical and Electrical systems necessary for the cafeteria modernization could not be taken into consideration. Instead, R.S. Means takes into account fascade, exterior walls, basic finishes, little to no kitchen equipment, and a full roofing system, all of which do not apply to the cafeteria project.

Project Cost

	Cost	Cost Per Square Foot
Construction Cost (CC)	$6,310,335	$225.85
Total Construction Cost (TC)	$7,888,275	$282.33

Building Systems Cost

Item	Cost	Cost Per Square Foot
Demolition	$76,221	$2.73
Structural	$279,393	$10.00
Mechanical	$2,280,607	$81.63
Electrical	$840,594	$30.09
Sprinkler	$25,944	$0.93

D4 Parametric Estimate

Building: Dogwood Center of Performing Arts Renovation

Item	Cost	Cost Per Square Foot
Demolition	N/A	-
Structural	489,123	17.46
Mechanical	985,400	35.20
Electrical	833,146	29.75
Sprinkler	N/A	-

Building: Main Cafeteria, Naval Supply Center

Item	Cost	Cost Per Square Foot
Demolition	$15,656	$1.66
Structural	$3,025	$0.32
Mechanical	$181,785	$19.33
Electrical	$94,000	$10.00
Sprinkler	$8,000	$0.85

R.S. Means

Using meanscostworks.com, a R.S. Means Sq. Foot Estimate was taken. Using the following data a final estimate price of $4,024,0000 was achieved.

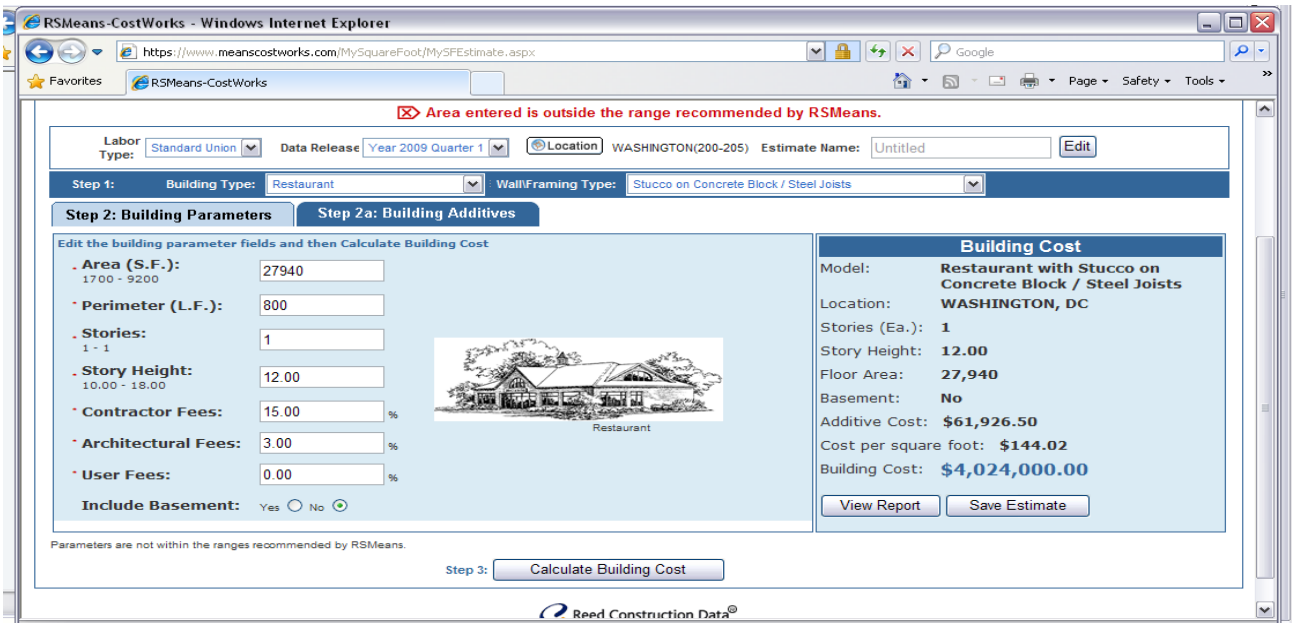
Area: 27,940 SF

Perimeter: 800 LF

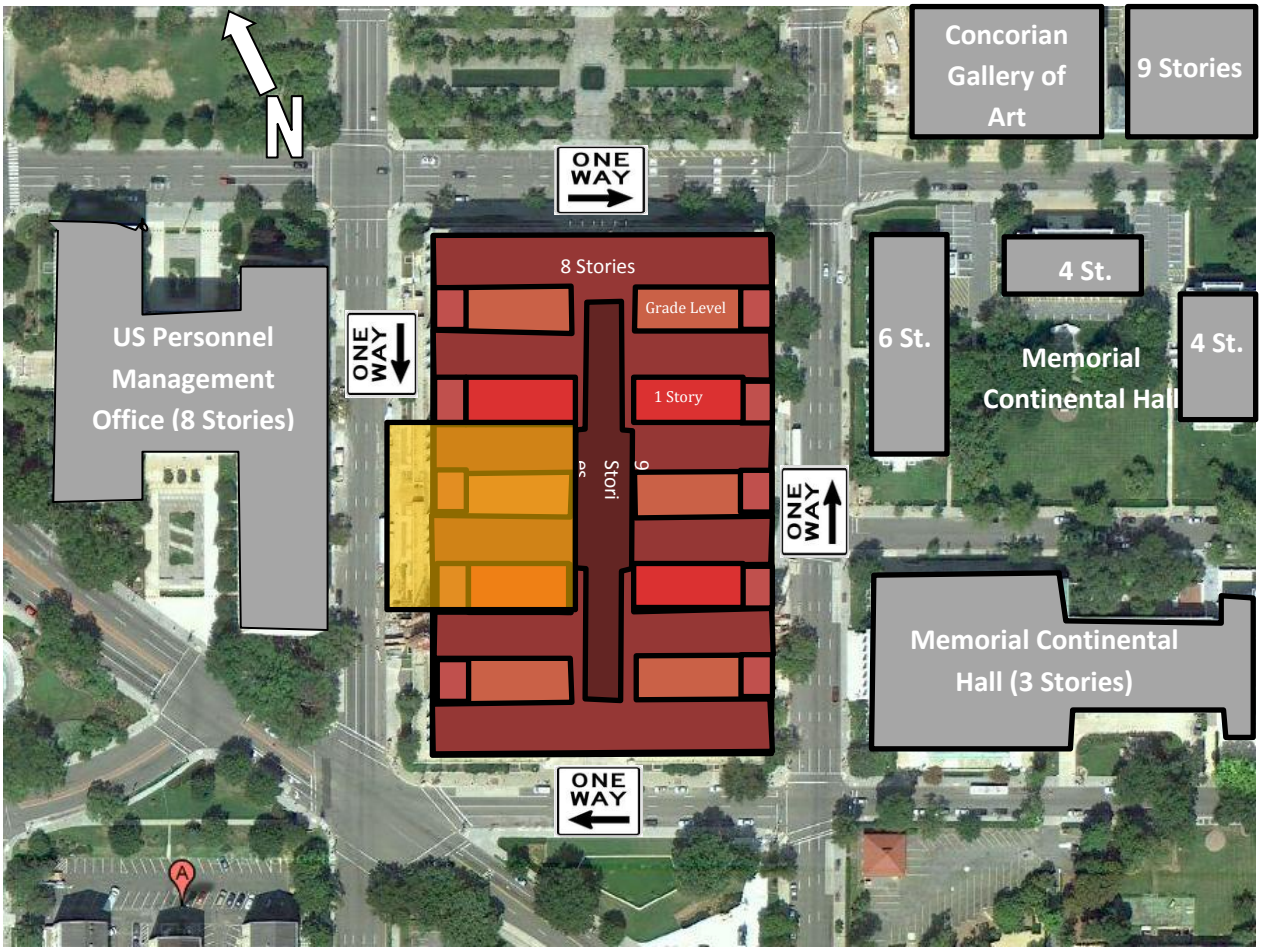
Stories: 1 @ 12 ft Story Height

15% Contractor Fee and 3% Architect Fee

Every Additive for Kitchen Equipment was added as well

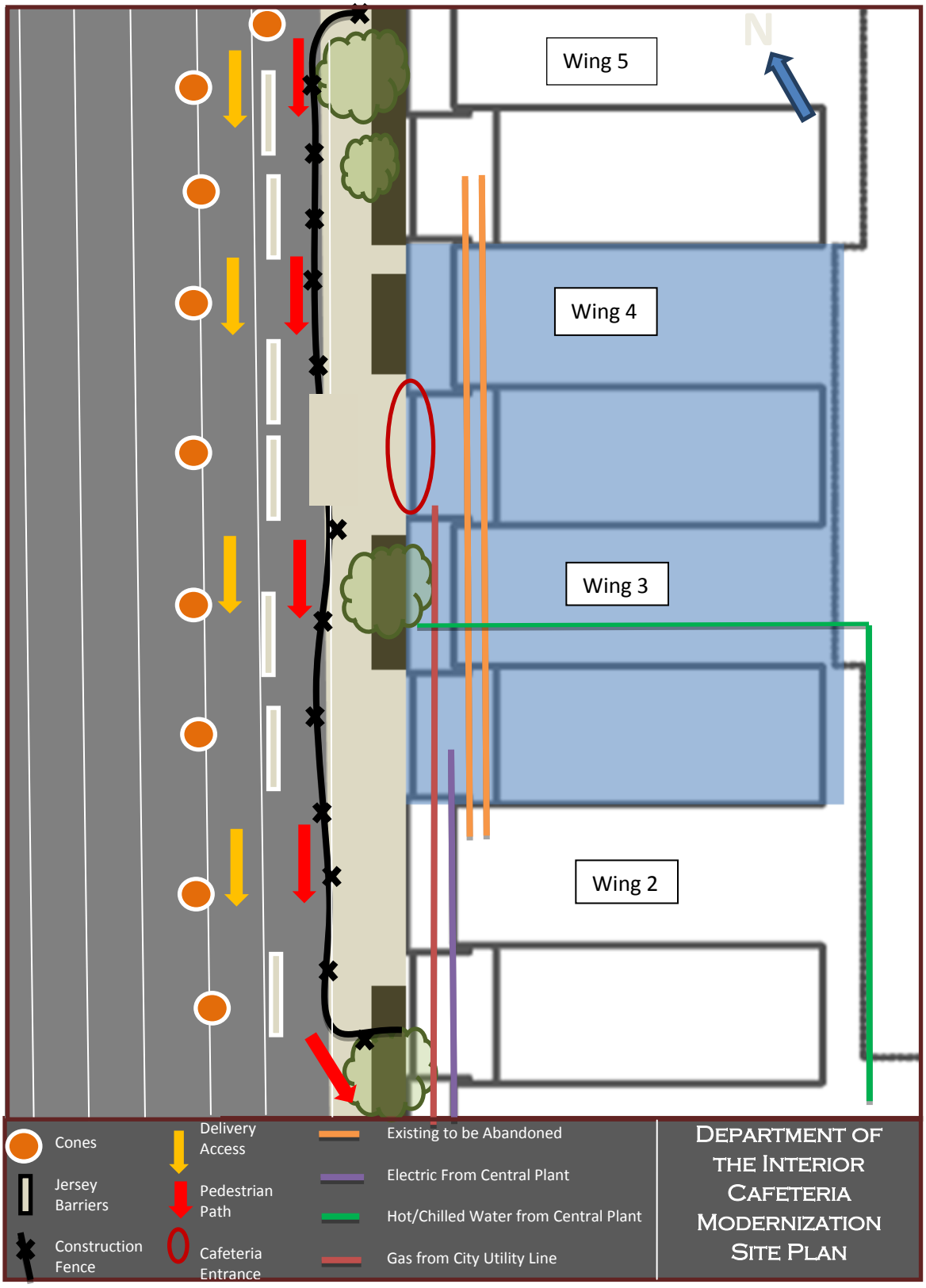


Existing Site Plan



The Department of the Interior building is located in the Foggy Bottom Section of Washington D.C., just east of the Washington Monument and White House. As with building in any city, parking is at a premium. Two hour limited parking is available on most city streets and while some parking is available in the parking garages, most workers commute by the Washington Metro System. 19TH Street is the only access road to the cafeteria entrance. It is a five lane road that has been reduced to three lanes due to the cafeteria construction (Refer to Site Plan for pedestrian/traffic/delivery patterns). Need for further lane closure must be schedule during night shifts, and receive District approval. Delivery schedules must take into account daytime and rush hour traffic as well as presidential motorcade road blocks.

Construction Site Plan



Local Conditions

Washington D.C. is one of the largest markets for construction in the world. Between the building codes, zoning, water table height, population density, and traffic, it is also one of the most challenging places to build. The following were construction issues that were a result of the local conditions.

Concrete

As most experienced in DC construction are aware, concrete is king. This is true due to the restriction on building height according to the district zoning regulations. DOI was unique in that its structural system consisted of steel beams encapsulated in concrete, as opposed to the usual reinforced concrete structures. The cafeteria modernization did not have to take any of this into account, but there was significant concrete placement on the project. The availability of concrete and the number of skilled concrete contractors drove down the price and drove up the quality of placement on this project.

Terrazzo

Terrazzo is a popular flooring material used in government office buildings. The popularity of terrazzo in the DC area made finding competent contractors and quality materials an easy task.

Stone

Popular throughout the Department of the Interior Building, black quarry stone is used from flooring transitions, to baseboards, to door trim. This historic stone was pulled from a quarry in DC in the early 1920's that is no longer in use. Somehow, a piece of historic stone that had been taken out for preservation was lost and needed to be replaced. Unfortunately no such local stone could match the historic one. In the end a close match was shipped in from a Tennessee quarry.

LEED Considerations

A few LEED points were considered easily achievable, such as local material selections and a sustainable site. Washington, D.C.,, being the construction epicenter that it is, made the selection of materials from within a 500 mile radius easily achievable. The location of the DOI Building in regards to public transportation and various shopping facilities also made the sustainable site selection credits feasible.

Parking

There is no on-site parking due to the location of this project. Local parking garages were available for $15/day. The Metro System is the most popular means of transportation with a bus station on the block over and the Metrorail being 5 blocks away. There is room for a truck or two within the construction fence on 18th and 19th street, but only for quick drop on and offs.

Any cranes or delivery trucks can only access the site at night, when more than one lane shut down in possible. All lane closures must be worked out through the District.

Recycling/ Tipping Fees

One dumpster is available onsite for garbage. It is sorted for recyclables off site. The typical tipping fee is $500.

Soil/Subsurface Conditions

Washington D.C. was built on top of a swamp, and thus has a low water table. One morning, a half hour thunderstorm overflowed the city sewer system, and flooded every neighboring street as well as the mechanical and electrical room in the cafeteria. This being said, waterproofing, rebar coverage, drainage, and structural foundations needed more than normal consideration.

Owner Background

The General Service Administration is an independently run government organization. Their purpose is to support all of the government agencies by means of office space, transportation, communication or whatever means necessary. Those in the construction industry know GSA as the owner of all government buildings. In the DC area in particular, GSA is the largest employer of construction services. Working with GSA as an owner provides a unique scenario, in that many of their employee's actually have engineering and construction degrees. The GSA representatives on the Department of the Interior Modernization Project have been acting as an owner on construction project for 20-30 years.

Department of the Interior Cafeteria

This project is a GSA owned building that has been leased to the Department of the Interior since the 1920's. The cafeteria serves both DOI and other government employees working in neighboring buildings. The existing DOI cafeteria had been last updated in the 1970's. The outdated architectural appearance, the closed in ceiling, inefficient mechanical system, and dilapidated kitchen area were due for modernization. Before the design phase, a feasibility study was taken to determine the factors that will provide a better cafeteria for DOI employees , neighboring government workers, and day-to-day visitors. This feasibility study was critical in determining a new vendor that would eventually occupy this the cafeteria's kitchen. In addition to the cafeteria's kitchen, there are two conference rooms and four offices spaces. The occupants of the four offices space will also serve to enhance the quality of life for those who occupy the Department of Interior Office Building. A new post office will allow government employees to handle all their mailing needs while at work. An Interior Department Recreation Association(IDRA) office will serve as a gift shop for visitors. In addition, a new credit union, and barber shop will allow visitors and employees run their daily errands during work hours. In conclusion, the mission critical is to provide all those who spend time in the DOI Building with a better quality, easier, and more efficient experience.

Logistics

The cafeteria project creates all kinds of logistical concerns in regards to time to cost, quality, schedule, safety, and phasing:

Cost

The cafeteria is being built under a Price to be Determined Later agreement. This being said, GSA requested an estimate by the architect, CM, and GC before any notice to proceed. It expected that Grunley will complete this project within range of those estimates. A negotiation meeting will be held at the end of construction, where all parties will come together to sort out cost that have

exceeded original estimation. Grunley agrees to a PDL keeping in mind that GSA provides them with a large amount of work, both on this project and others. Jacobs, is responsible for keeping track of Grunley's construction cost and watching out for the owner's best interest.

Quality

GSA expects quality in both materials and craftsmanship. It is up to Grunley to manage their subcontractors' quality of work. It is Jacobs responsibility to ensure that all construction is per contract documents. It is Shalom Baranes' responsibility to ensure that all contract documents are per code, and owner's specifications. In the end, the quality of the cafeteria modernization rested in each party's hands.

Schedule

Grunley began abatement in March of 2009. They were expected to have the cafeteria handed over in February of 2010. Due to unforeseen existing conditions, Grunley was significantly behind schedule. Conveniently, GSA was unable to procure a cafeteria vendor by their desired date, and thus Grunley was allowed to push back completion until August. August was an absolute deadline, because the vendor's contract stated that they could occupy the space by then.

Safety

Throughout the construction of the cafeteria, neighboring office spaces were being occupied. It was critical that DOI employees were not affected at all by any construction processes. Temporary Walls were built to separate the construction area from the neighboring corridor. Negative air pressure was maintained to ensure that no construction odors or pollutants could enter occupied space. In addition to the occupants' safety, any party that entered the construction area was forced to abide by the Grunley Construction Safety Plan. Hard hats, protective eye wears, and steel toed boots were required at a minimum at all times.

Phasing

The Department of the Interior building consist of six wings, with a large corridor running down between them. The Cafeteria lies under Wing 4 and Wing 3. It was decided that the Cafeteria would be included within the Wing 3 phase, but not begin until halfway through Wing 3 Construction. Originally Wing 3 and the cafeteria were supposed to be completed at the same time, but delays in the cafeteria pushed back the completion date as mentioned above.

Project Delivery Method Narrative

Contracts

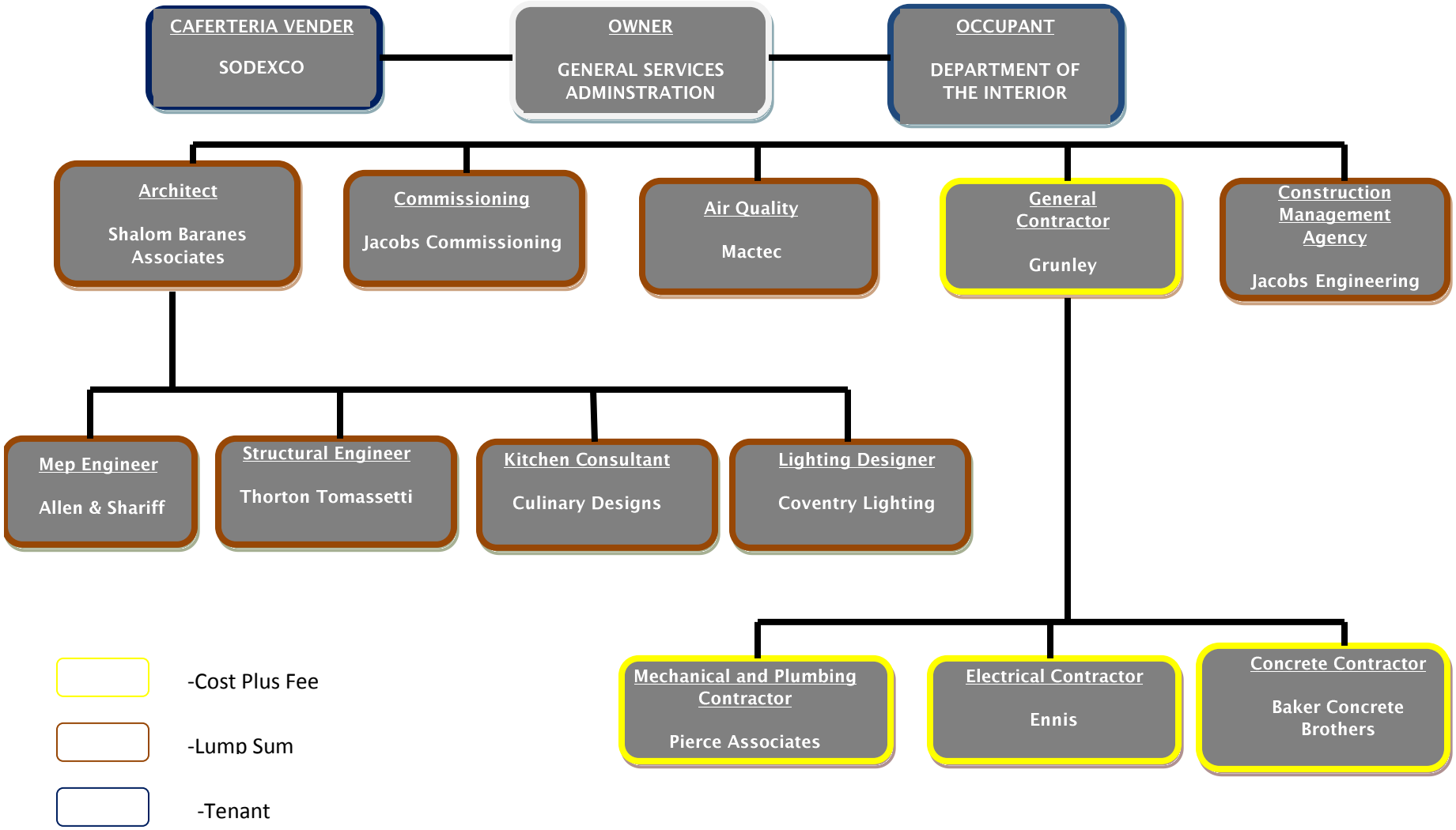
As previously stated, the Department of Interior Modernization Project was awarded to Grunley Construction Company for Wing 6 based on a Design-Bid-Build delivery method in 2001. Each addition to the original contract ("Option"), has been proceeded upon under a PDL (Price Determined Later) agreement. The cafeteria is actually a Change Order for the Option 3/Wing 3 contract. Also a PDL, the cafeteria is treated as a Cost Plus Fee contract with room for negotiation on the cost for construction. Between Grunley already being on-site, prior knowledge about this building's construction, and an existing relationship with rest of project team, this is the best delivery method for the cafeteria. A contract with a PDL requires a lot of trust between the CM, GC, and owner. A PDL only works in this system because of the potential for repeat business that comes with working for GSA. Additionally, Grunley holds bonding and the insurance plan on the rest of the building's construction and thus providing a cost savings for the owner.

The original construction management contract was awarded to Tishman Construction. After the Completion of Wing 5, the owner opted to release Tishman Construction and go with Jacobs Engineering as the Construction Management Agency. Jacobs is hired under a Lump Sum contract.

Finally, the architect of the Department of Interior Modernization Project, and particularly the cafeteria is Shalom Baranes Associates. The architect holds all the contracts with the engineering and design subcontractors. Shalom Baranes subcontracts engineering and design services out for whatever they cannot complete in-house.

Communication

All design communication runs through Shalom Baranes Associates. Any RFI or submittal will come through them, and then passed down to the appropriate engineer or designer. All construction communication runs through Grunley. Grunley must follow government regulations for contractor selection (minority owned contractors, bidding process, bidding invitations, etc.). Any communication between the construction team, the design team, and the owner runs through Jacobs Engineering. Jacobs acts solely for the Owner's Interest and thus only holds a contract with the owner despite lines of communication with every party.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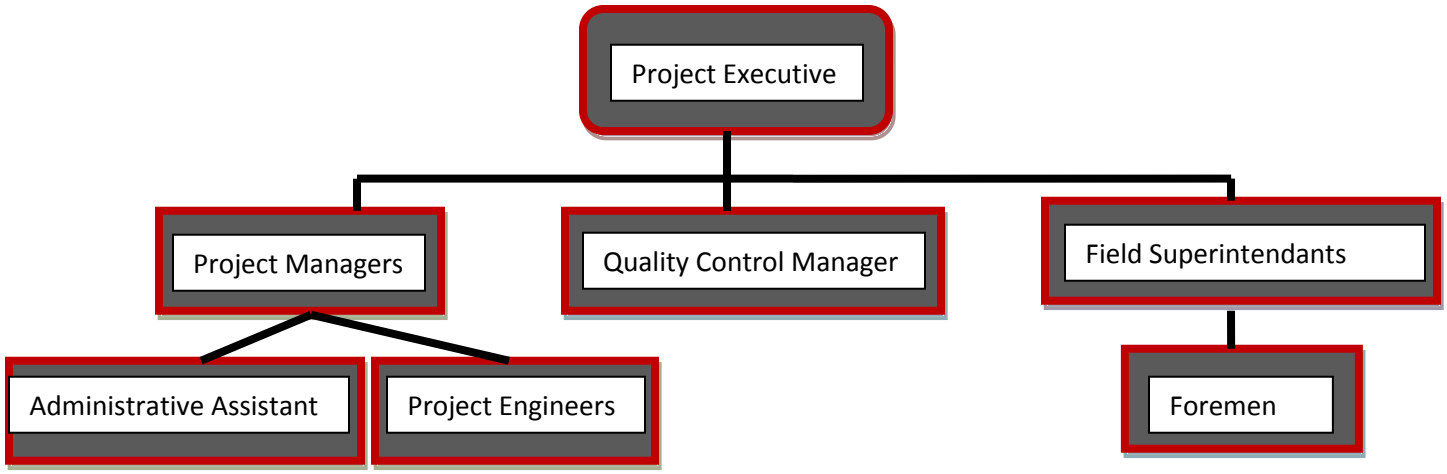
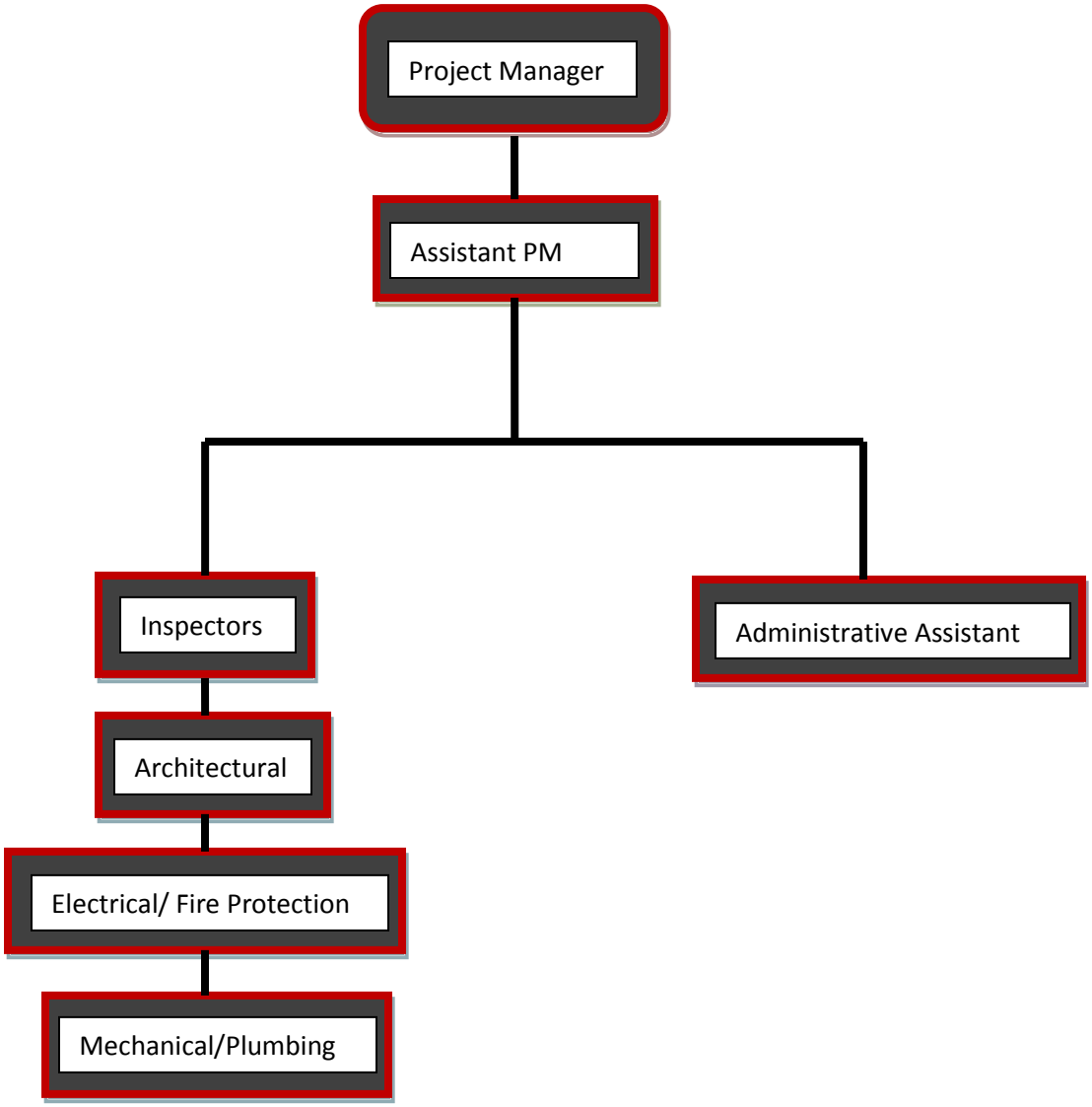
SODEXCO
OWNER
GENERAL SERVICES ADMINSTRATION
OCCUPANT
DEPARTMENT OF THE INTERIOR
Architect
Shalom Baranes Associates
Commissioning
Jacobs Commissioning
Air Quality
Mactec
General Contractor
Grunley
Construction Management Agency
Jacobs Engineering
Mep Engineer
Allen & Shariff
Structural Engineer
Thorton Tomassetti
Kitchen Consultant
Culinary Designs
Lighting Designer
Coventry Lighting
Mechanical and Plumbing Contractor
Pierce Associates
Electrical Contractor
Ennis
Concrete Contractor
Baker Concrete Brothers
-Cost Plus Fee
-Lump Sum
-Tenant

Grunley Construction Company



Jacobs


Project Manager
Assistant PM
Inspectors
Administrative Assistant
Architectural
Electrical/ Fire Protection
Mechanical/Plumbing

The Cafeteria Modernization presented both the General Contractor and the Construction Manager with a staffing dilemma. The cafeteria project ran simultaneously with the modernization of Wing 2 and Wing 3. While it needed enough staff to handle the $10 Million change order, it was not large enough to allocate personnel solely to the cafeteria. Both Grunley and Jacobs decided to assign management personnel to strictly handle the cafeteria, while using the rest of the team to work on both the cafeteria and wing modernizations.

Grunley assigned one project manager and one super-intendant to head up the cafeteria. The quality control manager, project engineers, administration as well as the field laborers and foreman split their time between the cafeteria and wing projects. Jacobs on the other hand, assigned an assistant project manager to lead the construction management, while splitting the rest of the staff's time between projects.

Laborer Working On Window Frame