Wesley A. Brown Field House

Peter Schneck

Construction Management

Existing Construction Conditions

Peter Schneck
Construction Management
Technical Assignment # 1

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A. Executive Summary

This document will provide a introduction to the current construction of the Wesley A. Brown Field House. The Field House is located on the United States Naval Academy's campus in Annapolis, Maryland. A overlook of the project schedule, building systems, and a project cost evaluation will be presented.

Wesley A. Brown Field House was awarded as a Design-Build project. The owner, The Naval Facilities Engineering Command, awarded the project on a best value evaluation. Value was determined by past performance, management/technical issues, subcontracting plan, design, staffing plan. The staffing plan was of particular concern, because the government requires a large percentage of the building to be subcontracted to small businesses.

The new Field House that the NAVY intends to build, is a state-of-the-art facility. They believe that in order for the United States Naval Academy to remain one of the United States most prestigious institutions, that it needs the matching facilities for their staff, guests, and students. The project systems will highlight some of the unique features of the Field House including a hydraulic track and a roll-out turf football field.

The cost analysis will show that this is no normal facility. R.S. Means and a D4Cost estimate will illustrate that the NAVY is willing to spend a large sum of money, approximately $45 million dollars, in order to build a world class Field House for their athletes. The estimates will show that similar functioning facilities do not usually cost near as much as the Wesley A. Brown Field House, and for good reason.

B. Project Schedule Summary

(Please refer to appendix A)

It was important to procure a pile contractor as soon as possible. Test piles need to be driven and tested before the true installation of the piles can take place. If the pile contractor was not procured quickly the test piles would not be driven in time to get proper testing done. If that would have occurred the entire schedule would have been greatly affected.

It is also important to note the site is very tight. Therefore, there would not be much room for a crane to fly steel. Most likely a crawler crane will be used for this operation, so it can gradually work its way out. If something blocks the cranes path, there might be a problem getting it back out. Careful coordination will be needed to the steel placement.

The major finishes that needs to be coordinated is the hydraulic track. It is located at the end of the schedule so nothing can damage the extremely expensive item. However, moving the track in and getting everything to fit perfect will probably take some time. Hopefully, there are not mistakes, otherwise if an adjustment to a long lead item like the track, the project finish date could be set back.

C. Building System Summary

Primary

Construction-

Wesley A. Brown Field House is a Design-build project. Hensel Phelps pre-qualified, through past performances, along with 3 other competitors to bid the project. Hensel Phelps along with a team of architects and engineers developed a design and construction schedule to meet the needs of NAVFAC's RFP. Hensel Phelps won the job through a best value selection. The value was determined through past performance, technical/management factors, subtracting plan, design, and a staffing plan that was communicated to NAVFAC in an oral presentation. The subcontracting plan was of particular interest, because the Government required a minimum of 73.7% of the subcontracting efforts to be small business including; 15.3% SDB, 13.8% WOSB, 3.1% HUBZone Small Business, and 3% SDVOSB. More credited was given for contractors who exceeded this target. Hensel Phelps won the bid and holds a Guaranteed Maximum Price contract

Electrical-

The primary switchgear for Wesley A. Brown Field house is 13.8kV. This feeds 2 main transformers. The secondary double-ended switchgear is 480/277 volt, 3 phase, 4 wire, and 60 hertz. The switchgear distributes electricity for the electrical closets and equipment.

Lighting-

The main field area has pulse start metal halide lighting. The rest of the space is primarily lit by fluorescent lighting. The emergency and exit lighting is powered by backup batteries.

Mechanical-

There are two types of mechanical systems in the Wesley A. Brown Field House. One is a CAV system to condition the field arena and the other is a VAV to condition the other spaces of the Field house. The CAV system is comprise of 2 42,000 CFM AHU's. These units supply low-pressure air to the field space via exposed ductwork. The VAV system is comprised of 100% return air 12,000 CFM AHU for the lockers, a 16,830 CFM AHU for the lobby, a 7,850 CFM AHU for the weight training area, a 3,570 CFM AHU for the treatment area, and a 1,520 CFM AHU for the storage areas. The VAV systems will supply medium pressure via ceiling mounted diffusers. The return air will be collected through ceiling mounted air devices.

Structural-

The field house is comprise of two main systems acting together. The first system is a structural steel system that provides a column free athletic area. The next system is a structure that will enclose the athletic space.

The structural steel system is mainly comprised of Columns that are space 24.5ft apart along the north and south of the building. The typical size for these columns are W 360 x 134. These columns support box trusses that span 200ft. The size for a typical main member of these box trusses are W360 x 72.

The foundation system for Wesley A. Brown Field House consists of 406mm Drilled Pressure Grouted Displacement Piles. These supported a two-way .25M thick concrete slab.

The enclosure system is comprised of precast concrete panels. These panels range from 6" in thickness to 15" in thickness.

Secondary

Fire Protection-

The fire protection system is an intergrated system of suppressing fires and notifying the occupants inside the facility that there is a fire. The suppression system is a wet pipe automatic sprinkler system that completely covers all area of the field house. The standpipe system is Class I. There are mounted fire extinguishers placed within recessed cabinets in the main areas of the building, and surface mounted cabinets are provided in the support spaces. There is a electrically supervised, addressable intelligent, manual and automatic, annunciated fire alarm and detection system throughout the facility. Manual pull stations, duct smoke detectors, heat detectors, audio/visual alarms, fire alarms radio transmitter and electrical supervision of all sprinkler system alarm and supervisory devices are included in the fire alarm system

Transportation-

There are 3 elevators in Wesley A. Brown Field House. All are hydraulically operated. There are 2 passenger elevators, one located by the lobby and the other in the middle of the south elevation of the building, with two stops. The 3rd elevator is a freight elevator with two stops, located on the west side of the building in the loading dock area.

Telecommunications-

The communications system will be provided from the on campus network system facility. The voice and data services and Category V services are available throughout the building. An intercom system is in the Field Area and Weight Training area.

Hydraulic Banked Track-

A six lane 200m hydraulically banked track is to be installed in the Wesley A. Brown Field House. The track requires a bearing capacity of 500 kg/sqm in the lowered position, 200 kg/sqm in the raised position. The track is manufactured by "Mondo" and is made up of a steel frame supported by steel beams. The frame fitted with a 21mm thick plywood with a resin coat. There is a two-layer track surface that is fixed to the plywood with adhesive. Automated cylinders operated from a computer system provide progression of the curve at all angles. The track, when not inclined needs to sit flush with its surroundings.

Synthetic Surface System-

A roll-out synthetic football field is located at the east end of the Field House. The field will consist of synthetic turf knitted using nylon and a 5/8" shock pad. The field will be able to cover the field house floor without being labor intensive. Hydraulic driven winches will help pull the field into proper position. Air blowers with electric drives are required for pneumatic lift for lifting and lowering the field into its storage pit. The field meets all football and soccer playing requirements and takes no longer than 2 hours to roll-out and no more the 1 hour to place back into its storage pit.

D. Project Cost Evaluation

Construction Cost:

$32,000,000.00

Construction Cost/SF:

$237.69

Total Project Cost:

$45,500,000.00

Total Project Cost/SF:

$336.50

Major Building System Costs

Mechanical:

$7,700,000.00

Electrical:

$4,600,000.00

Structural:

$7,500,000.00

Parametric Estimate

D4 estimated the cost of Wesley A. Brown Field House as $25,708,947

Please See Appendix B

Square Foot Estimate

($123.17/ft x 135160ft) + (2 passenger elevators at $47,900) + (1 freight elevator at $70,000) = $18,271,790.00

Obtained from RS Means

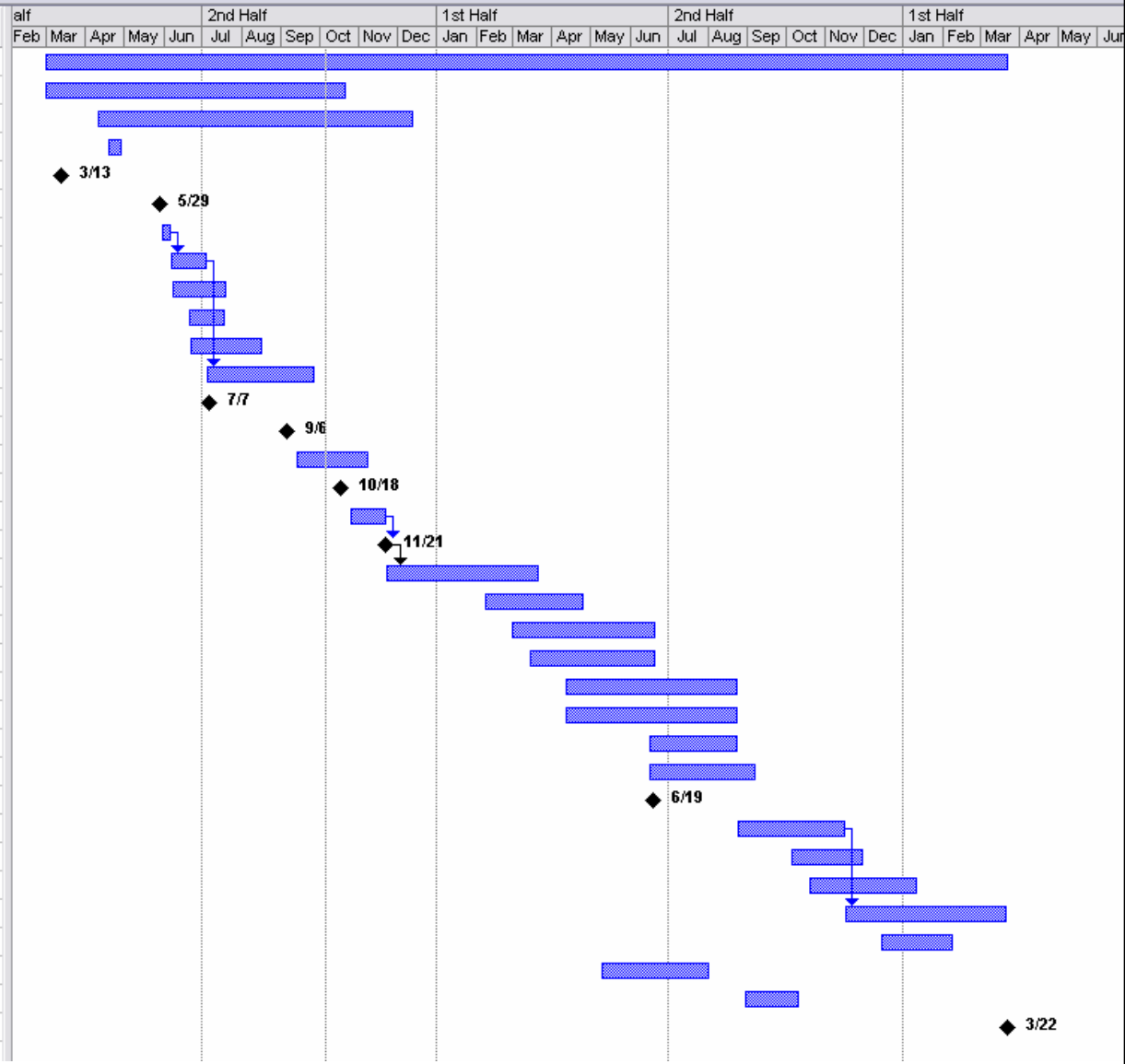
Comparison

Both estimates come in way below the actual cost. There are many issues that there is a large difference between the estimates and the actual cost. For starters Wesley A. Brown Field House is intended to be a world class athletic facility. Therefore, any comparison with other similar functioning buildings will not be close because those typical buildings do not have all the upgrades and amenities that Wesley A. Brown Field House contains. Specialty items such as a roll-out football field and a hydraulic track are especially expensive, basically they specially manufactured and they are definitely not common. Buying and installing equipment like that not only is expensive because the product costs that much, but because there is a high risk in installing a new item such as these.

Not only is Wesley A. Brown Field House a world class facility, but it is located on a Naval Base and is owned by the government. There are many restrictions for getting materials onto a base, and therefore the cost and scheduling of that must be accounted for when doing an estimate on a project like Wesley A. Brown Field House. Also, because the field house is ultimately owned by the government, there is a small business clause that also increases the project cost.

Wesley A. Brown Field House Schedule

	Task Name	Duration	Start	Finish
1	Contract Duration	539 days?	Tue 2/28/06	Fri 3/21/08
2	Design	169 days?	Tue 2/28/06	Fri 10/20/06
3	Procurement & Fabrication	177 days?	Mon 4/10/06	Tue 12/12/06
4	Mobilization	9 days?	Tue 4/18/06	Fri 4/28/06
5	Concept Design Complete	0 days	Mon 3/13/06	Mon 3/13/06
6	Commence Construction	0 days	Mon 5/29/06	Mon 5/29/06
7	Install Erosion Controll	5 days?	Tue 5/30/06	Mon 6/5/06
8	Site Demo	20 days?	Tue 6/6/06	Mon 7/3/06
9	Utility Relocation	30 days?	Wed 6/7/06	Tue 7/18/06
10	Site Prep for Piles	20 days?	Tue 6/20/06	Mon 7/17/06
11	New Utility Install	40 days?	Wed 6/21/06	Tue 8/15/06
12	Install Perimeter & Pit	61 days?	Tue 7/4/06	Tue 9/26/06
13	Design Development	0 days	Fri 7/7/06	Fri 7/7/06
14	100% Design Complete	0 days	Wed 9/6/06	Wed 9/6/06
15	Import Fill	40 days?	Wed 9/13/06	Tue 11/7/06
16	Final Design Complete	0 days	Wed 10/18/06	Wed 10/18/06
17	Install Piers	20 days?	Wed 10/25/06	Tue 11/21/06
18	Stand Steel	0 days	Tue 11/21/06	Tue 11/21/06
19	Install Structural Steel	85 days?	Wed 11/22/06	Tue 3/20/07
20	F/R/P Structural Slab	55 days?	Wed 2/7/07	Tue 4/24/07
21	Install Exterior Skin	80 days?	Wed 2/28/07	Tue 6/19/07
22	Install Roofing	70 days?	Wed 3/14/07	Tue 6/19/07
23	Mechanical System Rough	97 days?	Wed 4/11/07	Thu 8/23/07
24	Electrical System Rough-In	97 days?	Wed 4/11/07	Thu 8/23/07
25	Special System Rough-In	50 days?	Fri 6/15/07	Thu 8/23/07
26	Install Interior Walls	60 days?	Fri 6/15/07	Thu 9/6/07
27	Dried-In	0 days	Tue 6/19/07	Tue 6/19/07
28	Paint Interior	60 days?	Fri 8/24/07	Thu 11/15/07
29	Install Flooring	40 days?	Fri 10/5/07	Thu 11/29/07
30	Track & Field Special	60 days?	Fri 10/19/07	Thu 1/10/08
31	Punchlist	90 days?	Fri 11/16/07	Thu 3/20/08
32	Equipment	40 days?	Fri 12/14/07	Thu 2/7/08
33	Exterior Sitework	60 days?	Wed 5/9/07	Tue 7/31/07
34	Paint Exterior	30 days?	Wed 8/29/07	Tue 10/9/07
35	Project Complete	0 days	Sat 3/22/08	Sat 3/22/08



Estimate of Probable Cost

Wesley A. Brown Field House - Feb 2006 - MD - Annapolis

Prepared By:		Prepared For:	
	,		,
	Fax:		**Fax:**
Building Sq. Size:	**150000**	Site Sq. Size:	**382392**
Bid Date:		Building use:	
No. of floors:	**2**	Foundation:	
No. of buildings:		Exterior Walls:	
Project Height:		Interior Walls:	
1st Floor Height:		Roof Type:	
1st Floor Size:		Floor Type:	
		Project Type:	

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**2.21**	**3.78**	**567,723**
	Bidding Requirements	2.21	3.78	567,723
01	**General Requirements**	**3.67**	**6.29**	**943,026**
	General Requirements	3.67	6.29	943,026
02	**Site Work**	**5.68**	**9.74**	**1,460,775**
	Site Work	5.68	9.74	1,460,775
03	**Concrete**	**11.50**	**19.70**	**2,955,643**
	Concrete	11.50	19.70	2,955,643
04	**Masonry**	**10.87**	**18.62**	**2,793,434**
	Masonry	10.87	18.62	2,793,434
05	**Metals**	**12.79**	**21.93**	**3,289,362**
	Metals	12.79	21.93	3,289,362
06	**Wood & Plastics**	**0.89**	**1.52**	**227,818**
	Wood & Plastics	0.89	1.52	227,818
07	**Thermal & Moisture Protection**	**6.85**	**11.74**	**1,761,569**
	Thermal & Moisture Protection	6.85	11.74	1,761,569
08	**Doors & Windows**	**2.97**	**5.09**	**763,103**
	Doors & Windows	2.97	5.09	763,103
09	**Finishes**	**7.96**	**13.64**	**2,045,954**
	Finishes	7.96	13.64	2,045,954
10	**Specialties**	**0.76**	**1.30**	**194,916**
	Specialties	0.76	1.30	194,916
11	**Equipment**	**1.07**	**1.84**	**275,421**
	Equipment	1.07	1.84	275,421
12	**Furnishings**	**0.12**	**0.21**	**31,350**
	Furnishings	0.12	0.21	31,350
13	**Special Construction**	**6.65**	**11.39**	**1,708,833**
	Special Construction	6.65	11.39	1,708,833
14	**Conveying Systems**	**0.42**	**0.72**	**107,808**
	Conveying Systems	0.42	0.72	107,808
15	**Mechanical**	**17.59**	**30.14**	**4,521,339**
	Mechanical	17.59	30.14	4,521,339
16	**Electrical**	**8.02**	**13.74**	**2,060,870**
	Electrical	8.02	13.74	2,060,870
Total Building Costs		**100.00**	**171.39**	**25,708,947**

Total Site Costs	**100.00**	**0.00**	**0**
Total Project Costs	**--**	**--**	**25,708,947**

Wesley A. Brown Field House

Peter Schneck

Construction Management

Technical Assignment 1

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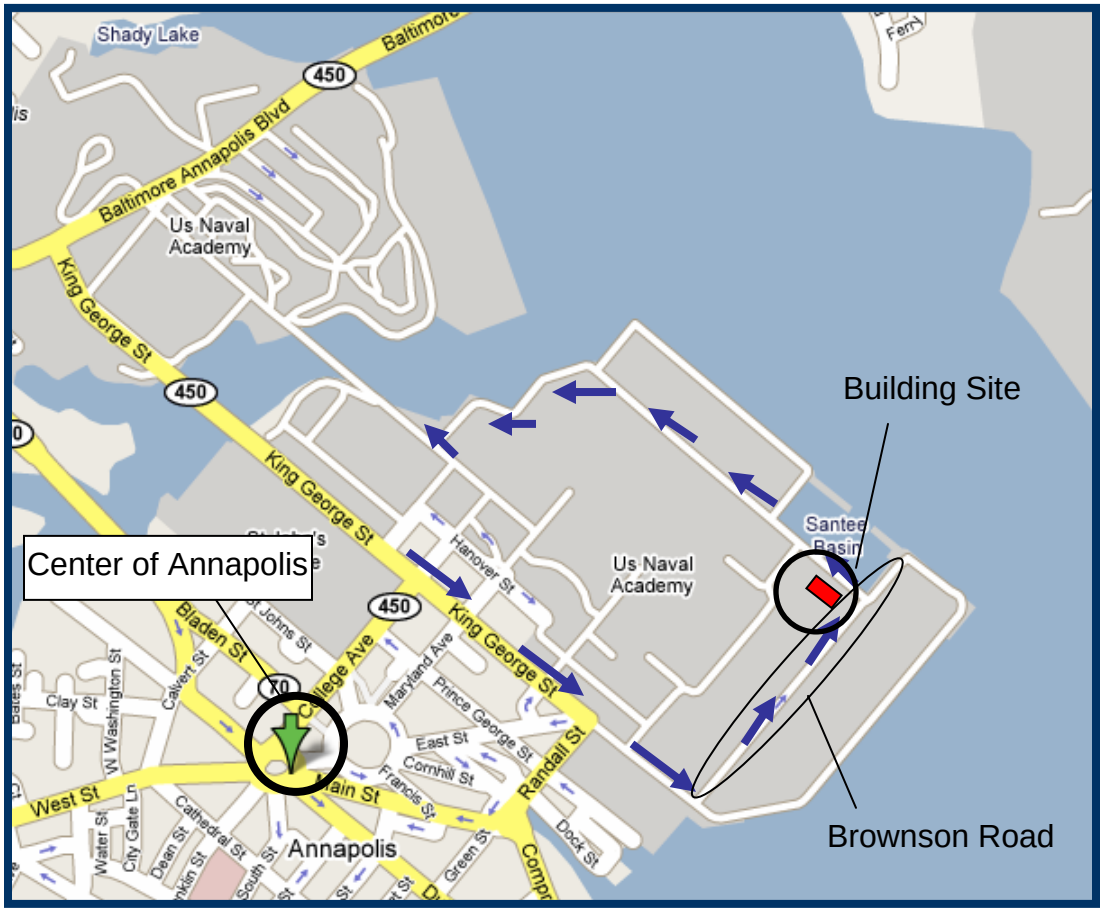
A. Site Plan of Existing Conditions

The Wesley A. Brown Field House is located in Annapolis, Maryland only a few miles from the center of the city. The building is located within the United States Naval Academy's campus overlooking the Santee Basin. The site is bounded by existing buildings and two roads; Holloway Road to the Northwest, and Brownson Road to the Southeast. Due to strict regulations of vehicular access on the United States Naval Academy's Campus and the fact that Brownson Road is one way headed Northeast, there is only one viable option for construction material to get to the site. Entering the campus coming from King George Street, then taking a left on Brownson, trucks can deliver materials to the site and then leave taking Halloway Road back off campus.



B. Local Conditions

Wesley A. Brown Field House is located in the center the United State Naval academy in Annapolis Maryland. The site is contained within Brownson and Santee Road on the southeast and northeast sides respectively; and Bancroft and McDonough Halls on the Southwest and Northwest sides respectively. The site is relatively level, ranging from 4 to 8 feet above sea level. Most of the trees that occupied the site have been previously removed, so that the land could be used as a staging and storage area for other construction projects on the campus. All the materials were moved prior to start of construction by Hensel Phelps.

Annapolis is located just Northeast of Washington D.C. Construction in this region have predominately been concrete structures. Although Wesley A. Brown is utilizing a steel frame, precast concrete panels are a major element in the building's envelope.

Hensel Phelps will dedicate a space, no smaller than 275 square feet, for the collection of recyclable materials. Also, at least 10% of all materials used in the construction will contain recycled content.

There is limited parking on the United States Naval Academy. Due to the limited parking availability, Hensel Phelps was only granted minimal area to park vehicles. Also, the academy is a Naval Base. Only those vehicles with proper clearance are allowed on site. Hensel Phelps, to combat the strict regulations and limited area for parking, is providing a shuttle service to a parking lot off the campus to pick up workers.

The soil on site does pose a threat to workers or others on the site, but it does contain petroleum containments. Therefore, any spoils are not allowed to be used fill and

must be disposed of properly. Also, the site stands where the basin waters use to occupy. Over time the academy has expanded its land by continuing to create sea walls further and further out. Due to the poor documentation of this process, excavation has uncovered many unforeseen material such as old bricks, blocks, and shells.

C. Client information

The client for the Wesley A. Brown Field House is the Naval Facilities Engineering Command, and more specifically the United State Naval Academy. The Naval Academy is one of the most prestigious educational institutions in the United States. The Academy's mission first and foremost is to maintain this standing. In order to do so, the Institutional needs to provide adequate facilities to its students and staff.

A number of studies were taken on the facilities of the Naval Academy. These studies suggested that there was a need for a new field house facility. The Navy's intent for Wesley A. Brown Field House, is to provide a state-of-the-art multi-purpose field house for athletic competition. The design and location of the field house will project the Naval Academy's dedication to physical fitness. The project, being the first major construction project in many years, will also be sensitive to the Academy's rich past, but provide a new image for the future.

The United State Naval Academy's major priority for the Wesley A. Brown Field House, to provide quality and ample space for its sports programs. The space program, developed by NAVFAC, was determined after several meetings with athletic staff and Academy officials. The discussion not only included the need for updates of current facilities, but the potential for growth in the future. Through this, and statements included within the RFP, such as "state-of-the-art" and "world class," it is clear that the Academy's major focus is the quality of the Wesley A. Brown Field House. The Naval Academy wants the design and construction of the field house to superior and the functionality for the athletes, spectators, and broadcasters excellent.

D. Project Delivery System

2.4.1Project Delivery System Description and Purpose

The delivery method for the Wesley A. Brown Field House is Design-Build. The United States Naval Academy pre-qualified bidders based on the past performance of highly rated competitors. Only 4 bidders, including Hensel Phelps, were pre-qualified. The pre-qualified bidders were judged on factors including past performance, technical/management factors, subcontracting plans, design, and their staffing plan. The Government selected the contractor whom they felt gave them the best value for their money.

(In Reference to organization chart on page 7)

Hensel Phelps holds a Guaranteed Maximum Price contract with Hensel Phelps. The United State Naval Academy is only permitted a certain budget each year. The Academy cannot and will not go over their budget, but wants to use all the available funds that it has been permitted for the Wesley A. Brown Field House. It is up to Hensel Phelps and the team of architects to deliver the best facility possible for that allocated money. Hensel Phelps holds lump sum contracts with the team of architects, engineers, and subcontractors. A major factor in the selection of the Hensel Phelps Design-Build team for Wesley A. Brown, was their past performances working with Hensel Phelps. Hensel Phelps has done at least one job with all the contractors listed on organization chart. Another important selection factor as time goes on and Hensel Phelps signs more subcontractors will be their Small Business standing. There is a strict Small Business clause, and small businesses will get a definite edge over its competition. Hensel Phelps requires any subcontractor placing work for more than $50,000 to be bonded. The a design-build job with a guaranteed maximum price contract is very appropriate for the Wesley A. Brown Field House. The NAVY wanted a world class athletic facility and had

a strict budget. With a Gauranteed Maximum Price the Government knows the project will be within budget, and the design-build delivery method allows for the best value possible by getting input from major team members early on.

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Organization Chart

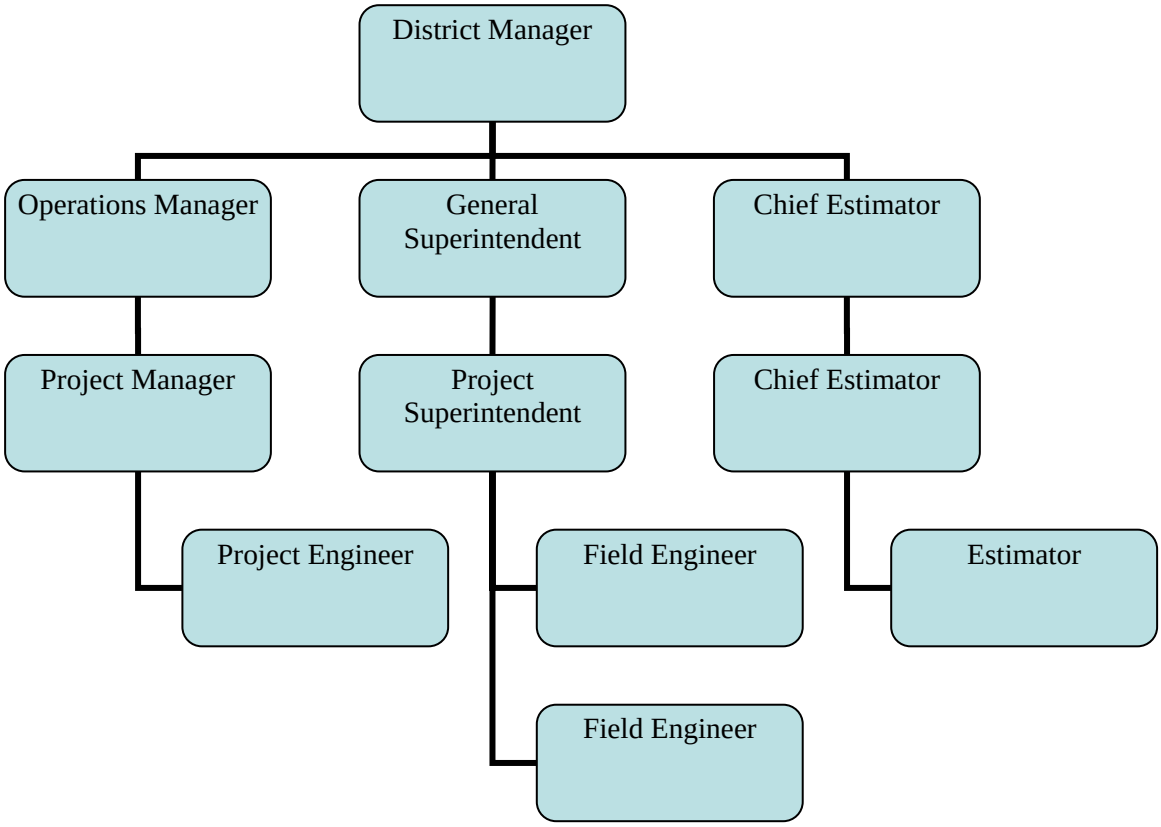
Naval Facilities Engineering Command
Owner

Guaranteed Maximum Price

Hensel Phelps Construction Co.
Construction Manger
Nick Trammer

HKS Inc. **Architect of Record** **Otto Dacosta**	Lump Sum
Mechanical Engineer **Kavocs Whitney & Associates**	Lump Sum
Electrical Engineer **M.C. Dean**	Lump Sum
Associate Architect **Shalom Baranes Associates** **Ari Blumenthal**	Lump Sum
Structural Engineer **Thornton Tomasetti** **Mark Tamaro**	Lump Sum
Fire Protection **National Fire Protection** **George Buell**	Lump Sum

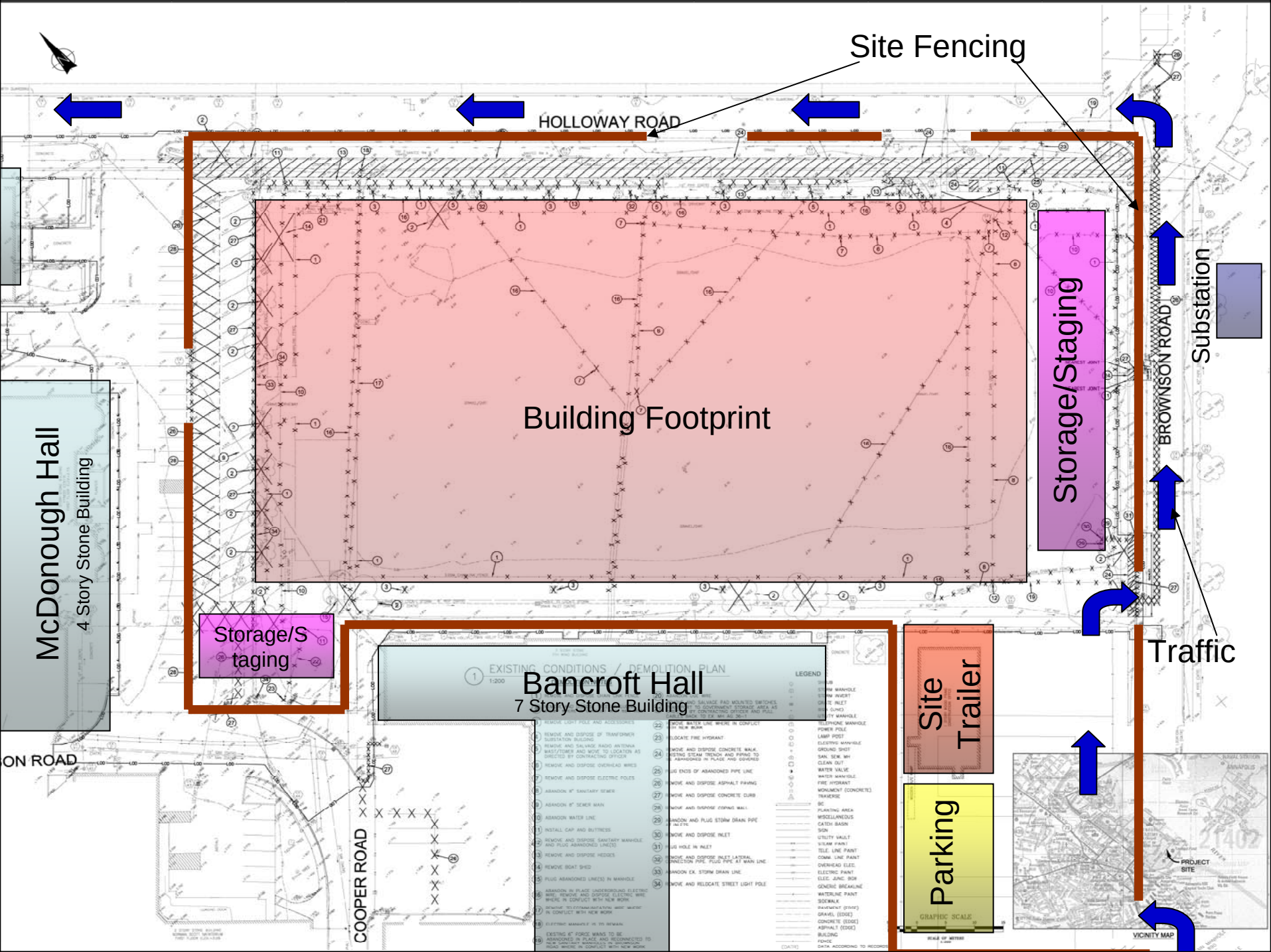
2.5 Staffing Plan



The Wesley A. Brown is currently staffed by Hensel Phelps like the above plan. The District Manager oversees all projects that come through the Capitol District Office in Chantilly, Virginia. The Operations Manager ensures that numerous projects in this district have the appropriate resources to complete the projects on time and on budget. The Project Manager's job is to oversee the Wesley A. Brown Field House. He attends all meetings and is a main source of contact to the Operations Manager. The Project Engineer is the Project Manager's right-hand man making sure all materials and resources are at the job and going into place on time.

The General Superintendent oversees the construction processes of a number of jobs in the Capitol District. The Project Superintendent directs and manages all construction processes occurring in the field. He helps direct subcontractors and reports any problems that occur in the field. The field engineers perform tasks to aid the Project Superintendent track progress as well as help layout and perform other preparatory duties for the subcontractors.

The Chief Estimator is in charge of all work that comes through the Capitol District. The Wesley A. Brown Field House was assigned a Chief Estimator. The Chief Estimator has developed most all of the estimates with the help of an estimator, when help is needed.


Site Fencing
HOLLOWAY ROAD
Building Footprint
Storage/Staging
BROWNSON ROAD
Substation
McDonough Hall
4 Story Stone Building
Storage/S taging
Bancroft Hall
7 Story Stone Building
Site Trailer
Parking
Traffic
COOPER ROAD
ON ROAD
EXISTING CONDITIONS / DEMOLITION PLAN
LEGEND
PROJECT SITE
VICINITY MAP