



*Wellington Condominiums*  
*Exton, PA*  
**Spring Thesis Research**  
**BUILDING FOR THE FUTURE**

## D.1 Summary and Conclusions

The following is a review of the summary and conclusions made about each analysis conducted in the report:

- **Critical Issues Research – Formwork Decision Process Model**
  - **Formwork Decision Process Modeling has proven to be a worthwhile investment** in exploring and viewing the connections between:
    - What occurs generically in the construction industry.
    - What actually occurred on the Wellington Condominiums Project.
    - And from that develop the most ideal formwork decision process model for the greatest probability of success.
    - It was found that to prevent the budget and schedule from inflation on the Wellington Condominiums Project; that the Contractor and not the Owner should work with the S/M/F early on in the design process.
    - If this does not occur, serious vulnerability to the project budget and schedule will result later on in the construction process.
  - Proven statically why a Design-Build contract succeeds over a traditional format.
    - **Advantages:** Wasteful processes have been taken out of the equation, better communication lines between project participants, and earlier involvement of all project participants leads to success. The Owner will also benefit due to a faster and more productive working environment with the project team. This reduces friction and creates a decrease in budget and schedule.
    - **Disadvantages:** More upfront cost due to the Contractor's early input. But it has been proven time and time again that it is well worth the investment of having good feedback, better communication lines, and working relationships.
  - By having the formwork decision process, Contractors are encouraged to explore new formwork products and become educated as to the latest most productive systems on the market today.
  - From the ideal decision process model for formwork systems, an interesting ideology transpires: Wherever a S/M/F enters into the scene; a Contractor is always there in the selected process.
    - This is due to the fact that **if an Owner and A/E are not experienced, it will lead to a possible loss in the Contractor's ability to learn and make rational constructability decisions and create an increased vulnerability in the project budget and schedule.**



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- Therefore the following rule from this research hypothesizes the following statement: **For increased project success, a Contractor should be implemented if an S/M/F is to enter a formwork decision process.**
- **The correct products for a construction project enter under the influence of a Contractor. While the probability of incorrect products for a construction project enters without the influence of a Contractor.**
  - This hypothesis has been proven by the Wellington Condominiums Project and can be served very useful to all construction industry personnel.
- **Generic and ideal decision processes promote different ways for S/M/F to conduct business. Savvy S/M/F knows this and benefit greatly from it!**
  - **Under the Generic Decision Process:**
    - The generic decision process is what is commonly found in traditional way of construction projects. A step by step method in which the contractor is brought onto the project at a later date.
    - The Savvy S/M/F knows this and therefore attacks early on in the design phase with the Owner and A/E. It is a great place for S/M/F to get into a project and have the designs utilize their products.
    - By the time the Contractors step into the picture, the design is already completed and is too late for S/M/F to participate in the project.
    - The more the S/M/F can offer to the Owner and A/E, the more business and profits the S/M/F will create!
      - Design becomes more of a factor to the decision process.
  - **Under the Ideal Decision Process:**
    - The ideal decision process is generally referenced to the new style of construction of design-build.
    - In design-build the Contractor has more say in the design and constructability of the project.
    - Owners tend to play less of a role and A/E relies more heavily on the Contractor's decision as to what systems or products would be best.
    - Therefore it is the Contractor that savvy S/M/F now attacks for business and working relationships. The more S/M/F can do for the contractor the better!
      - Subcontracting work become more of a factor to the decision process.



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- **Hambros Joist Composite Deck System:**

- *From the analysis we can determine that for the Wellington Condominiums Project the selection of the Epicore MSR Composite Floor System would have been best.*
- Even though the Hambros Joist Composite Deck System scored an “Okay-Good” rating, the Epicore MSR Composite Floor System scored a “Good-Great” rating.
  - One of the reasons for this is due to labor. Labor is a controlling factor and dictates what the schedule and budget will be for a given project.
- For the Wellington Condominiums Project the utilization of the Hambros Joist Composite Deck System could have been better suited for other projects.
  - Some of the issues that have arisen during construction that have made the Hambros Joist Composite Deck System unpractical for the Wellington Condominiums Project are due to:
    - The project team’s inexperience with the system, highly labor intensive system, acoustical demands for the living spaces, constraints of the formwork system selection process, and non-repetitive joist spacing layout.
  - From industry interviews it was determined that the following points of reference be utilized when considering the implantation of the Hambros Joist Composite Deck System:
    - Repetitive Joist Spacing and Uniformity Throughout
    - Sound Vibration not a critical factor in the building design
    - Have highly skilled labor
    - **Recommended Use:** Factories, Stores, Warehouses, Malls, Airports
    - **Not Recommended Use:** Retirement Homes, Hospitals, Hotels, and Luxury Apartments and Condominiums

- **Foundation Redesign:**

- The comparison and contrast of the two foundation systems have indicated that a score of 67.6% and 69.4% for the original and mat foundation system respectively. *Both are indicated as an okay system but it is the mat foundation which should be selected by the owner.*
- This provides an interesting perspective in that the mat foundation even though cost was a number one concern and was over three times the original foundation system; the mat foundation should be perused if given the correct amount of funding availability.



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- The advantages of the mat foundation in subsurface interaction and load distribution create just enough of an advantage to spend the extra money on the system.
- If however other variables were to change; it could give the possibility of the original foundation system being preferred over the mat foundation system. But with the current information provided, if the amount of funding is available, the mat foundation system should be selected for the Wellington Condominiums Project.

- **Façade Integration:**

- The comparison of the two façade systems have shown that a grade rating of 69.9 and 75.4 for the original and precast façade respectively.
  - *This indicates that the project team should select the precast façade system over the original façade system.* The advantages of choosing the precast system are as followed:
    - Large Schedule reduction
    - No shelter and heating required
    - Less Crews needed
    - Higher safety and increased productivity
    - Higher quality control
    - Condominium Owners can move in earlier
    - Increase profits of other facilities to counteract the additional cost of precast.
    - With all these advantages it is worth if caught early enough by the project team to value engineer the façade and structural supporting system. This also adds to the mat slab redesign because it would add value to the project due to the excellent distribution of loading to subsurface conditions and would not require additional structural footings. Therefore with all these advantages it is of the project team's best interest to utilize thin brick precast panels.