

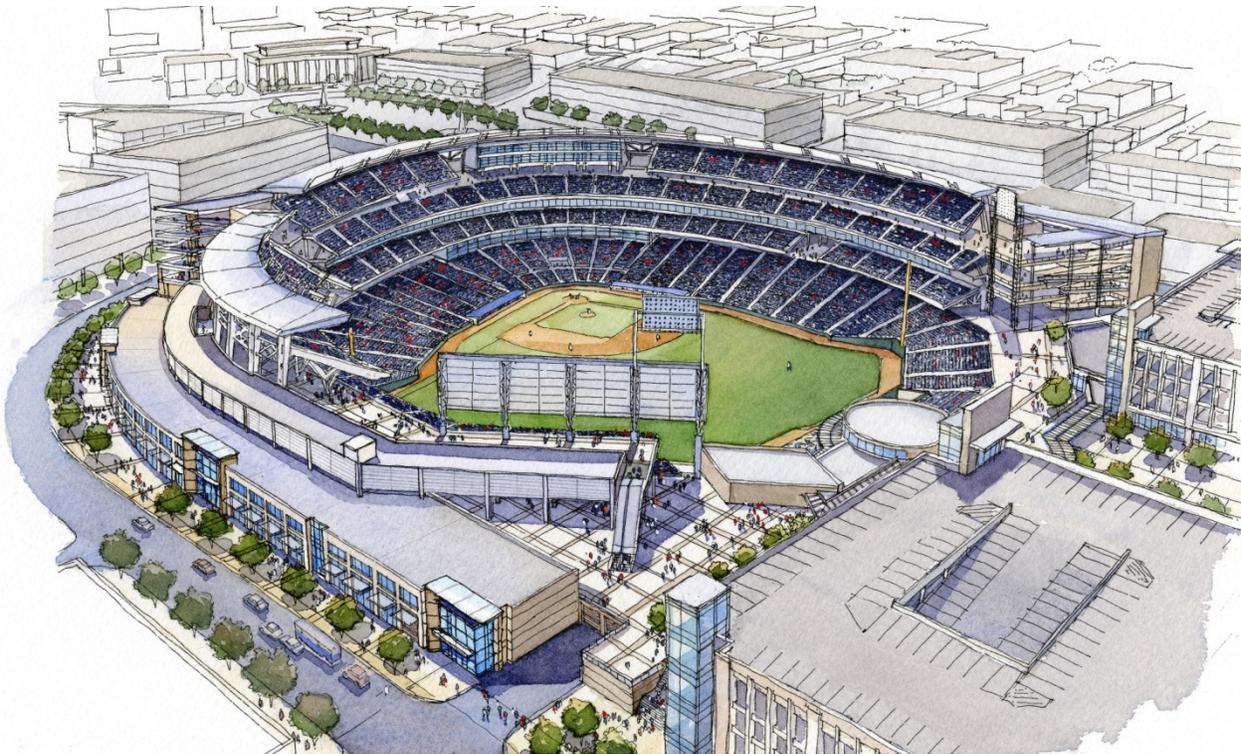
THE WASHINGTON NATIONALS BALLPARK
WASHINGTON, DC



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Technical Report 3

Alternative Methods and Research



Technical Assignment 3: Alternative Methods and Research

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Executive Summary

The Washington Nationals Ballpark is a major fast-tracked design build baseball Major League Ballpark located in the SE of Washington, DC.

This technical assignment contains alternative methods and research for the construction of The Washington Nationals Ballpark. Within this document, there are a critical industry issues that were discussed in the PACE Roundtable held on October 24, 2007. The theme of the Roundtable was Building Collaboration with the three discussion topics being Prefabrication, BIM (Building Information Modeling), and Workforce Development. This document also contains a two critical research issues which are, how can creating a joint venture between multiple companies benefit the project and how fast-tracked design build projects can be delivered efficiently. There are also several problems that were identified that could be pursued through detailed analysis, like the structural system, site congestion and LEED Certification. Also include is the technical analysis methods for two of the above problems, site congestion and structural systems variations. A Weight Matrix that will shows how I plan to distribute my effort for my analysis in the spring.



Critical Industry Issues

The 16th Annual PACE Roundtable event was held on October 24, 2007 in the Nittany Lion Inn. The roundtable is an event in which students get the opportunity to interact with industry members about critical topics that are posing issues within the construction industry. The theme of this year's event was Building Collaboration with the three discussion topics being Prefabrication, BIM (Building Information Modeling), and Workforce Development.

Prefabrication

The 1st topic that was discussed was prefabrication and the issues that arise with it. The members on the panel were Dr. Michael Horman, Director of Lean and Green Research Initiative at The Pennsylvania State University, Stan Carlat, Operations Manager at Hensel Phelps, James M. Haller, Construction Manager at Southland Industries, and Charles Yetter, Senior Director Design and Construction at Tishman Speyer. A major issue that was discussed was the amount of initial upfront work that needs to be done for prefabrication to be successful. With the new push toward BIM, prefabrication can become easier than ever before as well as a greater quality in the prefab units. The industry has a negative connotation when prefab is mentioned because they relate it with lack of quality. The most important concept that was taken away from that prefabrication discussion was that it will initially have more work upfront in the planning and development stages of the project but it will cut down on construction work in the field. The ballpark used prefabrication panels for the exterior façade. They found it very beneficial due to the ease of the erection when it came to placing the panels. With the use of the prefab panels there were major time savings in the construction schedule. The major idea that I took away from the prefabrication discussion was that even if initially prefabrication may take longer to plan it will help reduce cost and save time on site.

Building Information Modeling (BIM)

The 2nd topic that was discussed was Building Information Modeling or BIM. The members on the panel were Dr. John Messner, Director of Computer Integrated Construction Research Initiative at The Pennsylvania State University, Kurt Maldovan, Design and Construction Visualization Coordinator at Jacobs Engineering, Todd Vochinsky, Chief Estimator at Barton Malow Company, and Albert Zulps, AIA, Logistics Manager at Skanska USA. BIM is process in which the buildings construction method is used to help with the planning and sequencing of activities. The panelists pushed that there needs to be a cultural shift in the industry to start to use the technology that is at hand to help aid the entire building process. There was a discussion on who



should be responsible for creating the model where some people believed it was the construction manager and that some believed it should be the architect. There was also talk about the cost benefits which as of right now, it doesn't appear to have many significant savings but they believe that in the long run after more and more companies (subcontractors) adopt BIM it will be an easier tool for everyone to use and the savings will come along. It was brought up that the major benefit was with the clash detection between the mechanical and plumbing trades. After the discussion I believed that BIM is the future to use as a tool to help aid the construction manager in managing the different subcontractors and it will help benefit to the overall project to make it successful.

Workforce Development

The 3rd topic that was discussed was Workforce Development. The members on the panel were Dr. David Riley, Director of PACE and Executive Director of the Penn State Center for Sustainability at The Pennsylvania University, Michael Miller, Vice President of Operations at Southland Industries, Steven Smith, Division Executive Vice President, Director of Operations at Balfour Beatty Construction and Ray Sowers, Executive Vice President at ONCORE Construction. There was an astounding fact that was presented right at the beginning of the discussion; there is a 10% increase people retiring from the construction industry and a 30% decrease in new workers entering the construction industry. That fact instantly startled me and made me realized that we need to do something about trying to get the youth of America interested in the construction industry. It was discussed that contractors need to take the responsibly in to help create the new work force. There should be more programs that will get kids and teenagers interested in working in the industry. Another hot topic was the fact that there is a break in the language barrier that is becoming a greater issue when dealing with the upcoming workforce. There is also major immigration laws that are coming up in congress that the panel believes will start to affect the upcoming work force. The major concept that I took away from the workforce development discussion was that there needs to be something that helps get more people interested in the construction industry at a younger age.



Critical Issues Research Method

The ballpark is an extremely unique project that has many different companies coming together to form a joint venture to make the ballpark come to life. The project is being delivered as a fast-tracked design-build project. The design team of HOK Sport, and Devroux and Purnell, formed a joint venture to act as the architects of the project. Three major local general contractors, Clark, Hunt, and Smoot formed a joint venture to work together as one construction company and perform the work as the construction managers on the ballpark. They assumed the design team contract with the owner creating a large design build firm.

I would like to research 2 different construction issues:

1. How can creating a joint venture between multiple companies benefit the project?
2. How can fast-tracked design build projects be delivered efficiently?

The first goal of the research is to see how the joint venture was used and the advantages and disadvantage of having multiple construction companies as the general contractor. The second goal of the research is to discover the ways that fast-tracked design build projects can be successful. The audience will be future companies interested in forming a joint venture to win projects as well as companies interested in working on fast-tracked design build projects. I want to study how the design team and the construction managers team worked together to create a successful project. I want to look at issues that arose from a creating a joint venture by different companies and the advantages and disadvantages they had. I also want to look into the how you can effectively deliver a fast-tracked project.

I believe that by creating a successful survey that can be given to both the design team and the construction team that are involved with the ballpark I can get a better understanding of the issues they had as working as a joint venture. Another survey will be given to other industry members that have been involved in working within a joint venture project.



Sample Survey Questions:

- How many joint venture projects have you worked on before? Project name, and companies involved in the joint venture.
- What did you feel were the advantages of the joint venture?
- What did you feel were the disadvantages of the joint venture?
- What was the project delivery system of the joint venture project?
- What did you feel were the advantages of the project delivery system?
- What did you feel were the disadvantages of the project delivery system?



Problem Identification

Site Congestion

The ballpark's site has major issues with site congestion. The site itself is packed along the Anacostia water front with only one main road surrounding the ballpark. In the June of 2007 the city of Washington, DC closed the main access bridge so it could be reconstructed to handle the new ballpark's traffic. There are major concerns with not only access to the site but the site logistics as well. There is very limited space to use for site lay down areas.

Structural System

All Steel vs. All Concrete vs. Combination of Steel and Concrete

The ballpark is a combination of steel and cast in place concrete. The structural steel is unique because it is only located in the structures above the Club Level as well as in the scoreboard in the right field. Cast in place concrete was used for the load bearing foundation walls below the Club Level.

LEED Certified

The Nationals Ballpark is working toward achieving a Leadership in Energy and Environmental Design (LEED) Certification. Clark, Hunt, and Smooth are trying to make it the most sustainable professional ballpark in the country when it gains the ranking of Certified by the U.S. Green Building Council. There are many critical issues that can arise when trying to accomplish a LEED Certified Rating.

The ballpark will contain:

- Enhanced sandfilters to screen organic debris (peanut shells, hot dogs) and re-direct bowl wash-down sanitary system
- Reserved parking for fuel efficient vehicles and carpools
- Low emitting materials in the paint, carpet and adhesives
- High efficiency field lighting – 21% energy savings
- 20% recycled content in construction materials



Technical Analysis Methods

Site Congestion

Due to the ballpark's major congestion issues, I would like to propose multiple solutions to the issues concerning the little space available. I believe that by proposing different solutions, there could be some better uses of the space available on site. If the site is better utilized, there will be less obstructions that the individual trades will deal with on a daily basis.

Structural System

All Steel vs. All Concrete vs. Combination of Steel and Concrete

The ballpark's structure is a combination of steel and cast-in-place concrete. I would like to look into using an all-steel structural system and also into the use of an all-concrete structural system. I want to look at the benefits and trade-offs that will deal with the use of the different systems. I will specifically look at the cost impact and the project schedule impact that the different structural systems will effect.



Weight Matrix

Description	Research	Value Eng.	Const. Rev.	Sched. Red.	Total
Site Congestion	10%	15	x	5	30
Structural System	x	10	20	5	35
Creating a Joint Venture / Design Build	20%	5	x	10	35
Total	30%	30%	20%	20%	100%