JOHNS HOPKINS HOSPITAL
NEW CLINICAL BUILDING

Baltimore, Maryland

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Technical Assignment 3

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3.1 Executive Summary

Technical assignment three begins with the project's top three constructability challenges that were identified by the lead superintendent during a phone interview. They include:

1. Excessive project changes and enhancements
2. Congested site that restricts material deliveries and storage
3. Concrete over-pour on elevated decks because of steel deflection

The assignment then progresses into schedule acceleration scenarios. Currently, the project is running [redacted] months late with the potential to accelerate to [redacted] months late by working the mechanical trades overtime at a cost of [redacted]

The interview concluded with conversations about value engineering ideas that were and were not implemented. Most of the V/E that was used came from the MEP trades. The CM suggested building the core and shell first and then coming back to do the fit-out as a V/E idea but it was not implemented.

After evaluating the constructability challenges and other problems, I concluded that the excessive project changes are the biggest problem facing the NCB. Other project management and technical problems were evaluated and then five technical analyses were proposed based on those findings. They include:

1. Investigating alternative delivery methods such as Integrated Project Delivery and Design/Build
2. Developing a universal BIM 3D Coordination Execution Plan that could be used on any project
3. Analyzing the potential value of a phase delivery – core and shell then fit-out
4. Resolving the concrete over-pour due to the floor deflection
5. Selling power from the backup generators to the grid during peak power usage to generate revenue

3.2 Constructability Challenges

3.2.1 Project Changes and Enhancements

By far the biggest challenge on this project is the amount of changes and enhancements that JHH has issued. Currently, the numbers of Construction Change Directives (CCDs) are approaching 60 and there are over 2,700 RFI's, and the project is not even 1/3 complete. All of the changes and donor enhancements to date will add approximately [redacted] to the original contract. The number of changes and enhancements are expected to continue to grow throughout the project.

As discussed in Technical Assignment 1, JHH is rated as one of the best hospitals in the world which means they must maintain a very high reputation. Therefore, they must incorporate the latest and greatest medical equipment and technology in the building to meet this standard. This has been challenging because the medical equipment must be selected to finalize the design, especially the MEP design. However, JHH wants to wait to the very last moment to select the equipment so they can have the latest technology available. As such, the owner and A/E have been issuing CCDs and change orders to address the impact of the design due to the new equipment selection.

The structural steel boom supports in the ceiling of each operating room (see Figure 1 below for an example) are currently on hold because the owner cannot decide which type of boom they would like. This may seem like a small problem but you cannot simply use a conservative estimate of the weight to design the support because the booms' articulating arms can create significant moments that vary depending on which boom you use. By keeping this equipment on hold, the medical gas supply cannot be run to the boom finish plate. As a result, the medical gas supply is terminated near the boom support until a decision is made. This holds up the extensive testing procedures that must be done on the medical gas distribution and also prevents the closing of the ceilings, delaying inspection, wall finishes, floor finishes, etc. There are also many different operating rooms that will perform various procedures which means they will have different booms. Thus, the steel supports are different for each type of boom which makes coordinating all of the overhead MEP systems very challenging.

Figure 1: Example of a Typical Operating Room Boom

Another contributing factor is a large number of financial donations to the hospital to enhance the medical facility. As the building is being built, it has attracted a lot of attention and many individuals have contributed to the project. Most of the enhancements are architecturally oriented such as an upgraded lobby, lighting system and a high-end precast façade.

The poor quality of construction documents has also contributed to the number changes. The designers have had difficulty coordinating their design with all of the consultants and engineers that are working on this project. An example would be the location of a sink shown on the architectural plan that does not correspond to the location of the water supply and drain shown on the plumbing drawings. This is a common problem seen on nearly all construction projects, but the sheer number of conflicts and discrepancies are much higher than similar projects.

The affects of all the changes are difficult to manage and quantify. Currently, there are 700 change orders that have been processed and an average of 1 CCD per week is being issued. The schedule impact has not been fully realized yet. Clark/Banks has decided to break the changes into 3 packages so they can better manage them. The 1st package will include all changes and enhancements up to CCD 38, the 2nd package will include CCDs 39-48, and the 3rd package will include the remaining CCDs. Each package will be negotiated with the owner and A/E to finalize a cost and schedule impact.

3.2.2 Material Site Logistics

A big concern for this project in the beginning was how to feed the job materials. As I investigated in Technical Assignment 2, the superstructure and building enclosure phase of the project are very congested and present many site logistic challenges. Also, the size and type of the building create some unique site logistic challenges.

With two tower cranes and two mobile cranes located on the relatively small site, planning the delivery and handling of materials around picks were crucial from a productivity and safety standpoint. The only construction access road to the project is located on the south-side which runs right in front of both loading docks for the material hoists. Therefore, when a delivery truck is unloading they must block the access road. Not only does this cut off access onto and off the site, but restricts the flow of traffic on-site by material handling vehicles. To help mitigate this issue Clark/Banks initiated detail planning and scheduling of deliveries. Every delivery was scheduled days in advance through the site superintendent. The site superintendent then scheduled these deliveries around critical crane picks, shakeouts, and concrete pours. Figure 2 on the following page depicts how congested the site is on a typical day.

Figure 2: Typical Site Congestion

Once the materials were brought and unloaded on-site, the challenge was to distribute them to their necessary location. The materials needed to go two directions, vertical and horizontal. As already mentioned, a material hoist was installed on the AT and the CT to move the material vertically. The challenge was to find a location on the façade that had access to every floor and did not impact the schedule because the skin would have to be left off. The locations selected seem to have worked well except for the fact their location disrupts the site as mentioned above.

When the material is distributed to its respective floor it still must be taken to a location on that floor. This is a challenge that the project team continues to deal with because of the size of the building's footprint. Before the wall studs went up, the materials could easily be transported with dollies. After the walls were framed, it created a maze through the floor which made it difficult to transport the material. For this reason, only the corridors and MEP rooms were framed first. The remaining walls were held off until the last moment at which point the trades would have to transport the materials through the corridors. Today, most trades have several crews that are solely responsible for transporting and storing materials. This is an extremely inefficient and expensive method.

Another challenge that is unique to hospital projects is loading the hospital equipment into the building. There are hundreds of pieces of equipment that must be loaded into the building before it is closed up because of their size. For example, the hospital will have many MRI machines that will need to be hoisted in the building. MRI machines can weigh up to 50,000 lbs. and require significant planning with a structural engineer to determine how to load them into the building because only certain areas of the structure are designed to handle that kind of load. Clark/Banks is currently in the planning stages of determining how the equipment will be loaded into the building. Since JHH has not made many of the equipment decisions, Clark/Banks is struggling to make an accurate plan which could become a critical issue as the building skin continues to go up.

3.2.3 Elevated Concrete Deck Over-pour Due to Deflection

A constructability challenge that I experienced first-hand while working on this project during my summer internship was the over-pour of concrete on the elevated decks due to the steel deflecting. According to industry professionals this is a common construction problem when decks are not shored during pours as was the case on this project. When pouring concrete, the concrete actually acts as a live load to the structure and by code the deflection is limited to the span divided by 360, which is equal to 1" on this project.

The construction manager and structural engineer did not realize there was significant over-pour on the decks until the concrete subcontractor was pouring the upper levels of the CT which included the cantilever on the south-side. As the load from the concrete was placed on the cantilever it caused it to deflect. The concrete sub did not know that the steel was deflecting significantly because they were pouring to top of floor elevation, not thickness. However, as the steel subcontractor was erecting the steel on the cantilever on the floors above, they began to realize that the members were not lining up because the cantilever was sagging. Immediately this caused concern for the entire project team because the cantilever hung over Orleans Street. A survey was conducted by Clark/Banks and determined that the deflection was approaching [redacted] in some areas. The structural engineer ran the calculations with the extra concrete load and determined that the structure was within the factor of safety.

In order to address this issue, the remaining concrete pours would have to be poured to thickness plus or minus ¾" by wet sticking the concrete. This was challenging because the concrete specifications require the floor flatness to be 1/8" per 10'. Fortunately the floor flatness requirement was met because the structural engineer allowed the ¾" thickness variation to level the floors. If this had not been allowed, the floor flatness would have had to be corrected because you would have easily seen the floors were not flat when the VCT or the Terrazzo was installed.

3.3 Schedule Acceleration Scenarios

3.3.1 Critical Path

No different than most projects, the critical path includes the foundation, steel structure, building envelop, finishes, etc. However, the driving force for this entire project is the MEP activities which include riser, overhead, distribution, rough-in, terminating, commissioning/testing, etc. This is no surprise given the nature of hospital construction.

3.3.2 Schedule Risks

As I pointed out in the constructability section of this report, the biggest risk to the schedule is the number of changes and enhancements to the design. It has not only caused management problems, but has led to unnecessary amounts of reiterative work. This includes tearing down work that has already been installed in the field and re-coordinating the design, especially the MEP systems when new drawings are released, all of which may impact the schedule.

Another schedule risk is the shortage in the local labor pool. If an adequate number of craftsmen cannot be found for this project, then the schedule will not be able to be met. This also limits the capabilities of accelerating the schedule because there would not be enough labor to work overtime without exhausting the current workers. Specifically, the skilled MEP craftsmen were the main concern at the beginning of the project. But as the economy continues to slow, local construction projects are going on hold, freeing up more craftsmen.

3.3.3 Acceleration Scenarios – Costs and Techniques

The 1st package of changes and enhancements has been evaluated by Clark/Banks and they have determined that the schedule will be pushed [redacted] The only way to accelerate the job is to speed up the MEP activities. They have been impacted the most from the changes and therefore control the end date.

Clark/Banks has submitted a proposal to JHH to work 300 mechanical craftsman 10 hours per day, 6 days a week for the remainder of the job to reduce the schedule overrun from 7 months to 3 months. The cost for accelerating the job is approximately [redacted] It is assumed that the other trades can keep pace with the accelerated mechanical activities.

The proposed scenario seems like a good option considering that Clark/Banks' monthly general conditions are $1.5 million. [redacted] However, JHH has not accepted this proposal because they want to see what the schedule impact will be from package 2 and 3. The cost of waiting to see the effects of package 2 and 3 could be more severe than they are now.

3.4 Value Engineering Topics

3.4.1 V/E Implemented on the Project

The delivery method of this project did not take full advantage of the value engineering process. Typically V/E should be done during the preconstruction phase with the CM. During the schematic design phase the CM can provide V/E suggestions to the systems, followed by material V/E suggestions during the design development phase, and finally detail V/E suggestions during the construction document phase. However, Clark/Banks was brought in after the first CM was terminated early in the construction process and was not able to offer any significant V/E ideas. They did encourage their subcontractors to suggest V/E ideas for alternate materials and/or details during the bid and award phase in order to gain a competitive advantage.

The majority of the V/E ideas that were implemented on this project came from the mechanical and electrical subcontractors. The owner's goals for V/E was to reduce the cost without sacrificing the scope, quality, aesthetics, operating cost or long term maintenance and replacement costs. The following are some of the mechanical and electrical contractor's V/E ideas that were implemented on the project. Note that this is not a comprehensive list of all of the V/E implemented on the project.

<u>Mechanical Contractor V/E</u>

1. Change the filter frames to galvanized in lieu of stainless steel
2. Change humidifier requirement on the valve, strainer, and trap to be 100% stainless steel
3. HEPA filter to Flanders APLPHA 2000 – 99.97% in lieu of Type F
4. Delete Exhaust duct insulation on the roof
5. Provide standard galvanized duct in lieu of stainless steel at patient room bathrooms
6. Reduce the density on the duct wrap from 1# to ¾#
7. Change Chilled Water insulation type from Urethane to Fiberglass ASJ
8. Reduce insulation from 4" thick to 2" thick on exterior Supply and Return duct
9. Delete requirement for all control wire to be run in EMT. All control wire shall be run per NEC (in EMT where exposed and open, plenum rated cable where concealed accessible.)
10. Use BX type product in concealed spaces for low voltage control wiring. All exposed ATC wiring to be in conduit.
11. Delete redundant domestic water valves in patient toilets
12. Use CPVC piping for domestic water. Valves will remain as specified. Hangers are to be increased to ensure no sagging of pipe. Hot water and recirculation are to remain insulated. Cold water insulation will be deleted.
13. Propress fittings on domestic water piping 2" and smaller
14. Relax welding criteria so that piping, except for high pressure steam and high temperature hot water will have visual inspection only.

Total savings for mechanical contractor V/E = [redacted]

Electrical Contractor V/E

1. Utilize direct burial UF cable in lieu of conduit and wire for site lighting
2. Utilize schedule 20 EB conduit in lieu of schedule 40 PVC conduits for ductbanks
3. Fixture types FA & FA1 – use standard 2x4 in lieu of Lay-Lite System
4. Fixture types FB series – use Finelite in lieu of specified
5. Fixture types FD series – eliminate PAR units, use 6" troffers
6. Fixture types FF series – eliminate specified, use standard WW series
7. Fixture types GF – eliminate glass, use standard industrial
8. Fixture types FK – eliminate specified, use RA series
9. Fixture types FR – eliminate specified, use similar fixture by Advent or SPI
10. Fixture types FZ & FZ1 – eliminate specified, use Finelite series
11. Fixture types FAP series eliminate specified, use type RA
12. Fixture types RB & RB1 – eliminate specified, use 18 cell parabolic
13. Fixture types EXIT – eliminate specified, use thermoplastic type
14. Fixture types FJ – eliminate specified, change to WW4 or WW2
15. Fixture types FJ – eliminate specified, change to staggered strip with cove by GC
16. Fixture types FL – eliminate specified, change square to round
17. Fixture types DL – eliminate specified, allow Gotham style
18. Fixture types FAD - eliminate specified, allow standard downlights
19. Fixture types FN, FN1, and FS – eliminate specified, allow other than Alkco
20. Eliminate abundance of receptacles by 2%
21. Utilize nylon device plates in lieu of stainless steel
22. Mark circuit number inside device plate with permanent market or label in lieu of engraving the outside of the device plate
23. Eliminate the requirement that all branch circuits shall have individual neutrals
24. Allow die cast fittings in lieu of specified steel fittings
25. Allow MC cable homeruns for branch circuits to above panel board. Access the panel thru wireway and conduit drops.
26. Utilize steel flex in lieu of liquid tight flex
27. Eliminate seismic bracing requirements
28. Utilize 4" GRS conduits for MV feeders in lieu of specified 5"
29. Utilize aluminum feeder wiring for all cable #2 AWG and over
30. Utilize RHH-2 wire in lieu of specified MI cable for emergency feeders
31. Utilize THHN/THWN insulated wire in lieu of specified XHHW wire for size #6 and larger
32. Utilize aluminum bus in panel boards and switchboards in lieu of specified copper
33. Utilize aluminum windings in transformers in lieu of specified copper
34. Eliminate the fire alarm CIC cable, utilize standard fire alarm wiring.
35. Utilize hospital grade fire alarm rated MC cable in lieu of conduit and wire
36. Provide colored conduit in lieu of painting couplings for all systems including fire alarm conduits

Total savings for electrical contractor V/E = [redacted]

3.4.2 V/E Considered But Not Implemented on the Project

There were many V/E suggestions that were not implemented on the project. Most of them were relatively small and are not important for this thesis. The main V/E idea that Clark/Banks suggested after realizing the significance of all of the changes and enhancements to the design was to put the construction of the finishes and fit-out on hold and only build the core and shell of the building.

The purpose of this is to allow the design team time to finish the detail design and coordination and give the owner more time to select their equipment while the contractor is building the structure and envelop. The MEP system could be sized based on the assumed loads and the main distributions could be run. After the core and shell is complete, then the contractor could do a second pass to fit-out the building.

Although no formal analysis was done, Clark/Banks believes the main advantage to this method would be to reduce the schedule and cost impact of the design changes and enhancements by preventing the unnecessary amounts of reiterative work. One concern with this approach is that the floors would need to be core drilled for the MEP risers. However, the current delivery method has put the MEP coordination so far behind that the contractor is core drilling the floors. Therefore there would have been no additional cost for core drilling.

JHH decided that this idea was not the best approach mainly because they had already committed to the current delivery method. The potential benefits of changing to the new delivery approach were not worth the project management and legal risks associated with it.

3.5 Problem Identification

3.5.1 Project Management Problems

Clearly the biggest risk to the success of the NCB project is the project management challenges. It is not uncommon for projects to have change orders that total approximately 2% of the contract value. However, when changes total more than [redacted] of the original contract value, problems are almost certain. The problems are already becoming evident and have contributed to a myriad of issues.

The Design-Bid-Build delivery method has not fostered a collaborated teamwork environment in order to deal with all of the changes. The project team organization does not invoke any leader to take charge of the issue and resolve it. The CM has no control over the A/E, and the owner is not leading the charge, largely because they do not have experience with such a large project. The result of this may be a legal battle between the CM, A/E, and the owner. Legal battles are never good for a project and often no one wins. A different delivery method may have been better suited.

The amounts of CCDs and C/Os have also slowed down the MEP coordination process. The coordination process is being done with BIM clash detection. Most of Clark/Banks' MEP staff and the mechanical contractor are first-time users of this tool. Although, the process is expected to be slow in the beginning because of learning curve inefficiencies, the drawings are changing so much that the trades cannot coordinate them before they are issued new ones. This slows down the coordination which is part on the critical path of the project. As a result, the work in the field is held up and the schedule must be extended.

To be fair, the changes have only contributed to the inefficient coordination process. Some blame must be placed on the mechanical contractor. They have agreed to a very detail coordination schedule that has already been revised [redacted] because they have fallen so far behind. It is not clear why this has happened, but they have obviously struggled with the process. A better understanding of the mechanical contractor's 3D coordination process on this project would be needed to draw a conclusion.

Finishing the project as soon as possible is JHH's top priority. They are very concerned about the schedule being pushed and would like to do whatever it takes in reason to accelerate the project. This is problematic because they have added to the scope of work substantially and the labor pool is strained. Clark/Banks will need to employ some very creative project management techniques to accelerate the schedule without extending the end date.

3.5.2 Technical Problems

Surprisingly, Clark/Banks did not express many technical challenges for this project. I would have expected many given that this is one of the largest hospitals ever built. They felt that the project was not that technically challenging because most of the staff has had extensive experience on hospital projects. The NCB's design and construction practices are very similar to those of smaller hospital projects that they have worked on in the past. However, there were still some technical challenges they expressed and could be good topics for further research.

Joe Salerno, the Vice President of Field Operations for Clark/Banks thought that the material site logistics was a technical challenge that may not seem like a big problem at first glance, but when considering the overall impact it is very substantial. The schedule is very tight and depends heavily on the trades meeting their production rates. Hindering the material delivery and staging on-site has the potential to affect the production rates of the trades, thus impacting the schedule. The problems identified in the constructability section are very common on high-rise buildings because as the top of the building is being erected, the lower floors are typically in the finish stages. This means that all phases of work are going on simultaneously which attributes to this problem. If careful planning and scheduling is not applied, the productivity of the trades could be adversely affected.

A common problem that was encountered on this project was the over-pour of concrete on the elevated decks due to the steel deflecting. The concrete contractor did carry a contingency in their bid to account for the over-pour, but the deflection that was encountered on this project was greater than typical. They were given more money for the unforeseen amount of extra concrete. However, the effects of this problem could have been drastic. If the structural engineer would not have used such high safety factors during design, the extra concrete may have added more load to the building than it was designed for. Another result could have been an uneven floor if the contractor would have poured to thickness without the ¾" variation allowance. The cost implications for leveling out the floor may have been severe. Since this is a common problem it would be valuable to research the cause and develop some potential solutions.

3.6 Technical Analysis Methods

3.6.1 Alternative Delivery Method

Clearly, the delivery method used for this project has caused problems, or at the least has not dealt with the problems effectively. I propose to research alternative delivery methods such as Integrated Project Delivery and Design-Build to evaluate the potential benefits if they would have been used instead of Design-Bid-Build. Specifically, I would like to concentrate my studies on how the changes could have been managed under a different delivery scenario.

I would need to understand the current contract agreements and the incentives and penalties associated with them. The goals of the CM, A/E, and owner would need to be understood so they could be analyzed under a different delivery method. Finally, the cost and schedule associated with the original contract, changes, and enhancements would have to be collected to perform the analysis.

In order to collect information about the current delivery method and others, I would conduct surveys of all the project team members and relevant industry professionals. More information could be acquired by researching case studies of similar projects that used various delivery methods. Clark also has some projects underway that could be evaluated such as the Walter Reed Hospital which is Design/Build and the National Geospatial Agency which is being delivered with the Integrated Project Delivery Method. The information collected from these projects could be used as a means for comparison.

For the final analysis, I would evaluate the ability of each delivery method to deal with the changes as well as the cost and schedule impact. Other considerations would be legal risks, team environment, owner's goals, quality, and experience. The potential advantages and disadvantages would be weighed to determine which would have been best suited for this project.

The results of the analysis may be difficult to quantify because there is no way to know what their actual result may have been. Also, the results of the current delivery method are not yet known. This means that the analysis may be open to interpretation and opinion instead of hard facts.

3.6.2 BIM 3D Coordination Execution Plan

BIM is a relatively new tool for most contractors. The team expressed frustration and at one point considered abandoning BIM 3D coordination on this project. BIM is in its infancy stage and there are few project management guides or standards for BIM that tell you how to implement it on a project. Therefore, I believe this project could be used as a case study to help develop an execution plan for BIM 3D coordination. This plan would need to be universal so that it could be adopted on various projects.

First, I would need to understand the process used on this project in great detail by understanding the contract requirements for coordination, methods used to model, and the role of the CM and the subs. The coordination schedule would need to be acquired and analyzed to determine the affects of the changes as well as inefficiencies in the process. Also, a better understanding of traditional coordination practices would be helpful.

This analysis could be conducted in collaboration with the CIC – BIM Execution Planning Guide research project. This topic could be researched by surveying and interviewing team members and relevant industry professionals. I would also contact Autodesk and Bentley to learn more.

The final deliverable would be a planning guide that addresses typical durations for coordination schedules, how to buy BIM 3D coordination with subs, necessary staff, BIM tools, and technology to implement it, and the roles of each team member. In addition, the NCB will be used as a case study which will include the costs of implementing the tool, estimated reduction in field clashes and savings over traditional methods.

3.6.3 Phased Delivery – Core & Shell/Fit-out

The V/E idea that Clark/Banks proposed to build the core and shell and then come back and do the fit-out was very interesting to me. No formal analysis was done to compare this to the current delivery which may have been why JHH never really considered it. I suggest researching this to determine if this would have actually added value to the project by reducing the cost and schedule and adding quality.

In order to do this analysis, I will need to understand the cost and schedule associated with the original contract, changes, and enhancements. This will establish the baseline for the project and the findings from the phased delivery method would be compared to this.

For the phased delivery, I would need to assume that if the fit-out was put on hold that the A/E and the owner could finalize the documents and select their equipment by the time that the core and shell was complete. Therefore, all the changes and enhancements would need to be regarded not as changes, but as designs that were included in the construction documents when the CM begins the fit-out phase. In theory this should reduce the cost and schedule for those activities because it would reduce the reiterative work and the premium cost for change orders and increase the construction document quality.

To complete the analysis, I would need to develop new cost estimates and schedules for the phased delivery. Close collaboration with the CM and subcontractors would be necessary to achieve this. Once complete, the schedule and cost could be compared to determine which method would have been best.

3.6.4 Resolving Concrete Over-pour Due to Floor Deflection

The concrete over-pour due to floor deflection is a common constructability challenge. Many projects are faced with this problem and must take corrective measures during construction. I propose to research resolutions to this problem so that it can be evaluated in the preconstruction phase and resolved before it is a field issue. The analysis will also be my structural breath study.

To begin, I would need to work with the structural engineer to understand the design. Areas of interest would be typical deflections, allowable deflections, code requirements, steel camber, and shoring. The concrete contractor could be tapped to gain a better understanding of concrete placement methods and how they accounted for over-pour. Finally, I would need an as-built survey from the project to complete my calculations.

For my research I would investigate alternatives such as shoring, pouring to thickness, and cambering the steel. The cost and schedule impact of each alternative would need to be evaluated and compared to the current method. Although, on this project they were able to avoid any significant problems with floor flatness and overloading the floor, the risk of this must be taken into account with the current method.

3.6.5 Sell Backup Generators' Power

The entire JHH complex is supported by backup generators in the case of an electric power outage. These enormous generators sit idle until they are needed, except for routine maintenance start-ups. They could be fired up during peak power usage (or even more often) and the electricity that they generate could be sold back to the utility. This revenue could then offset the utility bills and help pay for the generators. I propose to do a feasibility study of this as an electrical breath analysis.

The first step would be to understand the generation system and its output. I would need to contact the local utility to find out if they allow electricity to be sold back to the grid and at what price. At that point a feasibility study could be done to evaluate the cost of running the generators and its payback. Finally, if the idea proves to be feasible, it could be presented to JHH in hopes it could be implemented.