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Project Management and the Construction of Worcester Psychiatric Hospital

A Major Qualifying Project

Submitted to the Faculty of

Worcester Polytechnic Institute

in Partial Fulfillment of the Requirements for the

Degree of Bachelor of Science

By:

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Abstract

This project reviews the project management and constructability practices during the construction of the Worcester Psychiatric Hospital. This was accomplished through the attendance of weekly meetings, site visits and interviews. Changes such as increased preparation, different presentation techniques, and postponing discussions with few people involved would help improve the overall communication and efficiency of the meetings.

Acknowledgements

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Steve Duvel – Senior Project Manager for Gilbane Building Company

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Department of Mental Health (DMH)

Division of Capital Asset Management (DCAM)

Ellenzweig

Tishman Construction

Michael B. Elmes – Professor of Management

Guillermo Salazar – Professor of Civil and Environmental Engineering

Authorship Page

In the context project integration the following individuals authorized this report, each with equal authorship responsibilities as well as collaboration between each discipline. Due to registration constraints, Jaclyn McDonough and John Upton will be submitting a modified report at a later time.

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John Upton – Civil Engineering with a minor in Management

Capstone Design Statement

The capstone design was satisfied through analysis of, and identification of potential solutions to repair cracks that were observed after a month of the concrete being poured for on grade concrete slabs in multiple wings of the hospital complex. According to Lin Associates, the structural engineering consultants, these cracks were apparently caused by a combination of settlement of the supporting soil and shrinkage of the concrete. We later verified this diagnosis. Cracks are likely to occur in many construction projects, but these ones drew attention early in the project and have continued to appear in new sections of the hospital as they are constructed. Using existing Boring Logs obtained from the soil reports conducted before excavation of the site, and from the slab specifications obtained from Gilbane, the likelihood of these problems occurring in other areas of the hospital was determined by us. Using those predictions, methods for preventing the cracks to continue appearing can be utilized in other wings of the hospital.

Site visits were conducted to add a hands-on element to the investigation. Soil profiles were created using the existing Boring Logs and eventually settlement was analyzed by calculating the load of the slabs and the total settlement of the soil in that area. Scheduling also played a part in the process, allowing us to investigate the weather during different pour dates. Temperature and overall weather was investigated using Gilbane's daily construction logs to find significant differences on the various pour dates to see if a drastic change in climate would be likely to cause shrinkage cracks.

Additional research in this area included quality control and supervision of workers meeting specifications for executing compaction methods of the soil. Other than design problems, this section of the report acknowledges the possibility of human error when performing the specified designs and methods (not design errors). The reports of soil placed at the site were also checked to see if the soil being used met any and all requirements. Since the problem shows up with the concrete slabs, it may

also have begun there. The slab design was reviewed to see if the physical size matches the planned dimensions.

Three of the eight realistic design constraints are primarily addressed through the completion of this project. Their incorporation in the project is outlined as follows:

Economic

One of the most apparent aspects of each component of a construction project is its cost. Since this project attempts to explain predictable reasons slabs may crack after being poured, money can be saved in the long run. It would cost companies significant money if cracks were severe enough to require re-pouring of the slab, especially if that slowed the schedule down for the remainder of the project. Cracks appearing in the first place have an economic impact on the project. Structural consultants must be utilized and any fixes prescribed must be carried out, all adding to the cost of the project.

Constructability

The constructability of this project is contained in the chronological end of the study. The solution to repair or prevent various crack sizes and severities is a good guide to field repairs which can be recreated in the field easily. When multiple solutions are available, choosing certain ones may yield more time-efficiency and do not need any further attention after being implemented. If the problems can be planned for and options are available to prevent cracks in future slabs, the option that is the least time-consuming may be chosen.

Health and Safety

The danger of cracks in slabs is directly related to the structural safety of the future building's site. The most extreme possibility is that the cracks will cause structural failure in the slab and any erected structures will be compromised. Much more common outcomes of the cracks are still hazardous

to workers on a daily basis. Cracking may be severe enough to protrude from the ground and cause workers to trip and injure themselves during construction before repairs can be completed. Being able to predict the likeliness that cracks will materialize and being able to remediate those situations quickly will lead to fewer safety incidents on site. It will also affect predictions of structural instability that could, in a worst-case scenario, cause structural failure after erection of the building has begun.

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1.0 Introduction

Construction began on the Worcester Psychiatric Hospital in 2009. A fire had destroyed the original Worcester State Hospital eighteen years earlier. The new facility is primarily being built by three major project participants: the owner, the Division of Capital Asset Management (DCAM), the Construction Manager, Gilbane, and the architect, Ellenzweig.

These three main parties are expected to work together for the duration of a project in order for it to be completed. In some, or most projects, the interaction between the representing parties has an effect on the project, whether it is small decision-making or major design arguments. The Worcester Polytechnic Institute's (WPI's) project team has observed these major companies working together on the Worcester Psychiatric Hospital over the course of six months and analyzed the specific meeting dynamics and participant interactions and how they affected the overall communication between the parties involved. The specific aspects of the participants being observed weekly was level of participation, focus, and interaction using custom observation rubrics. The overall communication results from these meetings in turn were used to interpret various aspects of the construction project management process and how they developed throughout the project. These analyses drew conclusions about which aspects could be improved and which were currently being executed well, such as number of participants and preparedness.

The final component of this project was the design component. The goal of the design component was to observe cracks that had appeared in the slab on grade of several wings in the building early in the project. The cracks appeared to be caused by a combination of settlement of the supporting soil and shrinkage of the concrete. Exploring these possibilities, using construction logs,

weather reports, and boring logs, the specific types of cracks, by size and severity, were addressed and recommendations for repair were given.

2.0 Background

The site of the new Worcester Psychiatric Hospital has a long history. This section explains the events leading up to the construction of the new facility and gives backgrounds of the main companies involved. It also reviews relevant topics related to this project and specific theories used in later analyses such as integrated practice, contracting law, stakeholder theory, meeting dynamics, and participant observation.

2.1 Worcester Psychiatric Hospital

The doors of the Worcester Insane Asylum were opened on January 12, 1833, serving as a psychiatric facility for the areas surrounding Worcester, MA. Over the next thirty-seven years, the asylum became overcrowded and was in need of a new hospital. Construction of the new Worcester State Hospital began in 1870, taking seven years to complete. Architect Ward P. Delano, of Fuller & Delano of Worcester, considered the Kirkbride Plan when designing the four-story, flagstone and brick building to be built around a clock tower, with the administration building located front and center (Kirsch).

Figure 1: Worcester, MA State Insane Hospital 1905 Postcard (Kirsch, n.d.)

In the mid 1800s, a Philadelphia psychiatrist by the name of Thomas Story Kirkbride developed a building design he thought mental institutions would benefit from. The design consisted of staggered wings in order to provide privacy and comfort to those residing in the institution, and to maximize the amount of sunlight and fresh air received by each building. Kirkbride's plans were based on a philosophy of moral treatment, focusing on the special care of treating those with mental illnesses (Buildings, 2001).

On July 22, 1991, a devastating five-alarm fire engulfed the Kirkbride building, destroying all but the right-most wing, administration building, and the clock tower (Figure 2). Upon the decision that the Kirkbride was in no condition to house patients, it was boarded up and its services were relocated to either the more recent Bryan Building on the UMass campus in Worcester or to surrounding hospitals. WSH remained abandoned until demolition of the building began in the summer of 2007 (Anderson, 2008), as can be seen in Figure 3.

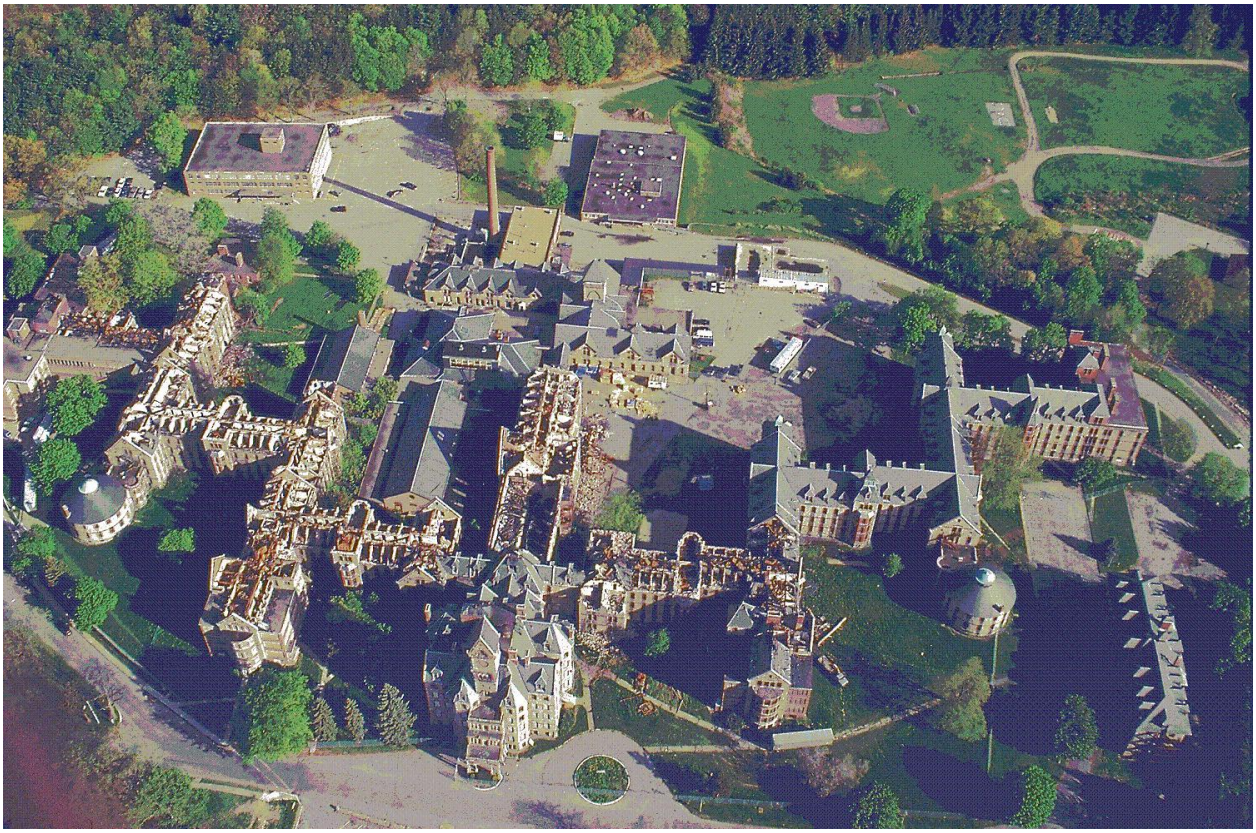

Figure 2: Worcester State Hospital after the 1991 fire (Gilbane Building Company, n.d.)

Figure 3: Worcester State Hospital before construction began for Worcester Psychiatric Hospital (Gilbane Building Company, n.d.)

With the construction of the first public psychiatric hospital in the nation, Massachusetts has been the leader in caring for those with mental illness. Over the course of the years, the Department of Mental Health (DMH) has altered their thinking in that their assistance should be administered in a more community-based atmosphere than restrictive environment. “Worcester has a legacy of being at the forefront of mental health treatment in the United States (Martinez, 2009)”, and with the construction of the new DMH hospital, will continue to uphold this reputation.

Ellenzweig, an architectural firm located in Cambridge, MA, was hired in by the Division of Capital Asset Management (DCAM) to provide programming, site analysis, and design of the new facility, and eventually the construction administration services for the new psychiatric hospital. In June of 2007,

the Department of Mental Health hired Gilbane Building Company from Providence, RI as the Construction Managers.

A groundbreaking ceremony was held on May 14, 2009 for the building of the first psychiatric facility in Massachusetts since the 1950s. Designed by Ellenzweig and managed by DCAM, the $233 million, 320-bed facility is scheduled for completion in 2012 by Gilbane Building Company. The Department of Mental Health's newly constructed Worcester Psychiatric Hospital will include a 260-bed adult hospital, a 30-bed children's inpatient facility, and 30 children's intensive residential treatment beds (Martinez, 2009).

2.2 Department of Mental Health

The Massachusetts Department of Mental Health (DMH) is an organization that operates to assist individuals with serious mental illness or emotional disturbance, so they may be able to live work and participate within their local communities (Massachusetts, Department of Mental Health, 2009). Massachusetts has been the leading caregiver to those who suffer from mental illnesses since 1833, when they opened Worcester State Hospital, the first public asylum in the United States. Located in Worcester, Massachusetts, this facility became the first of many public hospitals located throughout the state. In 1897, a Board of Health was created to ensure the proper steps were being taken to run these facilities, becoming the DMH in 1938.

Following the Community Mental Health Centers Act of 1963, which led to the reduction of large state mental hospitals and an increase in community mental health facilities, the state legislature enacted the Comprehensive Mental Health and Retardation Services Act in 1966.This act was passed in order to create a network of services within each community, so that those suffering from mental health issues may receive assistance closer to their residence. By not requiring a mental health patient to be

institutionalized, the availability and quality of the community programs were increased, along with the program utilization (Massachusetts, Department of Mental Health, 2009).

In Massachusetts, the Executive Office of Health and Human Services (EOHHS) is responsible for providing mental health services. DMH is part of one of the 15 EOHHS agencies and is distributed throughout six geographic Areas, each managed by an Area Director. These Areas consist of various Local Service Sites, which provide case management and run both state and vendor-operated mental health services. Included in these services are four state hospitals, five community mental health centers equipped with inpatient units, adult inpatient units at two public health hospitals, contracted adult, adolescent and latency age inpatient units, latency and adolescent intensive residential treatment programs, and community-based services.

The Department of Mental Health's central office is located in Boston, Massachusetts where there are three other divisions: Program Operations, Clinical and Professional Services, and Management and Budget. These divisions oversee planning, attainment of board policy and standards, and perform particular fiscal, personnel, and legal functions. In addition, certain specialized programs are centrally managed, such as forensic mental health services, child and adolescent inpatient units, and intensive residential treatment programs (Massachusetts, Department of Mental Health, 2009).

In order to estimate the presence of serious mental illness among adults and serious mental illness or emotional disturbance among children and adolescents in each state, the federal Center for Mental Health Services published a series of formulas used by the Commonwealth of Massachusetts. These methodologies determine that among the six million people residing in Massachusetts, approximately 44,731 adults (.98% of the adult population) have a serious and persistent mental illness and severe dysfunction that will most likely require publically funded mental health services. Within the six million residents are about 18,476 children ages 0-8 years (2.5% of the child population) and 96,740

children ages 9-19 (11% of the child/adolescent population) who suffer from a serious mental illness or emotional disturbance.

Currently, the DMH assists approximately 27,000 adults, adolescents and children through a variety of inpatient and community-based services. These community-based services range from intensive residential services and community rehab support to school therapy and medication monitoring. In addition, DMH performed 16,300 evaluations for adults in the courts system, and provided assistance to 3,684 children and families in the juvenile justice system (Massachusetts, Department of Mental Health, 2009).

2.3 Division of Capital Asset Management

The Division of Capital Asset Management, also known as DCAM, is the state agency responsible for major public building construction and real estate services for the Commonwealth of Massachusetts. DCAM dates back to 1980, when it was created by the legislature to encourage quality and veracity in the areas of construction and real estate within the Commonwealth (Massachusetts, Division of Capital Asset Management (DCAM), 2009). DCAM helps other client-agencies sustain state facilities through comprehensive and cost-effective maintenance and management strategies.

DCAM manages a wide variety of projects from new construction to the renovation and repair in areas such as academic buildings, courthouses, correctional facilities, and recreational facilities (Massachusetts, Current & Completed Projects, 2009). DCAM recently worked with Gilbane Building Company to complete the new downtown Worcester Trial Court in June 2007, with its final cost being 180 million dollars. The project delivery system considered was Construction Manager At-Risk, which entails a commitment by the construction manager to deliver the project within a guaranteed maximum price (International 3. , 2009). The new building was the first project delivered under this method, the first comprehensive justice center to include all five trial court departments and is the largest court

facility constructed by the State (Massachusetts, New Downtown Worcester Trial Court, 2009). Another project managed by DCAM was the Hampden County Women's Correctional Facility. DCAM worked with Fontaine Brothers on this 35.4 million dollar project to complete the new jail and house of correction that is under the jurisdiction of the Hampden County Sheriff's Department. The project type was considered a design-bid-build, which is a project delivery method in which the agency or owner contracts with separate entities for the design and construction of a project (Oberlender G. , 1993). It is a two story building located in Western Massachusetts that was completed in September 2007 (Massachusetts, Hampden County Women's Correctional Facility, 2009).

The Worcester Psychiatric Hospital is also being delivered under Construction Manager At-Risk approach (Massachusetts, DMH New Psychiatric Facility, Worcester, 2009). DCAM is the technical owner of the Worcester Psychiatric Hospital, but the user agency that will be in control of the facility once it has been completed is the Department of Mental Health.

2.4 Gilbane Building Company

Brothers William and Thomas Gilbane founded Gilbane in 1873 as a family-run carpentry and general contracting shop. This Providence, RI based company was first known for its quality and the construction of many homes in Providence. This soon expanded to an increase in work, including churches, hospitals, and various public buildings. Today, Gilbane, Inc. is known as one of the largest privately held, family owned companies within the construction and real estate industry.

Through the 1900s, Gilbane survived the Great Depression and obtained a desirable reputation in construction management after William H. Gilbane's sons, Thomas and William Gilbane joined the company. Some of their work includes defense projects throughout World War II and the Smithsonian's National Air and Space Museum in Washington, D.C. While on the rise, Gilbane embraced the opportunity to expand its company by establishing a development sector known as Gilbane

Development Company. Currently, Gilbane, Inc. consists of Gilbane Building Company and Gilbane Development Company who together have over 25 offices nation-wide, and brings in an excess of $2.5 billion per year in revenue (Gilbane Inc. History).

Today, Gilbane utilizes model-based design and construction information technology to assist them in achieving leading-edge efficiency within their projects. Kevin Bredeson, director of virtual construction at Gilbane, mentions, "Whether they are major or minor, each clash uncovered on a job site means the contractor must send a request for information (RFI) to the design team. This can potentially result in delays and a costly change order for the owner. We try to foster communication, collaboration, and clarity on our projects to prevent problems – and Building Information Modeling (BIM) is an important part of our success in doing so" (Gilbane uses BIM solutions from Autodesk to help reduce construction costs and shorten schedules, 2009). Gilbane's reputation, currently ranked 20th on Engineering News Record's Top 400 Contractors, has earned them the opportunity to become involved in numerous renovations and new construction projects over the years, such as Worcester Polytechnic Institute's Bartlett Center and the East Hall dormitory, the Worcester Trial Court, Fenway Park Renovations, the Prudential Center's New Jersey Devils Arena, and the Children's Medical Center Dallas Pavilion Ambulatory Care Center renovations (The Top 400 Contractors, 2009).

2.5 Tishman Construction

Julius Tishman founded Tishman Construction in 1898 in the Lower East Side of Manhattan. Nearly a century later, the company is led by fourth generation, Daniel Tishman. Today, it is known as one of the nation's leading construction management firms, where they provide construction services to clients varying in scope, budget, schedule and complexity. Tishman acts as both Construction Manager at Risk and Construction Manager as Agent and as an Owner's Representative. The projects vary in size and complexity and across a wide range of areas. They work on projects that include facilities in

education, health, government, restaurant, and transportation. They have completed work at the Chicago Police and Fire Stations in 1998 and 1999, as well as O'Hare International Airport in 2001, and Bridgewater State College in 2007 (Tishman). For the Worcester Psychiatric Hospital project, Tishman is acting as the owner's project manager.

2.6 Ellenzweig

Ellenzweig is a national architectural firm founded in 1965, and now located in Cambridge, Massachusetts. The services they provide include master planning, programming, feasibility study, in-house laboratory planning and architectural design services. Ellenzweig participates in a wide range of projects from complex building for science research and teaching, parking complexes, and transit facilities. Ellenzweig uses electronic technology in the planning, design, documentation, and construction phases of the architectural practice. The company uses a combination of Autodesk Revit Architecture, AutoCad, and SketchUp for the planning, visualization, and design of the various projects they are involved in. They incorporate Building Information Modeling (BIM) software into the various phases of development, which helps to streamline and coordinate the project delivery processes for each client. Some of their local projects include work done at Harvard University since 2001, at Massachusetts Institute of Technology since 1998, at the University of Massachusetts in 2004, and at the Massachusetts Bay Transportation Authority, Alewife Intermodal Transportation Facility in 1985 (Ellenzweig). Ellenzweig is the architect for the Worcester Psychiatric Hospital.

2.7 Construction Project Management

Construction is known as the process of constructing something, which is to make or form by combining parts or elements (Merriam-Webster). There are many different types of projects within the industry including building, civil, and industrial. The various types of construction projects included an individual or team, depending on the size, to plan, design, construct, and maintain the project. The

people involved in each team need to be able to work together to complete construction on schedule and on budget. In order for the process of construction to be maintained as efficiently as possible, it needs to be managed. A project manager is hired to plan, execute and close any project in the needed industry. The duties of a project manager include developing clear and attainable project objectives, establishing the project requirements, and managing the three constraints within a project; cost, time, and quality, while considering the best interests of the client (Oberlender G. D., 1993, p. 7).

Construction Management is the study and practice of the managerial and technological aspects of the construction industry (International 3. , 2009). There are seven different facets of construction management due to the fact that no project is ever the same. Therefore the duties of a project manager vary for each project and cannot be predetermined. The common responsibilities of a construction manager can be classified as the following:

- *Project Management Planning:* The construction manager needs to work with the owner and designer to plan the entire project. These aspects include defining the project objectives and creating the required methods to reach such objectives.
- *Cost Management:* Cost is the owner's main concern. The owner is mainly interested in achieving the lowest possible project cost while still guaranteeing the best possible outcome. The construction manager must estimate a final cost, which should include an allowance for changes, keep record of all changes, and inform the owner of any fluctuations in cost to determine if the project is under, on, or over budget.
- *Time Management:* The construction manager needs to develop a project schedule for all aspects of the project to ensure that the final project is delivered on time. In doing this, they must keep an updated schedule to show the work as it progresses, to be able to conclude if the project is behind, on time, or ahead of schedule.

- *Quality Management:* The construction manager is responsible for ensuring that all of its subcontractors are accomplishing their goals according to the details that were agreed upon, the building codes, construction standards, and any state or federal regulations.
- *Contract Administration:* Typically the construction manager is contractually bound to the subcontractors that have been assigned to the project. The construction manager must guarantee the timeliness, costliness, and quality of the subcontractors work.
- *Safety Management:* The safety of the workers involved and of the building itself is the responsibility of the construction manager. Good safety management will reduce the number of incidents on site. This can be accomplished by presenting safety reports, filing accident reports, and having on site inspections, if necessary.
- *Professional Practice:* Within this practice, it is the construction manager's responsibility to manage the people who are working towards the completion of the project. The construction manager needs to define each individual's roles and responsibilities, develop a successful means of communications, and resolve any discrepancies within the project.

The key to having a successful construction project is clear, efficient, and effective communication. Having a good means of communication can prevent delays and increased costs because it leaves less room for misunderstandings. All involved parties must be willing to coordinate and cooperate with each other effectively. The construction manager needs to facilitate communication between the owner, designer, government, and subcontractors involved in the project, to ensure that all parties are updated on any changes occurring in the project. The various parties should be aware of the job performance that is expected of them. The construction manager needs to inform each person what is expected of them in regards to the required budget and time constraints set for the project. The construction manager should also set dates that would serve as checkpoints. The checkpoints would be set to show in detail the progress that has been made in the project (Buehring, 2010). Project meetings are held

weekly to facilitate the communication between the project participants and to present updates to the team participants.

There are many variables that need to be considered when managing a construction project. A construction project manager is responsible for delivering a project on schedule and on or under budget, while still maintaining the high quality of the project and performing all work in the safest manner possible. One of the first things the CM needs to complete is the project objectives and plan. This includes defining the scope, budget, schedule, performance requirements, and selecting the subcontractors for the project. The owner, designer, and general contractor are all involved in the process of determining the cost and schedule limits of the project. The project manager also needs to be efficient with all the labor, materials, and equipment being used towards completion in order to maximize the resources while continuing to be cost-effective. The CM needs to ease communication between the owner, designer, and subcontractors to ensure all are working together and to resolve any conflicts before it can have a negative effect on the outcome of the project (Hendrickson, Project Management for Construction, 1998).

Two of the major variables to be considered in a project are the cost and the schedule. Although one of these elements may be according to plan, if the other is not, the project is not as successful as it could be. In Figure 5, the planning of construction is broken down by these two categories (Hendrickson, Project Management for Construction, 1998). There are many factors that can be involved in why the project is behind schedule or over cost and it is the CM's responsibility to become aware of the cause and develop a solution to the problem.

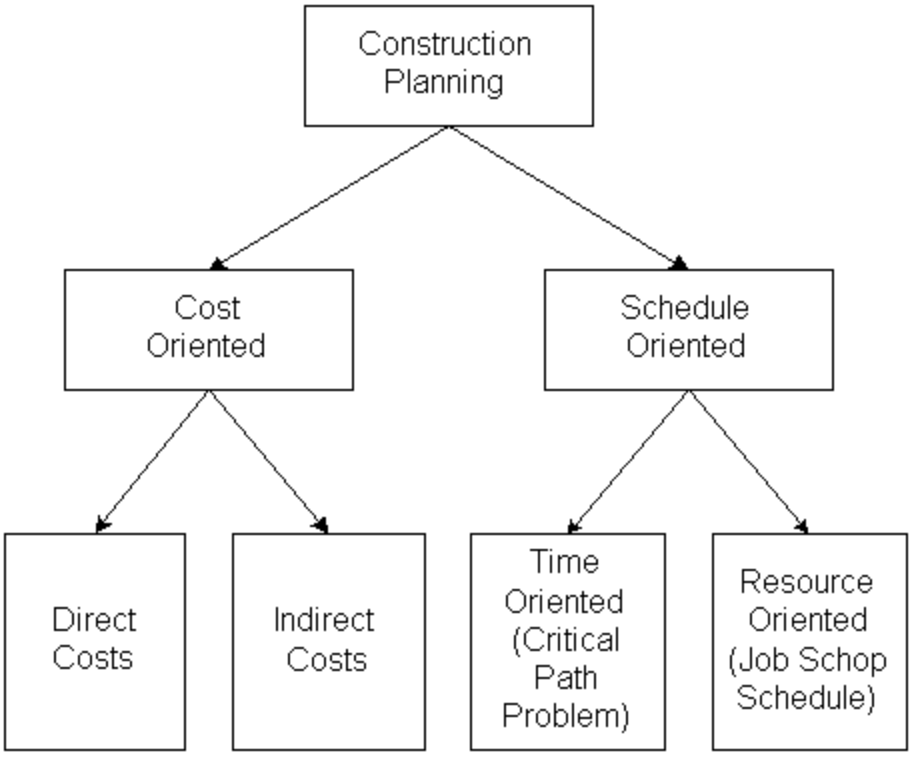

Figure 4: Breakdown of Construction Planning by Cost and Schedule (Hendrickson, Cost Estimation)

Gilbane Construction Company develops a construction schedule that highlights all of the events that will be occurring over the entire length of the project. Again, this schedule shows any activity that is early or critical and has a progress bar that gets updated according to what is happening. Gilbane also has an Owner's Executive Summary that reviews the entire scope of the project and breaks the dates down by quarters to display where the project should be in the following months until completion. Gilbane also uses a two-month look ahead in schedule to plan out the series of events that will be occurring on a short-term basis. This chart also shows what parts are being delivered early, and what activity is considered critical. It also includes an activity description, and start and finish date. There is also a two-week look ahead that is provided by Gilbane at each of the weekly construction meetings. The document shown in Figure 5 displays the work that is going to be accomplished over each area of the project, such as the design period or sitework and excavation, and also shows key milestones such as

when the building punchlists are completed and the expected project completion date.

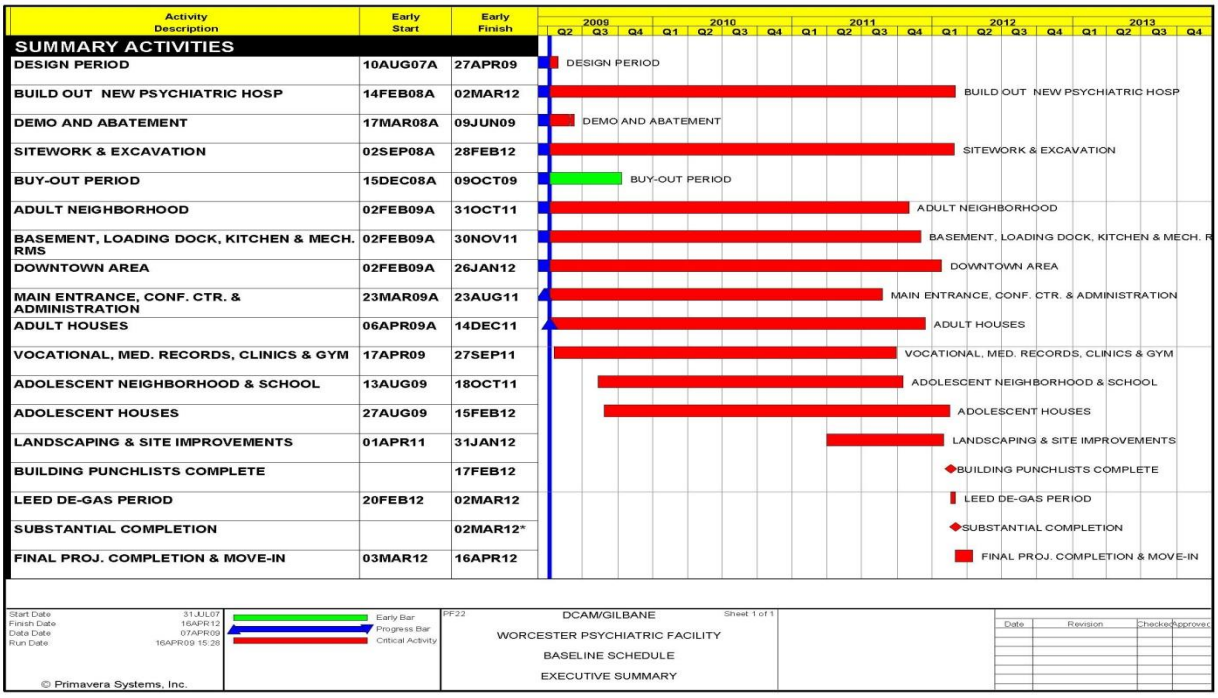

Figure 5: Owner's Executive Summary

Gilbane is acting as a Construction Manager at risk with a Guaranteed Maximum Price (GMP). This means that Gilbane will be performing project work, exposing them to the risks associated with quality, cost, and schedule. They will therefore be the primary party responsible if any of those criteria are not satisfactory. With CM at-risk, the owner has a contractual relationship with both the construction management firm and with the architectural firm. These two parties work together throughout the duration of the project, but are not contractually related. The construction management firm does however have contractual relationships with all the subcontractors involved with the projects. Although the subcontractors go through the public bidding process, they are eventually hired and managed by Gilbane. It is then Gilbane's responsibility to guarantee that the subcontractors perform under the guidelines of their contracts. If the subcontractors do not abide to their obligations, the cost and scheduling problems are now the construction management firm's problems. This at-risk contract causes the CM to have an agreement with the owner that states the project be completed at a

Guaranteed Maximum Price (GMP). If the project exceeds that price, the contractor must pay the difference, therefore losing money in the process (Oberlender G. D., 1993). In order to avoid this loss, the CM has the responsibility to continually encourage open and frequent communication between all involved parties. This helps to ensure that all aspects of the project are working in coordination with each other and are informed on the overall progress as to not exceed the GMP by going beyond schedule or over budget.

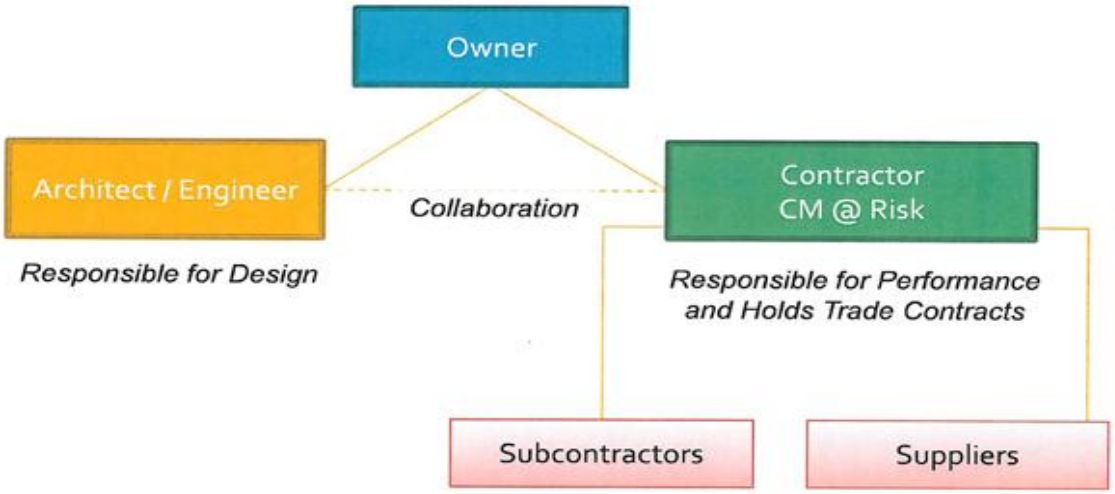

Figure 6: Construction Management At-Risk (Project Delivery Methods, 2008)

2.8 Contracting Law

The public bidding process in Massachusetts allows contracts from Gilbane to be given to the lowest eligible and reliable bidder, therefore maximizing the taxpayer's dollar. Before the statute's requirements are applicable, the public building project must be estimated to cost more than $25,000. The exception to this is under extreme emergency. Although it is not defined for public building projects,

extreme emergencies would allow contracts to be rewarded by Gilbane without a competitive bidding process (Hugh J. Gorman, 2007).

The awarding authority is required to award the contract to the lowest responsible and eligible bidder in the case of filed subcontractor bids. The lowest responsible and eligible bidder is defined as "the bidder (1) whose bid is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work; (2) who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed in the work; (3) who, where the provisions of section eight B of chapter twenty-nine apply, shall have been determined to be qualified there under; and (4) who obtains within ten days of the notification of contract award the security by bond required under section twenty-nine; provided that for the purposes of this section the term "security by bond" shall mean the bond of a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the awarding authority." (Hugh J. Gorman, 2007).

The contracting law also specifies that the bidder provide a bid deposit. This is collateral for any type of shortcoming or inability to perform that may be demonstrated by the bidder. The bid deposit may be in the form of a bid bond, cash, certified check, or treasurer's or cashiers check made payable to the awarding authority (Fierman & Barsamian, 2009).

2.9 Stakeholder Theory

Stakeholder theory was originally designed to characterize the parties involved with a company who have actual stake as well as those who are in situations, which require them to be treated as stakeholders.

The important part of stakeholder theory is the definition of a stakeholder. Other theories present descriptions of companies and argue that there are a small number of parties whose needs and wishes should be addressed to continue success of the organization. For example, shareholder theory

suggests that since shareholders are the owners of a company, their needs should be put first. In other input-output models, investors, employees, suppliers, and customers are the only parties that either provide inputs that can be converted to usable outputs, or buy the usable outputs. Therefore, those parties should be the ones who get their needs addressed. stakeholder theory basically argues that there are many more parties involved. Other parties that can be included in the definition are governmental bodies, political groups, trade associations, trade unions, communities, associated corporations, prospective employees, and prospective customers, the public, and sometimes competitors.

Stakeholder theory also describes situations to determine who really matters and addresses how to take into consideration the needs and wants of all parties affected. Some may criticize the theory for it sometimes implies that the needs and wants of stakeholders can be weighed against each other, seemingly never allowing everyone to be satisfied. To resolve the issues this creates, stakeholder theory puts heavy emphasis on conversation as a means to negotiate between the parties involved. Beyond dialogue and negotiation, there are few options to resolve conflict between stakeholders.

Stakeholder theory will be included in our analysis of meeting dynamics by taking into consideration the needs and wants of each party. This theory is used to describe how the parties are affected by actions that will occur and the effect they have over occurring actions. We will need to define who the key stakeholders are within this project. By doing so, we can have a better understanding of where the power and influence within the project lie. By defining the key stakeholders, we can tie the parties together. The connections between the parties could explain the relationships that develop. We will also want to look into any problems that arise within the different parties due to their underlying interests within the project. Throughout the project, each party makes their requests for different aspects of the process. Despite the magnitude or specific nature of the request, the resolution of those requests will be

analyzed in direct relation to stakeholder theory. By the end of the project, we will have enough examples and evidence to either support stakeholder theory in this instance or to show where the reality of the project deviates from the predicted outcomes.

The main stakeholders for this project are the owner, the Division of Capital Asset Management (DCAM); the user, the Department of Mental Health (DMH); the project management company, Gilbane Construction Company; the architect, Ellenzweig; and the hired subcontractors. The owner DCAM and Gilbane take an active role in the weekly construction meetings that are attended by the major parties of the project. Due to the contract that binds DCAM and Gilbane together, as well as the contracts between Ellenzweig and the owner, these four parties have a higher stake than the other participants at these meetings. Seeing as the project is defined as Construction Management at-risk, Gilbane is held responsible if the project is not delivered on schedule and is over budget. Any additional expenses would be taken from Gilbane's company account, therefore ensuring every effort made for an efficient and successful project completion.

In this particular project, Gilbane is held responsible for any costs that exceed the set GMP. With this in mind, Gilbane will be more actively attempting to keep the project on schedule and under budget. If the project were not a CM at Risk project, Gilbane would not be as concerned when other parties are not working up to their expectations. With the risk, it can be assumed that Gilbane will be attempting to influence other stakeholders at least to the extent of getting everyone to work adequately enough not to increase the cost of the project.

Under the Owner-Construction Manager Agreement, Gilbane's responsibility is to "perform the Work as required by the Contract Documents to construct Mass. State Project No. DMH 0501, DCI, New DMH Psychiatric Facility" (refer to Appendix D). The Work consists of a site inspection where the CM is to learn as much as possible for background information, obtaining site conditions including soil

information and subsurface conditions, and any additional site testing that may result in differing site conditions and cost reduction of the project. The CM and Trade Contractor are also held under contractual agreement. The Trade Contractor's responsibilities are to "furnish all labor, materials, equipment and services required for the completion of all work" as specified in the "Specifications for Heating, Ventilation & Air Conditioning Work and the Plans referred to therein for the Worcester – DMH Psychiatric Hospital all as prepared by Ellenzweig" (refer to Appendix E). The work mentioned is required to be in accordance with a list of strict provisions as outlined in the contract, including the date that it is to be completed by.

2.10 Meeting Dynamics

The publication Focused Sharing of Information, by Kathleen Liston (2001), has researched and presented the pros and cons of several methods of decision-making used during meetings. The points outlined in part of the paper, when applied to our regular meetings, made them more productive and facilitated the multidisciplinary interactions that took place.

Although several modes of presenting material can be utilized during meetings, the example on traditional meetings most applies to this project. One significant observation is that the current analysis of information, intended for individual review, travels through a medium in order to reach the individual. While these media are practical for each individual to have and perhaps take home to use, they do not assist in making the meeting run more smoothly. One necessity for a successful meeting is a shared focus. If the meeting's attendees each have their own set of documents, it is likely that each person is focusing on a separate part of the document. If each topic were being presented to everyone simultaneously, everyone's focus would be on the same presentation.

The other important distinction in the paper is between a shared focus and a shared focus that has a multi-disciplinary point of view. Although the prepared material is easy to understand by the

person who created it, members of the group who focus on other disciplines may not be ready to adapt. They may be attempting to analyze material from their point of view instead of from the creator's. The solution to this is to present materials in a way that they can be evaluated from different angles. This will not only make the presentation of the material more successful, it will also make the material more useful to the team as a whole so that it may be interpreted at a later time without the assistance of the creator.

The last clear take away from the paper is that separate information should be compared and related. Once compared and related, it should be shown in the material. It was shown that members of the group observed by the author of the article struggled at times with information that was presented separately, forcing them to draw out their own relationships, slowing down the meeting and possibly leading to misinterpretation. Drawing out the relationships beforehand will avoid these hindrances as well as cut out any superfluous information, speeding up the meeting even more (Liston, 2001).

There are other factors that appear in meetings, which may not always be noticeable but are always important. These more subtle meeting dynamics, such as someone shifting in their seat or glancing at a colleague about a decision or comment that was made, can be more important than the controllable methods of a meeting as described by Liston. The members of a meeting that openly disagree are not the ones that are a problem, it is the ones that leave unhappy but do not say anything about it during the meeting (Wolf, 1997).

It is often difficult for those running a meeting to pick up on the subtle meeting dynamics. Despite their importance, they cannot be placed as a higher priority than continuing the meeting. In an article by Neil Robinson (Robinson, 2006), owner of LANzen (an IT company consultant agency), it is suggested that meeting dynamics should be an assigned role to someone other than the leader of the meeting. For example, the minute taker is often uninvolved but must always be paying attention. If that

person makes notes of the subtle meeting dynamics, they can report to the meeting organizer to discuss the parties that may have seemed displeased with certain parts of the meeting, or even contact those people directly before bringing it to the attention of the organizer.

In more general terms, there are certain factors that will result in a "good" meeting. These factors are separate from the ones previously discussed. The previous points can be used to drastically improve meetings, but are not essential components to a successful meeting. Some of these factors include starting and ending on time, having some time for small talk, sendingout the agenda early, sticking to the agenda, only going to the meeting if you need to be there, taking breaks during long meetings if necessary, and staying focused (Rubin, 2009).

Duncan Brodie, author of "6 Key Tips for Running Effective Project Meetings", presents six factors that assist in running an effective meeting. These factors can also be used to analyze why a meeting gets off track or is not effective by identifying the absence of the following factors in the meeting being analyzed:

- *Set Objectives.* These objectives will help minimize the time needed for the meeting and allow all items to be addressed.
- *Set an agenda*. Agendas, especially those with indicative timing for each item, assist in keeping a meeting on track with few deviations. It is also more effective to send the finalized agenda to meeting participants a day or two before the meeting so there is time for review beforehand.
- *Keep meeting papers short.* In-depth details should be avoided as they may fluster attendees. One suggested tip is to follow a system that indicates the priority of the item to be discussed, signifying things that are going well, occurring issues, and urgent concerns.

- *Get the right people to attend the meeting.* If there is a meeting that will be in need of those at a more senior level to expedite the decision making progress, it is encouraged to contact them ahead of time in order to avoid indecisiveness at the meeting.
- *Ensure that the physical environment is comfortable.* If the meeting room temperature is too hot or too cold, the attendees will have a difficult time focusing on what is to be discussed.
- *Be sure that the meeting starts and finishes on time.* Meeting participants should be advised that the meeting will begin and end on time, and even encouraged to arrive early. Without adequate planning, a meeting cannot be run effectively (Brodie, 2010).

When formulating recommendations to compile at the end of the project, meeting dynamics will be incorporated into a large portion. The way a meeting is organized and presented could be a significant factor causing a potential problem to either fabricate or remain unaffecting.

All three points in the paper by Liston (Liston, 2001)are considered when interpreting the organization of the meetings. Whether there are mediums that exist to create a shared focus or if the meetings exclusively use media designed for individual review will be taken into account. Additionally, the design of those medias will be analyzed. If a specific presentable is consistently delivered with respect to one discipline, it may be causing frequent and similar issues among the other disciplines. In combination with the second point is the third point. If the presentable materials are used to relate two sets of data or compare different aspects of the project, it is important whether or not the data is presented as if it has already been compared. We will be looking for comparisons that are expected to be made, and comparisons that are already made, as they will have different effects on both the pace of the meeting and the comprehension of its participants.

2.11 Participant Observation

Weekly project meetings are held by the construction manager throughout the project period to review the progress of the work and to provide a place for the discussions of any problems that may arise. At such meetings issues pertaining to the project should be addressed and minutes from the previous meeting are to be read and approved. A progress report on the Request for Information's (RFIs) and submittals are to be reported along with the presentation of the construction schedule. New business is to also be discussed as well as any problems that could hinder the planned progress of the project (Services).

In order to learn about effective meetings in the construction management process, our team engaged in participant observation of the weekly project meetings throughout our MQP. Participant observation is a type of research method that we have significantly incorporated into our project. Its purpose was to provide familiarity to a group and their practices through intensive involvement of people in the natural setting over a certain period of time. Participant observation includes informal interviews, direct observation, collective discussion, and analyses of personal documents produced within the group (International F. H., 2009). This technique is organized to allow the production of ethnography, which is the description of the nature of a study. Many consider participant observation to be a straightforward technique that involves oneself becoming immersed in the subject being studied. The observer should be able to gain a deeper understanding as opposed to using questionnaires or surveys. There are several advantages to participant observation, such as the ability of the researcher to rely on first-hand information, validity of the data provided, and the relatively simple method itself. Often, within a group, there are diverse perspectives on a subject, and throughout our project we attempted to define these different perspectives and understand the relationships among them. The act of participant observation always takes place in a location related to the subject, because the location

tends to have relevance to the research questions. Researchers are able to discover the workings of an "insider" while remaining an "outsider" by using this process (International F. H., 2009).

3.0 Construction Project Management (CPM)

When considering the success of a project, one must understand the inner workings of the project itself. The areas that need to be addressed when planning out a project are the schedule, budget, quality, relationships and communication between parties, and the safety. These areas can affect each other and need good management to guarantee success.

The schedule needs to be developed by the construction management team with consideration to all the players involved in the project to ensure cooperation and commitment from all parties. The schedule should be agreed upon by the parties involved to prevent misunderstandings when activities take place. The construction schedule helps to determine the achievability of the project. It is used to assess the progress of the work that should be happening and it allows the owner to have a realistic timeline in which they can expect the project to be completed. The schedule makes it easier for the project manager to plan and coordinate for workers deliveries of materials and equipment rentals, as well as updating the project manager on any changes that need to be made in these areas due to delays or being ahead of the planned agenda. Today, there are multiple types of construction scheduling software packages available that companies use to facilitate the scheduling and updating process (Construction Schedule).

Tied into the schedule is the budget for the entire project. The Worcester Psychiatric Hospital project was given a guaranteed maximum price, or GMP. The GMP is the total maximum cost that is paid by the owner, DCAM, for the contractor's, Gilbane's, complete performance of all work and services. This cost includes the cost of the work and the contractor's fee. When contractors perform the job at-risk, they are held accountable for any costs that exceed the set GMP. Factors that are considered when deciding the total price of a project can include the following (Hendrickson, Cost Estimation):

- Land acquisition, including assembly, holding and improvement

- Planning and feasibility studies
- Architectural and engineering design
- Construction, including materials, equipment and labor
- Field supervision of construction
- Construction financing
- Insurance and taxes during construction
- Owner's general office overhead
- Equipment and furnishings not included in construction
- Inspection and testing

To ensure the best possible quality of the project, the construction manager must have a check on the quality assurance or quality control. The quality of all material that is being used in the project should comply with government standards. Also the quality engineer should ensure that the work is being performed in accordance to all standards and codes set forth by the city or state the project is taking place in.

Safety is a very important factor in the construction industry due to the fact that companies do not want to endanger workers and potential users of the facility. Construction managers have the responsibility to try to prevent accidents in the work place. Workers should be provided with a safe environment free of dangerous factors due to weather such as mud or ice patches, as well as providing them with any necessary training before being expected to use new equipment. The construction manager also needs to watch for defects and underperformance due to neglect in their projects because they can result in large costs to the CM and delays to the project.

Relationships and communication are one of the most important factors in the success of any project. Having good communication helps to prevent errors due to misunderstandings. When parties

have a good relationship with one another there is a greater chance of everyone working together for the success of the project. Good relationships help a project progress smoothly.

Construction of a new facility has a major environmental impact both directly and indirectly. When building a new facility, resources such as water, raw materials, and energy are used up. This produces waste and the various resources can potentially release harmful emissions into the atmosphere. Contractors and designers today encounter the task of delivering a project according to the demands and desires of the owner while minimizing the affect the new building will have on the environment (Committee, 2010). Many buildings today are being classified as a sustainable design, which seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance (Horn, 2010).

Sustainable designs strive to:

- optimize site potential
- minimize non-renewable energy consumption
- use environmentally preferable products
- protect and conserve water
- enhance indoor environmental quality
- optimize operational and maintenance practices

Aiming to achieve each area of the sustainable design will help decrease the impact a new facility has on the environment. Projects today are being done to reach different standards of LEED Certification, an internationally recognized green building certification system (LEED, 2010). The LEED certification verifies that the building was designed in such a way that energy, water, and carbon dioxide emissions were reduced. There are four levels of LEED certification, certified, silver, gold, and platinum. Each level

corresponds to the number of credits received in the five green design categories. The five green design categories are sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality (LEED Certification).

3.1 CPM Results and Analysis

The budget for the project is still being determined, although in February 2010, the GMP is estimated at two hundred thirty three million dollars. The budget is determined by the owner, DCAM. Scheduled into the GMP by DCAM for Gilbane, is a contingency for buyouts and problems with the schedule, as well as site improvement and design issues. It has been approximated at roughly 8-10 percent of the total cost of the project. In February 2010, the project is considered to be twenty-two percent complete and approximately 2.5 million dollars of the money has been allotted to the areas in the contingency. One third of this cost was incurred due to demolition at the site, while the rest was due to design setbacks. Neither of these costs were the result of the work of Gilbane Construction Co.

In order to ensure the project is delivered in a timely fashion, Gilbane updates the schedule at the time changes occur, and completes a monthly update for the entire project. DCAM also gives Gilbane updates to anything that has happened that will change the timeliness of delivery as it has occurred.

The architect has designed the building to try and reach the highest level of LEED certification possible. The Worcester Psychiatric Hospital project was recognized as the Gold Level of LEED certification, meaning the project received a minimum of sixty points out of the one hundred available points.

Gilbane works extremely hard to promote safety in the work environment. They go above and beyond what is expected of them by OSHA. Gilbane has a safety officer managing the entire project and well as requires any subcontractor with more than twenty workers on site to have their own safety

officer. Employees are given an orientation about safety, asked to pass a test, and are required to receive their ten-hour OSHA card. The site safety is maintained by the safety inspections that occur monthly. Currently there are twenty-one safety inspections occurring per month. Gilbane also offers incentives for achieving safety. They have rewards for each hundred days of safe work reached. In addition they host a barbecue each fall with work-related giveaways that promote a safe work environment.

4.0 Construction Meetings

The members of Gilbane hold weekly construction meetings for the construction of the Worcester Psychiatric Hospital. These meetings invite members from the other companies to discuss any issues and convey any updates that have occurred in the last week. This section presents our observations from attending these meetings and ultimately describes several recommendations to improve the efficiency and productivity of these meetings.

4.1 Role of Meetings

While attending the weekly meetings at Gilbane, we observed the meeting dynamics taking place between the various parties, and then we applied different methods of participant observation to gain the most insight from each participant and their company. Each week, we observed the interactions between the contractors, owner, architect, and project managers involved in the project. We were able to view firsthand the communication issues, if any that had occurred between these professionals each week. In various instances there were discrepancies regarding certain aspects of the project, and often a disagreement as to how the situation should be remediated. By witnessing these interactions we were able to see multiple approaches to problem solving. We also were able to learn who took an active role within the project meetings and whether their participation was related to the stake they held in the project. We also tracked the focus of each participant during the meetings. By doing this, we were able to see what influences caused distractions to the meeting and its' participants, therefore assisting us in making the proper recommendations to limit these distractions.

Participant observation requires that the observation take place over an extended period of time. We attended approximately twenty weekly meetings each Wednesday from September through February, which gave us an adequate amount of time to become involved observers. The scheduled meetings occurred on site, which allowed us to also see the progress of the work that was being

discussed. During this meeting time we each took notes according to the rubrics we developed, which assisted us in organizing three key points of each meeting; focus, interaction, and participation. When we reviewed our notes from the rubrics, we were left with unanswered questions. We then compiled a list of these questions to ask the participants in order to see how they felt about certain things that had been occurring in each of the meetings. After we reviewed the feedback from the questionnaire, we were able to make recommendations on changes that could be made to improve the meetings.

The meetings themselves are set up by Gilbane as a requirement in the contract with DCAM. The meetings serve to update the parties working on the project of any activity and also serve as a forum of discussion so that solutions of key issues can be resolved in a timely manner. The structure of the meeting follows the minutes of the previous week. Broken into categories such as QA/QC and DMH Coordination, issues and updates are presented by category. Once the minutes have run their course, a round table discussion is initiated during which everyone can bring up the topics they would like to discuss further or ask questions about.

4.2 Meeting Assessment Methodology

The meetings were attended by WPI's MQP team in order to make observations that could lead to recommendations about the efficiency, productivity, and communication of the overall project. After attending weekly construction meetings at Gilbane's on-site office and trying to obtain information through participant observation, it was apparent that there was a need to formulate a rubric for these meetings. The three main areas that we decided needed attention were focus, interaction, and participation. We chose these areas after general observations were made for several weeks without any rubrics to follow. In each of these areas, the rubric called for the person and their affiliation as well as the item number from the minutes. The focus area was broken into two other sections that identify the action that took place and the effect of that action on the meeting and its attendees. The

participation area noted the subject of the question asked or answered and whether the latter was relevant to the person's position. Lastly, we had the interaction section, which was separated according to how a person interacted within the meetings. There is a column for whether they spoke at the meeting, the effect it had, any reactions from themselves or others and the importance of their speech.

Each area is pertinent to the flow of an efficient construction meeting. Once the rubrics were created, there was a structured method to record and analyze what was taking place in the meetings and how it affected the overall productivity. Small distractions and irrelevant questions interrupted the flow of the meeting causing people to become sidetracked and lengthening the overall length of the meeting. Also, it had been noticed that certain attendees seem to have had a strong presence, being extremely involved with what was occurring, while others appeared to not have any contribution to the meetings at all. These actions can be related to the stakeholder theory, and possibly show a connection to the amount of involvement in the meetings from a certain person to the stakes they hold within the project.

4.3 Meeting Rubrics

4.3.1 Focus

The focus rubric, as shown in Figure 4, was used on a trial basis at a meeting to determine whether more valuable information could be gathered from the construction meetings. The rubric seemed to work well answering four of the five W's; who, what, when, and why. With the use of the rubric, the person who was focused was identified as well as their affiliation. The action occurring was recorded as well as the effect the action had on the meeting or attendees. It was found that the rubric could use an additional column for item number to ensure where in the meeting the action is taking place.

Item Number	Person/Affiliation	Action (takes notes, uses documents, checks emails, takes phone calls, side conversations etc.)	Effect of Action

Figure 4: Focus Rubric

By separating the meeting into the three focal points, we were able to zone in on the elements important to our project. The focus rubric identified who was paying attention during the meetings, and who was causing the meeting to be interrupted. At times, only one person was distracted, and at others the entire meeting was taken off track. Noting what action of focus each person was performing also showed the different methods people prefer. It was noticed that the same people tended to repeat the same action multiple times within one meeting and also from week to week. Many times cell phones were being used within the meetings to check e-mails and take phone calls, which caused a distraction to both those involved in such action and those around them. Some attendees brought their own notebooks to take notes, while others used the papers supplied. At each meeting copies of the past minutes, RFI's and two-week look aheads were distributed. When each of these items were being discussed, some people used the documents effectively, following along with what was being discussed, while others disregarded the papers altogether. While observing these actions, the question of why the company uses these papers was brought up. After reviewing the contract between Gilbane and DCAM, we found that monthly progress reports are required to be submitted to DCAM. They need to include a project status overview, procurement status report, project schedule update, and project cost update. Therefore, having them at the weekly meetings ensures that everything will be included in the documents submitted monthly.

4.3.2 Interaction

Interaction is defined as a mutual or reciprocal action or influence (Interaction Definition, 2009). In other words, the term can be explained as an agreeing or disagreeing action or influence between multiple people at a time, and can have a significant impact on how a meeting can function. The meeting rubric that was created to assist in the analysis of weekly Gilbane meetings, included looking at various aspects of interaction, such as recording the person and their affiliation, the frequency at which they spoke during the meeting, the effect their speech had on the rest of the meeting participants, whether the person interacting received a positive or negative reaction when they spoke and the importance of their contribution to the meeting. These variables would eventually show any possible relationship between interaction and the influence the individual had on the meeting, and whether or not it affected how often they interacted with the other attendees.

After using the original interaction rubric at a meeting, it was felt that there was more worthwhile information to be gathered in these meetings than what had been recorded, Alterations to the interaction rubric, as shown in Figure 5, included the “Speaking in Meetings” column and the “Reaction” column. These topics were critical to the overall assessment of the rubric; however the method of recording such information needed to be reconsidered. A reader can tell how frequently a person is interacting by how often their name appears on the rubric therefore, the “Speaking in Meetings” column was replaced with a column to record with whom they are interacting. This helped determine if there were any patterns in the interactions within the meeting, for example, did Person A always have the answers for Person B or did Person A have to go through Person B, C and D to get an appropriate answer. In addition, the positive or negative reaction column was replaced with a column that recorded how they interacted, whether it was with humor, agreement, scorn, frustration, etc. The final alteration made to the existing Interactions rubric was the addition of a column to record the item number that was being discussed. This was an essential aspect of this rubric, for it allowed the user to

accurately compare the interactions recorded to the topic that was in discussion at the meeting, identifying any repetitive behavior. These changes helped to narrow our observations and gather the appropriate information to make our assessments.

Item Number	Person/ Affiliation	Interacting With?	How They Interact	Importance / Effect

Figure 5: Interaction Rubric

4.3.3 Participation

Participation of a meeting for the intents of this rubric (Figure 6) was the frequency and purpose of each individual asking a question about the material being covered. Throughout regular meetings, it was common for individuals in attendance to ask questions. When they did, it was only beneficial to the company if the information was relevant to that individual. By having a section to mark whether or not the question relates to the person asking, this possibility was assessed. If it was a common occurrence for the same individuals to be asking questions outside of their discipline, the meeting could be suffering and slowing down significantly as a result. The subject of the question directly relates to why it was or was not relevant to their position.

The second column is simply the person who was asking and their affiliation. It was expected that there were several key players at the meetings and that everyone in attendance did not contribute equally throughout the meetings. By tracking who asked questions, we were able to decide who the participants were that most frequently asked questions and if there was a pattern to their questions. If they were frequently asking about one topic every week, perhaps it would be beneficial to add that item to the agenda to make it more efficiently integrated into the meeting structure. After an initial trial with

the rubric, the Agenda Section column was added to be able to tell when during meetings the questions are being asked. Certain people may ask the most questions at certain times during the meeting, or questions may be asked out of place or before they can be answered by regular proceedings that would have occurred later in the meeting.

Agenda section	Person asking / affiliation	Subject	Relevant to position

Figure 6: Participation Rubric

4.4 Meeting Analysis

During a period from November 2009 to February 2010, data was collected at the weekly meetings and recorded using three rubrics: the focus, interaction, and participation rubrics. The information collected by the use of the interaction rubric included the item number, the person who initiated the interaction, who that person was interacting with, how they interacted, and the importance or effect of the interaction. The data was then entered into an Excel spreadsheet, which allowed for the tracking of which attendees interacted with each other, and how often. The two main observations derived from this spreadsheet were how often an individual initiated interaction with other attendees, and how often they interacted with others overall. A partial example of this spreadsheet can be found in Figure 7 below, whereas the entire spreadsheet can be found in Appendix J for reference.

Date	Person	Steve	Bill H.	Mike	John	Jim	Brad		
02/03/10 - JU	Steve				1	5	1	7	Steve
	John	1						1	John
	Bill H.	1						1	Bill H.
	Bob							0	Bob
	Charles	4		3				7	Charles
	Mark					1	1	2	Mark
	Jim	6		3				9	Jim
	Brad	2						2	Brad
	Bill C.	3						3	Bill C.
	Erick				2			2	Erick
	Mike					3		3	Mike
Total		**17**	**0**	**6**	**3**	**9**	**2**	**37**	

Figure 7: Interaction Analysis based on the Interaction Rubric

Throughout the data collection period, it was found that there were three key speakers within the group were the three main parties involved with the construction of the hospital: the contractor (Gilbane), the designer (Ellenzweig), and manager (DCAM). It was observed that these three attendees had the most frequent interaction with the other members of the meeting, which was expected due to the nature of the contractual agreements among them. A representative on behalf of Gilbane acts as the meeting facilitator working to run an efficient meeting, while also coordinating additional meetings with members from the other companies to further discuss topics that arise within the weekly meetings. However, in some cases the designer and manager have a higher frequency of interaction due to the nature of the item being discussed. Ellenzweig's representative is familiar with the design aspect of the project and has the responsibility of reporting decisions and updates regarding nearly every aspect of the new hospital, as well as meeting the requests for information (RFIs) submitted by the other companies involved in this project. Lastly, a representative on behalf of DCAM attends the weekly meetings and has the responsibility of ensuring that the hospital will function as designed for the end users. This supports the purpose of these weekly meetings, in that they are held to facilitate communication between the contractor, designer, and manager and to update the individual parties on the project status. It is also observed that these same three representatives initiate the majority of the

interaction among the members in the weekly meetings. These three aspects of the project, the design, construction, and management control how successful the new hospital will be through their hard work and dedication as depicted each week. Although the construction manager has the ultimate responsibility of keeping the project on track and meeting budget, If there is inadequate interaction between these three parties, they carry the risk of delaying the project or not meeting their budget, therefore they have the most pressure to initiate interaction among the meeting attendees to ensure that every part of the project is on time and meeting the budget.

The data collected from the weekly meetings, regarding interaction, suggests that the presence of all the attendees may not be essential to the productivity of the time invested in the meetings. As mentioned above, there are only a handful of participants who interact on a regular basis, and many who frequently remain silent. In addition, meeting attendees could appropriately gauge whether or not their presence at each meeting is critical if the meeting's agendas were provided in advance. This would theoretically ensure that only those who are required to be at these meetings or those who find they are needed for a particular discussion are present.

When attending the weekly construction meetings at Gilbane Building Company, the focus of the group during such meetings was observed. The preliminary rubric called for the user to record the person and their affiliation, the action that was occurring, and the effect of that action. After the trail run on this rubric, it was decided that the item number was also necessary so the attendee could refer back to where in the meeting these actions were occurring. The finalized rubric was used at each weekly meeting to determine the number of occurrences of each action and the various effects they had on the team. The information was inserted into excel charts to easily show the number of occurrences at each meeting for each specific topic (total for everyone present) as shown in figure 8.

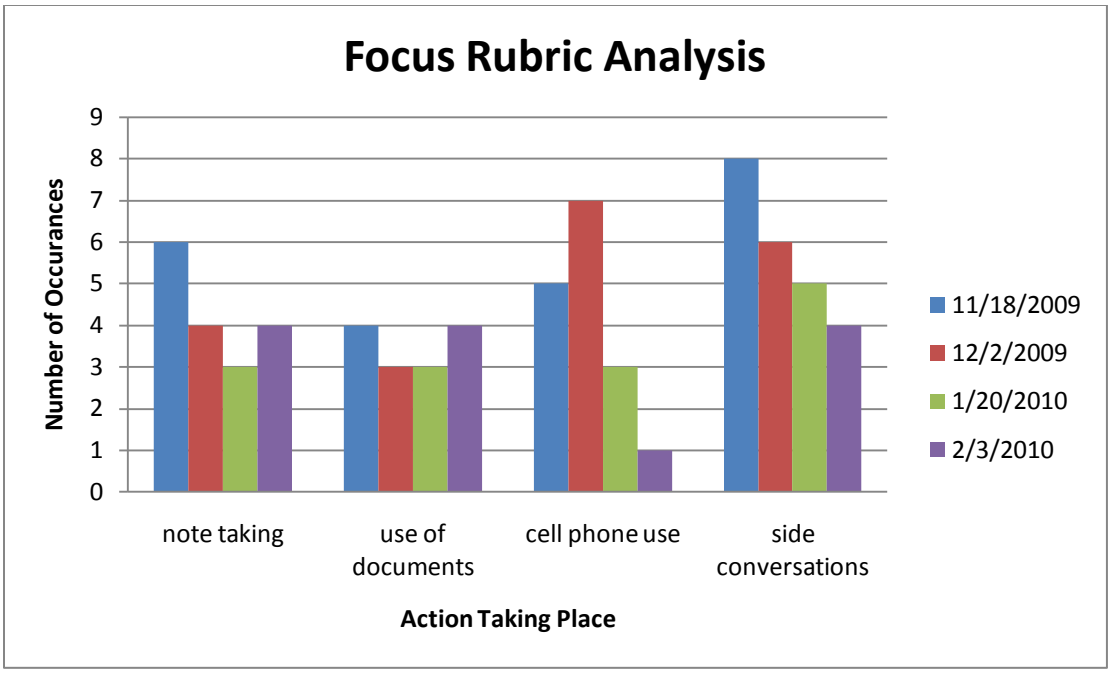

Figure 8: Focus Rubric Summary

When analyzing the recordings taken at the weekly meetings, it had been noticed that many meeting participants frequently used the documents given to them at the start of the meeting or were note taking on their own memo pads. It is believed that this action was done for future reference to issues that were presented at that meeting and to make notes as a reminder of the explanation given in regards to what was written in the meeting minutes. At times these parties were able to refer back to their past notes to explain misunderstandings at a later meeting. It did not appear that cell phones played a role in clarifying issues or for future reference. Side conversations over the first few meetings seemed to be excessive and lacking relation to what was happening in the meeting. With further research into this however, it was noticed that many times side conversations were to simplify what had just been reported or to help prepare a correct statement for the person's report.

One of the largest distractions and reasons for lack of attention at meetings was due to cell phones use. In today's world cell phones are necessary, but according to contract they are not supposed to be turned on at the weekly meetings. At every meeting there was an instance of cell phone use,

whether it was somebody leaving the room to take a phone call or checking their phones as they received messages. When each of these actions occurred, it caused the involved party to be lacking attention to what was being said for that short period of time, and it tended to distract others, even though it was only for a split second. Side conversations caused a distraction to at least one member of the meeting and at times disrupted the flow of the entire meeting.

4.5 Meeting Conclusions and Recommendations

At the conclusion of our attendance to weekly meetings, we distributed questionnaires to the project team to understand how they felt about various issues that we observed over our involvement in the project. These questions were to help us relate what we observed in the meetings to what the group had observed. The answers to the questionnaires assisted us in formulating recommendations and conclusions for the group. Based on our research and analysis, several conclusions were drawn and the following recommendations were decided:

From attending the weekly project meetings at Gilbane from September through February, the data collected through the rubrics suggested that all the company representatives might not have to be present at each weekly meeting. By holding a meeting for only the appropriate representatives, the attendees would together be able to discuss any issues that arise without wasting the allotted time of others, since the only representatives required by contract to attend the meetings are Gilbane, DCAM, and Ellenzweig. This would also assist in ensuring that those present have the capability of making and finalizing decisions on behalf of their company. From the perspective of the representative, this would generate a more efficient meeting, as previously mentioned in Duncan Brodie's article on "6 Key Tips for Running Effective Project Meetings". In addition, reducing the number of meeting attendees was suggested from the questionnaire distributed to the weekly meeting participants. The feedback we received from the team suggested that only people with authority attend the meetings also. One way of

achieving this goal would be to make available the meeting minutes from the previous week that would be reviewed at the upcoming meeting prior to the start of the meeting. This would allow each representative that does not interact on a regular basis to review the minutes and gauge whether or not his or her presence at that particular meeting is necessary. Not only would these recommendations reduce the number of attendants, but it would also increase the overall efficiency of the meeting.

The attendants of the weekly meetings, other than Gilbane, DCAM, and Ellenzweig, were all there by choice. No contracts require the parties to be there, other than Gilbane who runs the meeting, the owner, DCAM, and the architect, Ellenzweig. With that in mind, it can be assumed that those in attendance want to be there. The problem, which was evident from the results of the participation rubric, is that not many people actively participate in the discussions. Additionally, as shown by the focus rubric, not everyone was always completely engaged. It can therefore be assumed that alternatives must be found to encourage participation and engagement. We received feedback from our questionnaires stating that participation from team members was extremely beneficial to the project and needed to be increased.

It is also important to realize that those who can remain in constant participation and engagement may be able to do so because of their learning style. The minutes from the previous meetings are distributed, and that document serves as the agenda for the current meeting. This method puts everyone's focus on their own papers. The focus rubric reveals that some people frequently take notes on the given material, while others do not. This may be attributed to different memory abilities, but it more likely is caused by the medium of information that does not work with everyone. In several meetings, especially those that discussed specific design specifications, some members of the meeting requested that diagrams be drawn to visualize the situation. Most of the time, the same group of people was requesting this method, which suggests that it is their preferred medium to present the

information. A solution to this problem would be to use more visual elements throughout the meeting as dictated by the attendants. Most of the same people attend the meetings each week. It would be reasonable to assume that the average learning styles of the group will not change from week to week. A learning style survey at the beginning of the project could help to plan the presentations at subsequent meetings. The paper component is essential, especially because it is the minutes from previous meetings, but more frequent use of various visual elements would be beneficial to those who are not currently grasping the information as quickly as others.

Changing the presentation of information is an opportunity to correct another issue at some meetings. From results in the focus rubric, some members of the meetings can become distracted or will be looking at different parts of the minutes than the rest of the group. One solution to this focus problem is to have more communal presentation material. The minutes used right now are given to each person. There are currently no fixed group focus elements. Adding occasional visual devices will take the focus of everyone in the room and put it in one place. It will periodically refocus everyone to avoid self-distractions.

An important thing to remember when running any meeting is that most of the time not everyone is there for the same reason. Especially in this situation, when the attendants are not required to be there, a different motive may be applicable to each person, even within one company. One thing that can be assumed is that the attendants come for the same reason each week. Similar to conducting learning style inventories, attendants can be polled at the beginning of the project to discover the goals of individuals that drive them to attend the weekly meetings. With this information, Gilbane can be sure to directly engage certain people during specific topics. Also, certain topics may need to be added to the agenda so that each participant leaves the meeting feeling like they accomplished what they came to do. Unlike the learning style inventories, this information can be collected more easily (attendants can

simply email subjects a day or two before the meeting) and therefore more frequently if the person running the meeting decides it is beneficial.

Often at the weekly project meetings, the content of the meeting is not applicable to each company's representative. The interaction rubric shows only certain attendants at the meetings interacting, while others wait for future topics. One recommendation would be to postpone lengthy discussions where only a few of the attendees are interacting, so that the meeting can continue on to more general topics. Topics that require a more drawn out discussion by select representatives can be scheduled for another time so that only those involved will be present. This would alleviate the majority of down time experienced by some of the more infrequent participants and provide more opportunities to discuss with the remaining representatives topics that involve them personally, or their company.

Each week before ending the meeting there is a round table discussion where each attendee is given the opportunity to ask any questions or address their concerns. It is very important to the meeting to have a successful round table discussion. The person running the meeting, usually Steve Duvel, goes around the table one by one and each person can bring up any topic or topics of his or her choice to ask questions about and discuss. Based on the survey results, this section of the meeting is often considered the most beneficial. The style of directly asking someone for his or her input is more effective than the traditional method of talking only as a large group throughout the meeting. This is each attendees chance to have everyone else's undivided attention. By using this opportunity to raise the questions they might have, it could help clarify issues for the entire party and dismiss other meetings that were scheduled to answer such questions. Although, when bringing up an issue, if it can only be answered by a limited number of people, outside meetings should be used rather than the round table discussion.

It would be very beneficial to the meeting if each team member came prepared to use the round table discussion if need be. The questions or concerns that need to be tackled should be well

thought over and worded correctly so that the suitable answer is being found in as little time as possible. It could be beneficial to send a copy of the previous round table discussion to each appropriate party before the next meeting to help them prepare.

5.0 Concrete Slab Cracking

This section provides an analysis and identification of potential solutions to repair cracks that were observed after a month of the concrete being poured for on grade concrete slabs in multiple wings of the hospital complex. According to Lin Associates, the structural engineering consultants, these cracks were apparently caused by a combination of settlement of the supporting soil and shrinkage of the concrete. This section seeks to discover the cause of the cracks and recommend solutions for repair. In doing so, similar instances on future slabs will be more predictable and therefore preventable.

5.1 Types of cracks

About a month after being poured, the slabs on grade for two wings of the Hospital complex experienced cracking, such as that shown in Figure 9.

Figure 9: Crack on slab on grade.

5.1.1 Settlement cracks

Settlement cracks appear most often in floating slabs (called slabs on grade). Floating slabs are those that have been poured, probably on a layer of gravel over soil, and have no other means of support such as footings (Figure 10). The layer of gravel is placed after the underlying soil has been compacted. These slabs are the most vulnerable to settlement cracks because there are more possible locations that settlement may occur. With the entire slab resting on the ground, one section undergoing settlement could cause the slab to crack. When a bending force is applied to a slab (in this case the force is gravity where settlement occurred), a compression force and a tension force act on opposite sides

(Beer, Johnston, & DeWolf, 2006, pp. 213-215). If the tension force is too high, the concrete will fail and a crack will form. There are certain advantages and disadvantages to this type of slab. The fact that the cracks affecting a slab on grade are limited to the slab is a more manageable problem than in other types of slabs, which will be discussion shortly. The structural integrity of the structure being supported (upper floors, etc.) will be unaffected unless the cracks begin to form in the actual foundation walls. The disadvantage of floating slabs is that un-compacted soil can settle easily from a variety of causes. Runoff, flooding, or leaks can cause the soil to settle, leading to cracking (Friedman, 2010).

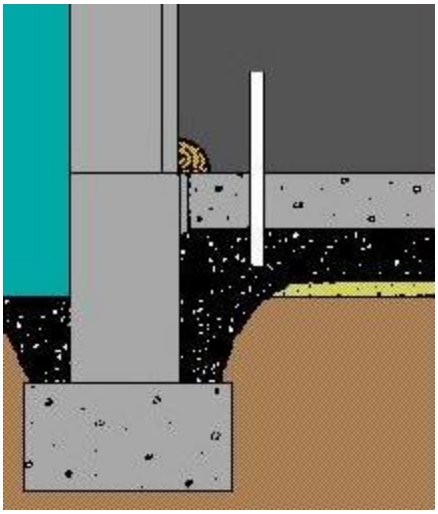

Figure 10: Floating Slab (Types of Slabs, 2009)

Settlement cracks may also occur in supported concrete slabs. These slabs are similar to floating slabs in the sense that they are poured on gravel and soil, but they are additionally supported by various footings and perhaps resting on a lip on the edge of the foundation wall, called structural slabs (Figure 11). There are advantages and disadvantages for this type of slab as well. The advantage is that slight settlements will not affect the slab as sensitively as a floating slab. The disadvantage is that if enough settlement occurs under the footings, the cracks that do occur tend to be more severe (Friedman, 2010).

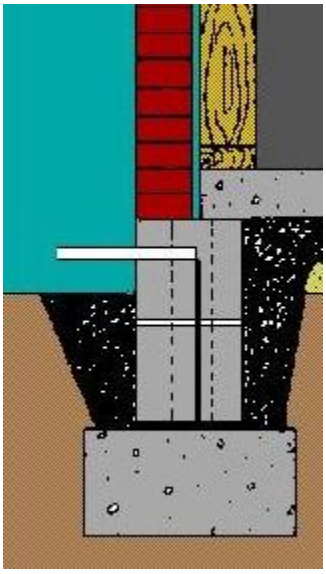

Figure 11: Supported Slab (Types of Slabs, 2009)

Settlement cracks can cause structural instability since the slab becomes unlevel. If the settlement cracks are severe, the slab may need to be re-poured after the soil is compacted.

5.1.2 Shrinkage Cracks

Shrinkage cracks in concrete have certain characteristics that distinguish them from other type of cracks, such as settlement cracks. They are caused when shrinkage occurs before enough strength is gained to resist the shrinkage. As a natural part of the hardening process, water is removed from the concrete (Illston, Dinwoodie, & Smith, 1979, p. 190). This loss in volume causes the concrete to shrink. A change in temperature will speed up or slow down this process if it is hotter or colder, respectively. ACI 306 states that cold conditions exist when temperatures drop below 40 degrees F and stay below 50 degrees F for at least three days. When concrete is cured properly, it is able to retain its water, postponing shrinkage, while the concrete gains strength. Once enough strength is gained, it is able to resist the shrinkage that would normally occur when the water is released. Curing can be accomplished in several ways. One method, the most common, is to flood the slab or spray it with a mist. Another method is to cover the slab with certain materials that can be kept wet such as burlap or sand. Plastic films can be used to prevent water from evaporating but this may cause discoloration so it should not be used when the appearance of the slab is important. A fourth method involves chemical membranes applied as soon as the pour is complete. This may affect the application of resilient flooring.

Figure 12: Shrinkage Crack ending and restarting again in parallel on the A Wing slab. Picture taken 11/11/2009.

The appearance of shrinkage cracks is unique, letting the observer know of the cause without very detailed inspection. One sign that cracks are caused by shrinkage is the continuity. When shrinkage occurs, cracks are rarely one long continuous crack. Often, the cracks

end, but then begin again nearby and parallel (Figure 12). A common location for shrinkage cracks is re-entrant corners (Friedman, 2010).

Unlike settlement cracks, shrinkage cracks in on-grade slabs do not usually cause any structural harm unless they are unusually severe. The main reason they need to be repaired is to prevent water from seeping through the slab. This can cause the basement of buildings to flood, or, in worst-case scenarios, the soil underneath the slab may wash out resulting in air pockets and further structural instability leading to settlement cracks.

5.2 Methodology

The first objective was to determine if settlement could cause the cracks that were appearing in the slabs. Soil profiles were created before construction began and they were used to interpolate soil profiles that cover the areas that slabs were poured. These soil profiles (Appendix I) reveal fairly uniform distribution of soil across the areas under investigation. These soil profiles were used to predict if settlement would occur unevenly due to a non-homogenous distribution of soil.

The next determination to be made was the cause of the cracks using visual cues. Different causes of cracks exhibit various characteristics. A walkthrough of the site was performed and pictures of the various cracks were taken (Figure 13). With that information, the specific types of cracks were determined. This allowed several more analyses to be made including severity of the crack relating to structural integrity and methods for repairing the crack. More importantly, it allowed predictions to be made as to when these cracks will occur in other sections of the construction site.

Figure 13: Areas of the construction site where cracks were found in A Wing (bottom circle) and B Wing (top circle) in November 2009.

5.3 Analysis

The soil profiles created using the boring logs showed a fairly uniform type of soil throughout the area of the on-grade slabs. If settlement were to occur, the uniform slab and gravel layer would cause an even settlement. This revealed that the cracks were most likely not caused by settlement. Compaction specifications called for soil to first be laid in a maximum of nine inch layers. These layers would individually be compacted to no less than 95% of maximum dry unit weight. Lastly, the layers would be compacted with a compactor no less than four times. Although the soil was compacted before the slabs were poured, this does not ensure that settlement will not occur. However, it does minimize the potential settlement. There were a few cracks that appeared to be caused by settlement, based on the uneven height of the slab on either side of the cracks, but they were not severe enough to require extensive repair of the slab. Since it is a floating slab, the settlement cracks are minor and sealing the cracks is to prevent moisture leakage rather than protect the structural integrity.

After visually examining the cracks in person, it was observed that the characteristics of most of the cracks matched those of cracks caused by shrinkage. The cracks had characteristics such as ending and beginning nearby, parallel to the original crack (Figure 14). This analysis led to several investigations regarding the cause of the shrinkage. The first possible explanation would be human error leading to a simple mistake during pouring. This type of poor workmanship and supervision would lead to a bumpy surface and uneven thickness. No signs of an uneven surface were visible during the site walkthrough. If an incorrect amount of concrete was poured compared to the designed amount, different shrinkage would occur in unpredicted areas. The records of the pours were compared to the

Figure 14: Shrinkage Crack ending and restarting again in parallel on the A Wing slab. Picture taken 11/11/2009.

design values found in designs of the structures. The values matched (both 14,800 ft^3.), and any small discrepancy here would have unlikely led to the shrinkage cracks.

The next possible explanation for shrinkage cracks is a change in temperature. Ideal temperatures for pouring concrete range from 50-75 degrees Fahrenheit (Table 1). The first date represented in Table 1 for each slab is the date that it was poured. These conditions existed on both pour dates for A and B wings, including several days following.

Slab A						
Date	9/10/2009	9/11/2009	9/12/2009	9/13/2009	9/14/2009	9/15/2009
Mean Temperature (F)	57	53	59	67	62	65
Precipitation (in)	0	0.37	0.43	0.01	0	0
Wind Velocity (mph)	9	9	8	7	8	8
Slab B						
Date	9/22/2009	9/23/2009	9/24/2009	9/25/2009	9/26/2009	9/27/2009
Mean Temperature (F)	65	69	67	53	52	56
Precipitation (in)	0	0	0	0	0	0
Wind Velocity (mph)	11	13	9	9	7	7

Table 1: Complied weather reports on and after pour dates (Weather Underground, 2010)

There is no similarity in rainfall since it rained slightly the few days following the pour of A wing but did not rain after pouring B wing. Rainy weather is useful for keeping the concrete moist during curing, but too much direct exposure to the rain can cause some of the cement to wash out and compromise the surface of the slab. Temperature and wind speed also did not fluctuate much the day of the pour and the days following. Shrinkage cracks are almost unavoidable when pouring concrete. A successful pour is not determined by the non-existence of shrinkage cracks, but by the limited number of them. Control joints are used for this purpose. The control joints used on these slabs were saw cut and placement was not unusual. One characteristic of the control joints is that shrinkage cracks occurred very close to the control joints in several locations. From this, it is possible to conclude that control joints were either not wide enough or not deep enough, mostly likely the latter. Saw-cut control joints are usually not as wide as those made using flexible joint inserts during the pour. When cracks occur out

of control joints, it is usually a sign that the joints were not deep enough or that the concrete should be reinforced at the re-entrant corners.

As a result of these cracks being spotted, Lin Associates was consulted and came to take a look. After their visit, they determined that cracks larger than 10mm should be filled with epoxy. Cracks less than 10mm do not need treatment. To prevent further cracking in other slab on grades, they recommend #5 bars on inside corners. Their recommendations in detail can be viewed in Appendix I. The cracks were concluded to not have been affecting the overall strength of the slab. The cracks were not repaired for at least 4 months after Lin Associates were first contacted.

5.4 Conclusion and Recommendation

After investigating the potential causes for cracks using pre-construction documents such as design specifications and boring logs, it has been concluded that severe settlement cracks are unlikely since it is a floating slab on uniform and compacted soil. The cracks observed that appeared to be from settlement were minimal and caused no structural problems. These cracks can be routed, cleaned, and filled with a special caulk, such as a masonry caulk or radon sealant caulk, or a semi-rigid epoxy.

The shrinkage cracks that exist are both more predictable and less of a structural threat. The smaller shrinkage cracks (less than about 13mm) most likely do not need to be repaired at all since it is unlikely that they penetrate the entire slab, allowing moisture to seep through. The wider shrinkage cracks (about 13mm or more) however, should be sealed in a similar fashion to the settlement cracks (Mallick & El-Korchi, 2009, p. 208). A similar conclusion was reached by Lin Associates, but they specified that 10mm would be the judged length.

The truly useful solution is not how to repair the cracks, but how to prevent them. Not much can be done to prevent the settlement cracks beyond better compaction of the soil before the slab is poured. For shrinkage cracks, there are a couple options. The first option is the increase in the depth of

the control joints. This will further limit the shrinkage cracks occurring outside control joints. If the contractor is confident about the compaction of the soil, this option is both cheap (requires only a larger blade to cut the joints) and easy to execute. The other option is to add more steel reinforcement in the slabs, particularly in areas highly susceptible to shrinkage cracks such as re-entrant corners. Initially, wire mesh was used with the slab. While this may cost slightly more than cutting deeper control joints, it will not lead to any further problems with settlement.

Since some settlement cracks have occurred in the slabs, it is not recommended that the control joints be cut deeper than they presently are. The addition of steel reinforcement in re-entrant corners of future slabs is the most likely method of prevention for the current shrinkage cracks. The evaluation of the cracks by Lin Associates concluded with very similar recommendations. The estimated size of the cracks in their report to be repaired was slightly more conservative than mine (10 mm rather than 13).

Bibliography

Anderson, K. (2008, August 27). *Fighting for Preservation: Worcester State Hospital and the Death of a Kirkbride.* Retrieved September 10, 2009, from Associated Content: http://www.associatedcontent.com/article/970694/fighting_for_preservation_worcester_pg2_pg2.html?cat=62

Beer, F. P., Johnston, E. R., & DeWolf, J. T. (2006). *Mechanics of Materials.* New York: McGraw-Hill.

Buehring, S. (2010, 1 16). *the importance of communication in project management*. Retrieved 1 19, 2010, from http://www.projectsmart.co.uk/the-importance-of-communication-in-project-management.html

Buildings, K. (2001, January 11). *Kirkbride Plan*. Retrieved December 11, 2009, from Kirkbride Buildings: http://www.kirkbridebuildings.com/

Committee, W. S. (2010, 1 21). *Sustainable.* Retrieved 2 20, 2010, from Whole Building Design Guide: http://www.wbdg.org/design/sustainable.php

Construction Schedule. (n.d.). Retrieved 9 2010, 2, from ConstructionSchedule.net: Construction Schedule Articles, Software, and Management Ideas: http://www.constructionschedule.net/

Ellenzweig. (n.d.). *Ellenzweig*. Retrieved 1 19, 2010, from http://www.ellenzweig.com/

Fierman, J. B., & Barsamian, N. M. (2009, April 9). *CM at Risk - A New Alternative for Public Construction Projects.* Retrieved September 22, 2009, from Good Company: http://www.sheehan.com/publications/good-company-newsletter/CM-at-Risk--A-New-Alternative-for-Public-Construction-Projects.aspx

Friedman, D. (2010). *Slab Crack Evaluation*. Retrieved 1 14, 2010, from Inspectapedia: http://www.inspectapedia.com/structure/FloorCracks.htm#bannertop

Gilbane Inc. History. (n.d.). Retrieved September 10, 2009, from Gilbane Co.: http://www.gilbaneco.com/history.html

Gilbane uses BIM solutions from Autodesk to help reduce construction costs and shorten schedules. (2009). Retrieved September 9, 2009, from Ideate: http://www.ideateinc.com/ideas/case_studies/aec/navisworks10_custstory_gilbane.pdf

Hendrickson, C. (n.d.). *Cost Estimation*. Retrieved 19 2010, 1, from Project Management for Construction: http://pmbook.ce.cmu.edu/

Hendrickson, C. (1998). *Project Management for Construction*. Retrieved December 11, 2009, from Fundamental concepts for owners, engineers, architects, and builders: http://pmbook.ce.cmu.edu/09_Construction_Planning.html

Horn, D. (2010, 1 5). *Sustainable Design Program.* Retrieved 2 20, 2010, from U.S. General Services Administration: http://www.gsa.gov/Portal/gsa/ep/contentView.do?contentType=GSA_OVERVIEW&contentId=8154

Hugh J. Gorman, I. (2007, February). Public Construction: Bidding on Public Building. *Construction Business Owner* .

Illston, J. M., Dinwoodie, J. M., & Smith, A. A. (1979). *Concrete, Timber, and Metals.* New York: Van Nostrand Company Ltd.

Interaction Definition. (2009). Retrieved 12 7, 2009, from Merriam Webster Online Dictionary: http://www.merriam-webster.com/dictionary/interaction

International, 3. (2009, December 11). *Construction Management at Risk*. Retrieved December 11, 2009, from 3D International Inc: http://www.3di.com/toolbox/cmatrisk.pdf

International, F. H. (2009, December 11). *Participant Observation*. Retrieved December 11, 2009, from techsociety: http://www.techsociety.com/cal/soc190/fssba2009/ParticipantObservation.pdf

Jones, S. A., Gudgel, J. E., Gilmore, D. S., & Buckley, B. (2009). *The Business Value of BIM.* Retrieved September 13, 2009, from SmartMarket Report: http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab081275.pdf

Kirsch, T. (n.d.). *Worcester State Hospital History*. Retrieved September 9, 2009, from Opacity: http://www.opacity.us/site56_worcester_state_hospital.htm

LEED. (2010). Retrieved 2 20, 2010, from U.S. Green Building Council: http://www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

LEED Certification. (n.d.). Retrieved 2 20, 2010, from National Resources Defense Council: http://www.nrdc.org/buildinggreen/leed.asp

Liston, K. (2001, November). Focused Sharing of Information for Multi-Disciplinary Decision Making by Project Teams. *ITcon* , pp. 69-82.

Mallick, R. B., & El-Korchi, T. (2009). *Pavement Engineering.* Boca Raton: Taylor & Francis Group LLC.

Martinez, J. (2009, May 14). *Patrick-Murray Administration Breaks Ground on New Psychiatric Hospital.* Retrieved September 10, 2009, from Mass.gov Health and Human Services: http://www.mass.gov/?pageID=eohhs2pressrelease&L=4&L0=Home&L1=Government&L2=Departments+and+Divisions&L3=Department+of+Mental+Health&sid=Eeohhs2&b=pressrelease&f=090514_psychiatric_hospital&csid=Eeohhs2

Massachusetts, C. o. (2009). *Current & Completed Projects*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=afsubtopic&L=4&L0=Home&L1=Property+Management+%26+Construct

ion&L2=Design+%26+Construction+of+Public+Buildings&L3=Current+%26+Completed+Projects&sid=Eoaf

Massachusetts, C. o. (2009). *Department of Mental Health*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=eohhs2agencylanding&L=4&L0=Home&L1=Government&L2=Departments+and+Divisions&L3=Department+of+Mental+Health&sid=Eeohhs2

Massachusetts, C. o. (2009). *Division of Capital Asset Management (DCAM)*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=afagencylanding&L=4&L0=Home&L1=Property+Management+%26+Construction&L2=Oversight+Agencies&L3=Division+of+Capital+Asset+Management+(DCAM)&sid=Eoaf

Massachusetts, C. o. (2009). *DMH New Psychiatric Facility, Worcester*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=afterminal&L=5&L0=Home&L1=Property+Management+%26+Construction&L2=Design+%26+Construction+of+Public+Buildings&L3=Current+%26+Completed+Projects&L4=Human+Services+Projects&sid=Eoaf&b=terminalcontent&f=dcam_project_highlights_hs_

Massachusetts, C. o. (2009). *Hampden County Women's Correctional Facility*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=afterminal&L=5&L0=Home&L1=Property+Management+%26+Construction&L2=Design+%26+Construction+of+Public+Buildings&L3=Current+%26+Completed+Projects&L4=Public+Safety+Projects&sid=Eoaf&b=terminalcontent&f=dcam_project_highlights_ps_h

Massachusetts, C. o. (2009). *New Downtown Worcester Trial Court*. Retrieved September 11, 2009, from Mass.gov Administration and Finance: http://www.mass.gov/?pageID=afterminal&L=5&L0=Home&L1=Property+Management+%26+Construction&L2=Design+%26+Construction+of+Public+Buildings&L3=Current+%26+Completed+Projects&L4=Court+Projects&sid=Eoaf&b=terminalcontent&f=dcam_project_highlights_jud_worceste

Merriam-Webster. *Merriam-Webster Dictionary.* Merriam-Webster Mass Market.

Oberlender, G. D. (1993). *Project Management for Engineering and Construction.* Boston, MA: McGraw-Hill Gigher Education.

Oberlender, G. (1993). Project Management for Engineering and Construction. Boston, Ma: McGraw- Hill .

Pressman, A. (2007, May). *Integrated practice in perspective: A new model for the architectural profession.* Retrieved September 12, 2009, from Architectural Record: http://archrecord.construction.com/practice/projDelivery/0705proj-1.asp

Project Delivery Methods. (2008). Retrieved September 13, 2009, from Nebraska Design & Construction Industry Council: http://www.ne.dcicouncil.com/delivery.html

Robinson, N. (2006). *Using Business Meeting Dynamics.* Retrieved November 20, 2009, from Mangerwise: http://www.managerwise.com/article.phtml?id=511

Rubin, G. (2009, July 1). *Fourteen Tips for Running a Good Meeting.* Retrieved November 19, 2009, from The Happiness Project: http://www.happiness-project.com/happiness_project/2009/07/14-tips-for-running-a-good-meeting.html

Services, O. o. (n.d.). *Chicago Public Schools*. Retrieved 1 16, 2010, from Project Meetings: http://www.cps.edu/About_CPS/The_Board_of_Education/Documents/Standards/Infrastructure/General/Gen01200_projectMtgs.pdf

The Five Phases of Architecture... The Process of Design. (2009). Retrieved September 13, 2009, from Fivecat Studio: http://www.fivecat.com/Home/The_Five_Phases_of_Architectur/the_five_phases_of_architectur.html

The Top 400 Contractors. (2009). Retrieved September 10, 2009, from Engineering News Record: http://enr.construction.com/toplists/Contractors/001-100.asp

Tishman. (n.d.). *Tishman*. Retrieved 1 19, 2010, from http://www.tishmanconstruction.com/

Types of Slabs. (2009). Retrieved 2 9, 2010, from Do It Yourself Pest Control: http://www.doityourselftermitecontrol.com/termites/slabs.htm

Weather Underground, I. (2010). *History: Weather Underground*. Retrieved 1 25, 2010, from Weather Underground: http://www.wunderground.com/history/

Wikipedia. (2009, August 20). *Construction*. Retrieved September 11, 2009, from Wikipedia: http://en.wikipedia.org/wiki/Construction

Wikipedia. (2009, September 3). *Project Manager*. Retrieved September 11, 2009, from Wikipedia: http://en.wikipedia.org/wiki/Project_manager

Wolf, K. (1997). *The Makings of a Good Meeting.*

Appendices

Appendix A: Gilbane Meeting Minutes

16 September 2009 Meeting

ELLENZWEIG

16 September 2009 Meeting

Re:	New Psychiatric Hospital Mass. State Project No. DMH0501
Subject:	Project Meeting #44
Attendees:	
DCAM	Charles Wilise; Mark Bontempo; Bill Cobbett
DPS	Joe McEvoy
Tishman	Jeff Eamer; Erick Bakstran
DMH	Ken Lortie
Ellenzweig	Peter Pogorski; Jim Hoffmann
Gilbane	Mike O'Brien; Steve Duvel; John Roche; Bill Heiberger
WPI	Jackie McDonough

Distribution by Ellenzweig: DCAM; DMH; Tishman; Gilbane

Item	Description	Date	Action
	Safety		
044-01	No incidents. Gilbane Safety Week will be held the week beginning 9/28.		
	QA/QC		
044-02	No issues.		
	RFIs		
044-03	RFIs in order of priority: 491, 515, 534, 558, 496, 512, 555, 559, 561 and 523.		
	Submittals		
044-04	Submittals in order of priority: • Steel piece drawings for J&H Cluster (packages 76, 86, 97, 98, 99, 108) • Steel piece drawings for A Wing (package 107) • Steel piece drawings for B Wing (packages 38, 43 and 58)		
	Construction Schedule		
044-05	There was an overview of upcoming work: • Slab on grade prep for B Wing and Cluster– pour date is 9/22. • Continue underground plumbing in C Wing and Cluster. • Continue foundation walls in E Wing, begin footings in D Wing. • Continue interior walls and footings in deep basement. • Begin backfilling in H & J basements.		

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

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Meeting Notes
9 September 2009
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Item	Description	Date	Action
044-06	Gilbane met Monday with Cives and Capco and stated that the steel start date is being pushed back to 9/28. In addition, HJ steel is pushed back to March 10 due to the shop being full in Maine. This will push the completion date for the entire project to September 2012.		
	DMH Coordination		
036-06	DMH asked Ellenzweig to proceed with the design of the accessible entry to the Storehouse loading dock. Ellenzweig will coordinate with Nitsch.		
	Ellenzweig will do a code review of the entry to the Storehouse to insure that once the work is complete it will create a fully accessible entry.	7/29/09	
	Draft code review is being updated by Ellenzweig.	8/12/09	
	Ellenzweig to send to DCAM and DMH for review.	8/19/09	
	Report sent to DCAM for review.	9/02/09	
	DCAM is still reviewing the report. Plans are at the beginning stage to add a handicapped parking space and a ramp to access the Storehouse.	9/16/09	
044-07	Work will begin soon on Bulletin 51 which will shut down the bus loop by the Hooper Turret. Gilbane will present a plan to DMH to re-route the bus route for about 3 weeks.		
	LEED Certification		
003-04	*(Notes for this item have been compressed. See earlier minutes for notes prior to 8/05/09)*		
	Submission is complete. Project is being reviewed for compliance.	8/05/09	
	Bidding		
042-05	Building Skin and Finishes		
	Trade contractors for Building Skin are: Masonry, Waterproofing, Damproofing & Caulking, Misc. Metals, Roofing, and Metal Windows.		
	Trade contractors for Finishes are: Tile, Painting, Acoustic Ceilings, Glass & Glazing, and Flooring.		
	DCAM has resolved all legal issues and will be sending letters to the bidders.		
	Exterior Skin packages will be on the street in a week or so. Finishes will follow once Exterior Skin is bid.	9/09/09	
	Letters have been sent out and responses received.	9/16/09	

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

ELLENZWEIG

Meeting Notes
9 September 2009
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Item	Description	Date	Action
040-08	Other Trades		
	Doors, Frames & Hardware, Drywall, and Metal Panels were sent out last week.		
	Resinous Floors, Carpet, and Specialty Doors are next.		
	Resinous Floors, Carpet, and Specialty Doors are out to bid. Millwork and Landscaping remain.	8/26/09	
	Doors, Frames & Hardware, Drywall, and Metal Panels are due on 9/16. Resinous Floors and Carpet will be delayed one week to include information in Bulletin 57.	9/09/09	
	Metal Panel bids will be received today, Drywall on Friday. Resinous Floors, Carpet, and Specialty Door are due next Wednesday.	9/16/09	
	Permitting		
029-06	There was a question regarding the elevated gas permit. NSTAR to be on site in the next 3 to 4 weeks to tie in the line.		
	Work to begin tomorrow. Ellenzweig to check on status of permit.	7/08/09	
	Permit has been sent to Tom Angelo. Does not require approval from the Plumbing Board.	8/19/09	
	Architectural Engineers are to obtain a letter from the Plumbing Board on the use of a ventless gas regulator.	9/09/09	
	Will confirm that Architectural Engineer's letter is in the package is given to NStar.	9/16/09	
030-05	Gilbane stated that they had received the responses from Ellenzweig to their code compliance issues – there are several differences of opinion that will need to be addressed before meeting with the AHJ.		
	Meeting was held to review regulatory compliance confirmation of several code issues. All issues were resolved. Ellenzweig will begin the preparation of the final documents for the permit application. This should be complete in about two weeks.	8/05/09	
	Ellenzweig will forward the Permit Application to DCAM for review and for approval by Joe McEvoy.	9/02/09	
	Permit application was sent to DCAM last Friday.	9/09/09	
	There is a meeting scheduled for today with Joe McEvoy on the permit application and all remaining issues.	9/16/09	

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

ELLENZWEIG

Meeting Notes
9 September 2009
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Item	Description	Date	Action
	Other Business		
032-07	Mock Up DCAM asked if there were any outstanding RFIs or other issues that were holding up the completion of the mock-up room. Ellenzweig and Gilbane will review.		
	Gilbane handed out a schedule for the work at the mock up—work is in progress.	8/26/09	
	Plumbing roughing is mostly complete.	9/09/09	
	Will review after the meeting.	9/16/09	
035-08	Gilbane stated their concern regarding the permanent electrical service from NGrid. Service is needed on site by September, but NGrid has not received City Council approval at this time.		
	NGrid received approval from the City Council to proceed with the work on Innovation Drive.	7/29/09	
	Update: Start date for the work is 9/21. Work expected to take 2 weeks.	9/09/09	
036-08	There was a meeting held on Tuesday with the DEP regarding controlling storm water run-off on the site. The DEP had 4 suggestions: • Enlarge the retention basin. • Line swale with fabric, sand, and stone. • Enlarge the retention basin at Camp Joy and build up the berm at the property line. • Control the water run-off at A and B wings that travels down Innovation Drive.		
	The DPE also requested that Dow contract with a storm water expert to take overall responsibility for the site storm water control.		
	Work is complete at the retention pond by Camp Joy. Dow has hired an environmental consultant - ETS.	8/12/09	
	Nitsch sent the Field Report to Mr. Belino. Mr. Belino visited the site on Friday. Dow still has work to do on the swales.	8/26/09	
	A meeting scheduled with Dow on Tuesday to review ETS's report.	9/02/09	
	All work listed on Nitsch's field report is complete. Dow will divert water at the road around the Clocktower to have it discharge on site. Clocktower slopes will be stabilized and hydroseeded.	9/09/09	
	ETS recommendations have been sent to Nitsch for review – will then forward to DEP.	9/16/09	

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ELLENZWEIG

Meeting Notes
9 September 2009
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Item	Description	Date	Action
041-07	Gilbane noted that Cives is billing stored materials for the month of August and that they are sending Nathan Silva to visit the plant on Monday.		
	Gilbane noted that the specification calls for an inspector to be at Cives' plant to inspect the full-penetration welds. Cives is only doing visual inspections of the welds. DCAM to review if the welds need to be inspected at the plant or if they can be inspected in the field once the steel has been delivered.	9/02/09	
	DCAM is reviewing.	9/09/09	
	DCAM will have UTS perform visual inspections of the welds on site.	9/16/09	
043-07	Gilbane will hold a kick-off meeting for the MEP contractors next week. Ellenzweig will work on providing CAD files for the coordination drawings.		
	There will be a kick-off meeting for 8 contractors tomorrow. Production of the disks of CAD files for coordination drawings is in progress.	9/16/09	
043-08	DCAM met yesterday with DMH and representatives from Camp Joy regarding making improvements on or around the Camp Joy property. DCAM would like to expedite some of the work scheduled for the area adjacent to Camp Joy including relocating material stockpiles, grading and seeding, and relocating the construction fence. DCAM, Ellenzweig, Gilbane, and Dow will walk the area after the meeting.		
	Work is in progress, clearing out of building materials should be complete by next week. DCAM will review before topsoil and seeding.	9/16/09	
044-08	There was a discussion on eliminating the trap primers in the deep basement mechanical room. Gilbane stated that it was done to provide an easier installation and less maintenance due to fewer trap primers.		
044-09	There was a discussion on the need for a fire department repeater system. It will be required but is not currently part of the project. Gilbane suggested scheduling a meeting with Coughlin electric and Comptronics to come up with a design/build proposal.		
044-10	Gilbane would like to use a single fire stopping manufacturer for the various MEP trades for continuity. This has been bought in the MEP scopes and they would like to use 3M. There were no objections.		
044-11	Gilbane stated that they would schedule a trip to Cives' Maine plant to see the plant and check on the steel fabrication.		

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ELLENZWEIG

23 September 2009 Meeting

Re:	New Psychiatric Hospital Mass. State Project No. DMH0501
Subject:	Project Meeting #45
Attendees:	
DCAM	Charles Willse; Mark Bontempo; Bill Cobbett
Tishman	Jeff Earner; Erick Bakstran
DMH	Tony Riccitelli
Ellenzweig	Jim Hoffmann
Gilbane	Steve Duvel; John Roche; Bill Heiberger
WPI	John Upton

Distribution by Ellenzweig: DCAM; DMH; Tishman; Gilbane

Item	Description	Date	Action
	Safety		
045-01	No incidents. Gilbane Safety Week will be held the week beginning 9/28.		
	QA/QC		
045-02	There have been several hairline cracks appearing in the slabs on grade in K & A Wings. These cracks have occurred close to the deep basement walls. Lin Associates was on site on Friday and reviewed the situation.		
	RFIs		
045-03	RFIs in order of priority: 555, 559, 561, 529, 548, 451, 599, 609, 604, and 606.		
	Submittals		
045-04	Submittals in order of priority: • Steel piece drawings for B Wing (packages 38, 75, 92, 93) • Steel piece drawings for C Wing (package 50) • Steel piece drawings for J&H Cluster (packages 106, 108, 112, 119) • Steel piece drawings for A Wing (package 114)		
	Construction Schedule		
045-05	There was an overview of upcoming work: • Continue underground plumbing in C Wing and Cluster. • Continue foundation walls in E Wing, begin waterproofing • Continue footing and foundation walls in D Wing, begin F Cluster. • Begin backfilling in deep basement, begin underground plumbing. • Begin steel erection on 9/28.		

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Item	Description	Date	Action
	DMH Coordination		
036-06	DMH asked Ellenzweig to proceed with the design of the accessible entry to the Storehouse loading dock. Ellenzweig will coordinate with Nitsch.		
	Ellenzweig will do a code review of the entry to the Storehouse to insure that once the work is complete it will create a fully accessible entry.	7/29/09	
	Draft code review is being updated by Ellenzweig.	8/12/09	
	Ellenzweig to send to DCAM and DMH for review.	8/19/09	
	Report sent to DCAM for review.	9/02/09	
	DCAM is still reviewing the report. Plans are at the beginning stage to add a handicapped parking space and a ramp to access the Storehouse.	9/16/09	
044-07	Work will begin soon on Bulletin 51 which will shut down the bus loop by the Hooper Turret. Gilbane will present a plan to DMH to re-route the bus route for about 3 weeks.		
	Bulletin 65 will be put on hold at this time. Gilbane will meet with DMH to review the proposed bus route.	9/23/09	
	LEED Certification		
003-04	*(Notes for this item have been compressed. See earlier minutes for notes prior to 8/05/09)*		
	Submission is complete. Project is being reviewed for compliance.	8/05/09	
	Initial review is complete by the reviewing committee. Various questions have been asked by the reviewers that will need to be addressed to have points certified.	9/23/09	
	Bidding		
042-05	Building Skin		
	Trade contractors for Building Skin are: Masonry, Waterproofing, Damproofing & Caulking, Misc. Metals, Roofing, and Metal Windows.		
	DCAM has resolved all legal issues and will be sending letters to the bidders.	9/09/09	
	Letters have been sent out and responses received.	9/16/09	
	There was a meeting of the prequalification committee today. Bids will be out next week.	9/23/09	

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

Item	Description	Date	Action
040-08	Other Trades		
	Trade contractors for Finishes will be sent out once the building skin bidding is complete. Finishes are: Tile, Painting, Acoustic Ceilings, Glass & Glazing, and Flooring.		
	Doors, Frames & Hardware and Specialty Doors will have scope reviews next week.		
	Drywall and Metal Panel scope reviews are complete. Post bid supplement for Metal Panels went out on Friday. Drywall post bid supplement will be next Monday.		
	Resinous Floors and Carpet bids are due on Friday.		
	Millwork went out for bid last Friday.		
	Permitting		
029-06	There was a question regarding the elevated gas permit. NSTAR to be on site in the next 3 to 4 weeks to tie in the line.		
	Work to begin tomorrow. Ellenzweig to check on status of permit.	7/08/09	
	Permit has been sent to Tom Angelo. Does not require approval from the Plumbing Board.	8/19/09	
	Architectural Engineers are to obtain a letter from the Plumbing Board on the use of a ventless gas regulator.	9/09/09	
	Will confirm that Architectural Engineer's letter is in the package is given to NStar.	9/16/09	
	Tom Angelo expects to have the application form complete this week.	9/23/09	
	Other Business		
032-07	Mock Up DCAM asked if there were any outstanding RFIs or other issues that were holding up the completion of the mock-up room. Ellenzweig and Gilbane will review.		
	Gilbane handed out a schedule for the work at the mock up—work is in progress.	8/26/09	
	Plumbing roughing is mostly complete.	9/09/09	
	Will review after the meeting.	9/16/09	
	Waiting for door frames to proceed with work.	9/23/09	

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

Item	Description	Date	Action
036-08	Storm Water Control *(Notes for this item have been compressed. See earlier minutes for notes prior to 9/16/09)*		
	All work listed on Nitsch's field report is complete. Dow will divert water at the road around the Clocktower to have it discharge on site. Clocktower slopes will be stabilized and hydroseeded.	9/09/09	
	ETS recommendations have been sent to Nitsch for review – will then forward to DEP.	9/16/09	
	Nitsch will hold on to the report until they hear from the DEP. There are several action items in the report: Clean out the drain line at the back of the salt shed and add some Cape Cod Berm to divert water coming down the hill at the salt shed.	9/23/09	
043-07	Gilbane will hold a kick-off meeting for the MEP contractors next week. Ellenzweig will work on providing CAD files for the coordination drawings.		
	There will be a kick-off meeting for 8 contractors tomorrow. Production of the disks of CAD files for coordination drawings is in progress.	9/16/09	
	Wednesday, October 14, will be the first commissioning and MEP coordination meetings. The Owner's meeting will be at 1:00 that day.	9/23/09	
043-08	DCAM met yesterday with DMH and representatives from Camp Joy regarding making improvements on or around the Camp Joy property. DCAM would like to expedite some of the work scheduled for the area adjacent to Camp Joy including relocating material stockpiles, grading and seeding, and relocating the construction fence. DCAM, Ellenzweig, Gilbane, and Dow will walk the area after the meeting.		
	Work is in progress, clearing out of building materials should be complete by next week. DCAM will review before topsoil and seeding.	9/16/09	
	Grading is 98% complete. DCAM will review after the meeting.	9/23/09	
044-11	Gilbane stated that they would schedule a trip to Cives' Maine plant to see the plant and check on the steel fabrication.		
	Steel fabrication was overbilled for the previous month which made this month appear to be low. Gilbane stated that none of the wings are 100% fabricated.	9/23/09	
045-06	Gilbane stated that they had a preliminary cost proposal from Cives of $700,000 for the revised schedule that was presented at last week's principals meeting. The added costs are for items such as shop overtime.		
045-07	Gilbane expressed concern that the slab openings were not coordinated with the elevator pits and were not consistent on the drawings. Gilbane will verify the elevator pit dimensions and forward them to Cives.		

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

ELLENZWEIG

Meeting Notes
23 September 2009
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Item	Description	Date	Action
045-08	Gilbane stated that they will need to leave out steel pieces in order to install the Otis elevator machinery from above. This was unanticipated and will require comeback time for the steel installer.		
045-09	There was a discussion of future submittals. Ellenzweig asked for a submittal schedule for upcoming submittals. Ellenzweig stated that each trade is to provide a schedule of all of their submittals for approval by DCAM and Ellenzweig. Gilbane said that submittal schedules would be provided.		
045-10	DCAM stated that the NGrid ductbank extension to BNRI was not installed in accordance with the NGrid drawings – it is not under the roadway as designed. DCAM is asking for a document from NGrid approving the installation.		
045-11	DCAM noted that the project was behind schedule and asked Gilbane for a recovery schedule. Gilbane stated that they were loading data this week and expected to have the recovery schedule by next Friday.		

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

30 September 2009 Meeting

ELLENZWEIG

30 September 2009 Meeting

Re:	New Psychiatric Hospital Mass. State Project No. DMH0501
Subject:	Project Meeting #46
Attendees:	
DCAM	Charles Willse; Bill Cobbett
Tishman	Erick Bakstran; Bob Morelli
DMH	Tony Riccitelli; Ken Lortie, Carol Jalbert; Brad Dewar
Ellenzweig	Jim Hoffmann
Gilbane	Mike O'Brien; Steve Duvel; John Roche
WPI	Jackie McDonough; Bethany Lagrant; John Upton

Distribution by Ellenzweig: DCAM; DMH; Tishman; Gilbane

Item	Description	Date	Action
	Safety		
047-01	No incidents.		
	QA/QC		
047-02	There is a washout beneath a small section of footing at the end of D Wing. GEI will provide a fix to fill the void.		
047-03	The steel erector asked that the lay down area for the steel be improved to be less muddy and slippery. Gilbane and Dow will address the issue.		
	RFIs		
047-04	RFIs in order of priority: 615, 616, 340, 556, 569, 608, 462, 397, 451, and 554.		
	Submittals		
047-05	Submittals in order of priority: • Steel piece drawings for H&J Cluster (packages 125,128,129,132,137) • Steel piece drawings for G & F Clusters (packages 105, 109, 116) • Steel piece drawings for A Wing (package 131) • Steel piece drawings for B Wing (package 121)		
	Construction Schedule		
047-06	There was an overview of upcoming work: • Inspect underground plumbing in H &J. • Backfill and begin slab on grade prep in C Wing • Complete backfilling for E Wing, begin underground plumbing. • Begin Waterproofing in D Wing. • Continue steel erection in K wing.		

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

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Item	Description	Date	Action
	DMH Coordination		
047-07	No issues at this time.		
	LEED Certification		
003-04	*(Notes for this item have been compressed. See earlier minutes for notes prior to 8/05/09)*		
	Submission is complete. Project is being reviewed for compliance.	8/05/09	
	Initial review is complete by the reviewing committee. Various questions have been asked by the reviewers that will need to be addressed to have points certified.	9/23/09	
	Waiting for the energy modeling.	10/07/09	
	Bidding		
042-05	Building Skin		
	Trade contractors for Building Skin are: Masonry, Waterproofing, Damproofing & Caulking, Misc. Metals, Roofing, and Metal Windows.		
	DCAM has resolved all legal issues and will be sending letters to the bidders.	9/09/09	
	Letters have been sent out and responses received.	9/16/09	
	There was a meeting of the prequalification committee today. Bids will be out next week.	9/23/09	
	Letters sent out yesterday designating the prequalified bidders.	10/07/09	
046-06	Other Trades		
	The prequalification Committee will set up a meeting to review the finishes packages next week. Finishes are: Tile, Painting, Acoustic Ceilings, Glass & Glazing, and Flooring.		
	Doors, Frames & Hardware will have post-bid supplement sent out this week.		
	Drywall and Metal Panel final bids received – RTAs will be sent out this week.		
	Resinous Floors and Carpet scope reviews are complete – post bid supplements to be issued.		
	Millwork pre-bid meeting was held last week.		

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

ELLENZWEIG

Meeting Notes
30 September 2009
3 of 5

Item	Description	Date	Action
	Permitting		
029-06	There was a question regarding the elevated gas permit. NSTAR to be on site in the next 3 to 4 weeks to tie in the line.		
	Architectural Engineers are to obtain a letter from the Plumbing Board on the use of a ventless gas regulator.	9/09/09	
	Will confirm that Architectural Engineer's letter is in the package is given to NStar.	9/16/09	
	Tom Angelo expects to have the application form complete this week.	9/23/09	
	The signed document was received from Tom Angelo and sent to Architectural Engineers.	9/30/09	
	Architectural Engineers delivered the permit application to the Plumbing Board and is waiting for a response.	10/07/09	
	Other Business		
032-07	Mock Up DCAM asked if there were any outstanding RFIs or other issues that were holding up the completion of the mock-up room. Ellenzweig and Gilbane will review.		
	Gilbane handed out a schedule for the work at the mock up—work is in progress.	8/26/09	
	Plumbing roughing is mostly complete.	9/09/09	
	Will review after the meeting.	9/16/09	
	Waiting for door frames to proceed with work.	9/23/09	
036-08	Storm Water Control *(Notes for this item have been compressed. See earlier minutes for notes prior to 9/16/09)*		
	Nitsch will hold on to the ETS report until they hear from the DEP. There are several action items in the report: Clean out the drain line at the back of the salt shed and add some Cape Cod Berm to divert water coming down the hill at the salt shed.	9/23/09	
	Dow is proceeding with all work recommended by ETS within the construction fence and are preparing a proposal for the work outside of the fence.	9/30/09	
	Gilbane has the costs for work outside of the construction fence and will forward them to DCAM for review.	10/07/09	

Note: These meeting notes will be incorporated into the office record. Please advise by the next meeting if any of the information contained herein is found to be incorrect.

ELLENZWEIG

Meeting Notes
30 September 2009
4 of 5

Item	Description	Date	Action
043-07	Gilbane will hold a kick-off meeting for the MEP contractors next week. Ellenzweig will work on providing CAD files for the coordination drawings.		
	Wednesday, October 14, will be the first commissioning and MEP coordination meetings. The Owner's meeting will be at 1:00 that day.	9/23/09	
	Meeting times are being coordinated.	9/30/09	
	Commissioning meeting is at 8:00. Owner's meeting is at 11:00. Cives/Capco meeting is at 1:00.	10/07/09	
045-06	Gilbane stated that they had a preliminary cost proposal from Cives of $700,000 for the revised schedule that was presented at last week's principals meeting. The added costs are for items such as shop overtime.		
	Gilbane has received an updated cost and recovery schedule with a request from Cives for direction to proceed with their proposal by Friday. DCAM took exception to this ultimatum in that they did not have the time or information to respond to the presented costs. DCAM will respond to Gilbane to keep the progress moving forward. A meeting is tentatively set for next Wednesday with Cives to discuss the issue.	9/30/09	
	Meeting is today at 1:00.		
045-07	Gilbane expressed concern that the slab openings were not coordinated with the elevator pits and were not consistent on the drawings. Gilbane will verify the elevator pit dimensions and forward them to Cives.		
	A meeting is being set up between Gilbane, Otis, Ellenzweig, and Lin Associates to resolve any issues regarding the elevator shafts.	9/30/09	
	Meeting is today.	10/07/09	
045-10	DCAM stated that the NGrid ductbank extension to BNRI was not installed in accordance with the NGrid drawings – it is not under the roadway as designed. DCAM is asking for a document from NGrid approving the installation.		
	CAD drawings were forwarded to NGrid. There has been no response to date.	9/30/09	
046-08	Tishman asked if the leaks were repaired on the fuel oil lines at the new Boiler Plant. DMH said that the leaks have been repaired but the pumps are not working due to a faulty microprocessor and the lines can't be tested at this time.		
	Two leaks were repaired yesterday. Waiting to restart the system to see what the status is.	10/07/09	
047-08	Gilbane noted that warranty work was underway on the Ranger equipment at BNRI. Gilbane is monitoring the progress.		

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ELLENZWEIG

Meeting Notes
30 September 2009
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Item	Description	Date	Action
047-09	DMH asked when the patient room mock-up is scheduled to be complete. The completion is scheduled for early December.		
047-10	DCAM noted that the site would be closed on Monday, October 12th, for Columbus Day.		

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Appendix B: Weekly RFIs

23 September 2009 Log

Gilbane

**Open RFI Log

Summary Log 9/23/09 @ 8:15AM

RFI #	Subject	Author Company	Date Created	Date Rqstd	Date Resp
0340	Elevator Rail Support Dimensions (ON HOLD) * until shops	Gilbane Building Company	6/29/2009	7/6/2009	7/13/2009
0355	05B Bid Question - Pergola Gates Foundations	Gilbane Building Company	7/1/2009	7/8/2009	
0397	09I Bid Question - Parapet Details at Clock Tower	Gilbane Building Company	7/17/2009	7/24/2009	
0398	09I Bid Question - Clock Details at Exhaust Tower Clock	Gilbane Building Company	7/20/2009	7/27/2009	
6 0451	08D/07A Bid Question - Stainless Steel Flashing at Glazed Canopy (Area H)	Gilbane Building Company	7/31/2009	8/7/2009	
0462	Interior Expansion Joints Locations/Assemblies	Gilbane Building Company	8/4/2009	8/11/2009	
0484	Projector Elevator	Gilbane Building Company	8/11/2009	8/18/2009	
- 0512	Floor Drains at Porch Areas - VERBAL -	Gilbane Building Company	8/24/2009	8/31/2009	
0514	Bulletin #62 Dimensional Variations	Gilbane Building Company	8/24/2009	8/31/2009	
0518	09A Bid Question - Markerboard Schedule	Gilbane Building Company	8/26/2009	9/2/2009	
4 0529	Beam Elevations Between Gridlines FD & GB.4	Gilbane Building Company	8/28/2009	9/4/2009	
0531	04A Bid Question - Channel Steel Lintel Bearing at the G8 and J8 Walls	Gilbane Building Company	8/28/2009	9/4/2009	
0542	Bedroom Mockup - Wall Dimensions at the Adult Patient Bathroom Toilet Wall	Gilbane Building Company	9/1/2009	9/8/2009	
0547	Bedroom Mockup - Cold Water to Lavatory	Gilbane Building Company	9/2/2009	9/9/2009	
5 0548	Bedroom Mockup - Cold Water to Shower	Gilbane Building Company	9/2/2009	9/9/2009	
0549	Shower Bases	Gilbane Building Company	9/2/2009	9/9/2009	
0554	Area K Elevator Machine Beam Supports/Conflicts * Pending shops	Gilbane Building Company	9/8/2009	9/15/2009	9/11/2009
1. 0555	Slab Opening Adjacent to H8.7 - H&J Cluster (H+J) * Hot	Gilbane Building Company	9/9/2009	9/16/2009	
0556	08C Bid Question - Wood Door Details & Specifications	Gilbane Building Company	9/9/2009	9/16/2009	
2 0559	Area H&J Slab Depression & Slab Support Detail (H+J) * Hot	Gilbane Building Company	9/9/2009	9/16/2009	
3 0561	Area H&J Hut Beams & Framed opening Conflict (H+J) * Hot	Gilbane Building Company	9/9/2009	9/16/2009	
0566	Areas G- 6th FL Beam Elevation & D Dimension	Gilbane Building Company	9/10/2009	9/17/2009	
0567	Drain at Scissor Lift	Gilbane Building Company	9/10/2009	9/17/2009	
0569	08C Bid Question - Folding Door Assembly	Gilbane Building Company	9/10/2009	9/17/2009	
0571	Existing Storehouse Rainleader Relocation	Gilbane Building Company	9/10/2009	9/17/2009	
0579	09A Bid Question - Partitions	Gilbane Building Company	9/11/2009	9/18/2009	
0581	09A Bid Question - Marker Boards	Gilbane Building Company	9/11/2009	9/18/2009	
0598	Corbeled End Dimensions & Weld Sizes	Gilbane Building Company	9/18/2009	9/25/2009	
7 0599	Elevator Lobby Canopy Framing Conditions (H&J)	Gilbane Building Company	9/21/2009	9/28/2009	
0600	09A Bid Question - Insulation Thickness Inside Partitions ←	Gilbane Building Company	9/21/2009	9/28/2009	
0601	Specification Section 055000 Modification in Bulletin #57	Gilbane Building Company	9/22/2009	9/29/2009	
0602	09A Bid Question - Markerboards in Classrooms (Area F) ←	Gilbane Building Company	9/22/2009	9/29/2009	
0603	09A Bid Question - Metal Panels/GFRG Column Details (A9.50o) ←	Gilbane Building Company	9/22/2009	9/29/2009	
9 0604	09A Bid Question - Stainless Steel Chair Rails ←	Gilbane Building Company	9/22/2009	9/29/2009	
0605	09A Bid Question - Stainless Steel Snap-Lock ←	Gilbane Building Company	9/22/2009	9/29/2009	
10 0606	Slab Opening Discrepancies - G Cluster	Gilbane Building Company	9/22/2009	9/29/2009	
0607	09A Bid Question - Reveals in Patient Room Ceilings ←	Gilbane Building Company	9/22/2009	9/29/2009	
0608	Brace Requirements Along FG Line	Gilbane Building Company	9/22/2009	9/29/2009	
8 0609	Relieving Angles Area F&G	Gilbane Building Company	9/22/2009	9/29/2009	
0610	Arcade/Canopy Footings @ JA/J9-G9	Gilbane Building Company	9/23/2009	9/30/2009	

(25) OVERDUE

← = 6 bid questions needed for Post-Supplement for 09A Drywall

Total Number of RFIs for this project: ~~40~~ 38

Submittal Packages

Summary Log In Review

Worcester Psych Hospital
305-B Belmont St
3rd floor
Worcester, MA 01604

Project # 114461000
Tel: 508-753-4309 Fax: 508-753-5164

Gilbane Building Company

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
062-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #38)	ELLENZWEIG	7/23/2009	8/6/2009		48	
075-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #50)	ELLENZWEIG	8/3/2009	8/17/2009		37	
070-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #46)	ELLENZWEIG	8/3/2009	8/17/2009		37	
001-078100-0	Gilbane Building Company	Fireproofing Rating Table & UL Tests	ELLENZWEIG	8/5/2009	8/19/2009		35	
002-078100-0	Gilbane Building Company	Concealed Spray-Applied Fireproofing	ELLENZWEIG	8/5/2009	8/19/2009		35	
003-078100-0	Gilbane Building Company *	Semi-Exposed Spray-Applied Fireproofing	ELLENZWEIG	8/5/2009	8/19/2009		35	
004-078100-0	Gilbane Building Company	Exposed Spray-Applied Fireproofing	ELLENZWEIG	8/5/2009	8/19/2009		35	
005-078100-0	Gilbane Building Company	Spray Fireproofing Shop Drawings Areas K&A	ELLENZWEIG	8/5/2009	8/19/2009		35	
005-079200-1	Gilbane Building Company	Tremco THC-901 Traffic Joint Sealant - RESUBMIT	ELLENZWEIG	8/10/2009	8/24/2009		30	
090-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #65)	ELLENZWEIG	8/13/2009	8/27/2009		27	
002-018113-1	Gilbane Building Company	LEED MRc2.2 Waste Tracking	Symmes Maini & McKee Associates, Inc.	8/13/2009	8/27/2009		27	
098-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #73)	ELLENZWEIG	8/18/2009	9/1/2009		22	
099-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #74)	ELLENZWEIG	8/18/2009	9/1/2009		22	
100-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #75)	ELLENZWEIG	8/18/2009	9/1/2009		22	
014-333000-0	Gilbane Building Company	Rain Leader Downspout Boot And Cleanout Sample	ELLENZWEIG	8/20/2009	9/3/2009		20	
107-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #82)	ELLENZWEIG	8/21/2009	9/4/2009		19	
108-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #83)	ELLENZWEIG	8/21/2009	9/4/2009		19	
023-260001-3	Gilbane Building Company	SITE - Light Poles	ELLENZWEIG	8/25/2009	9/8/2009		15	
111-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Gluster (Pack. #86)	ELLENZWEIG	8/26/2009	9/9/2009		14	
112-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #87)	ELLENZWEIG	8/26/2009	9/9/2009		14	

E-Copy ✓

1 2 8 ✓

49 days old

(38) OVERDUE

Prolog Manager Printed on: 9/23/2009 NENG Worcester Psych Hospital Page 1

* spray fireproofing submittals AREA K need by 9.25.09.

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
113-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #88)	ELLENZWEIG	8/26/2009	9/9/2009		14	
114-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #89)	ELLENZWEIG	8/26/2009	9/9/2009		14	
115-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #90)	ELLENZWEIG	8/26/2009	9/9/2009		14	
116-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #91)	ELLENZWEIG	8/27/2009	9/10/2009		13	
9 117-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #92)	ELLENZWEIG	8/27/2009	9/10/2009		13	
10 118-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #93)	ELLENZWEIG	8/27/2009	9/10/2009		13	
119-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #94)	ELLENZWEIG	8/27/2009	9/10/2009		13	
009-312000-2	Gilbane Building Company	SITE - Stone LEED Documentation	Symmes Maini & McKee Associates, Inc.	8/27/2009	9/10/2009		13	
120-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #95)	ELLENZWEIG	8/28/2009	9/11/2009		12	
✓ 123-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluster (Pack. #98)	ELLENZWEIG E-Copy ✓	9/2/2009	9/16/2009		7	
002-055100-1	Gilbane Building Company	Stair #7, #26 & #28 Drawings and Calcs	ELLENZWEIG	9/2/2009	9/16/2009		7	
125-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. 100)	ELLENZWEIG	9/2/2009	9/16/2009		7	
126-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #101)	ELLENZWEIG	9/3/2009	9/17/2009		6	
127-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #102)	ELLENZWEIG	9/3/2009	9/17/2009		6	
128-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #103)	ELLENZWEIG	9/3/2009	9/17/2009		6	
129-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #104)	ELLENZWEIG	9/4/2009	9/18/2009		5	
130-051200-0	Gilbane Building Company	Steel Piece Dwgs - G&F Cluster (Pack. #105)	ELLENZWEIG	9/4/2009	9/18/2009		5	
010-078100-0	Gilbane Building Company	Metal Lath & Accessories	ELLENZWEIG	9/8/2009	9/22/2009		1	
3 132-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluser (Pack. #106)	ELLENZWEIG	9/8/2009	9/22/2009		1	
009-329201-0	Gilbane Building Company	SITE: Warm Season Grasses: Installer and Testing Agency Qualifications	ELLENZWEIG	9/8/2009	9/22/2009		1	
✓ 133-051200-0	Gilbane Building Company	Steel Piece Dwgs - A-Wing (Pack. #107)	ELLENZWEIG E-Copy ✓	9/9/2009	9/23/2009		0	
5 134-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #108)	ELLENZWEIG	9/11/2009	9/25/2009		-2	
135-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #109)	ELLENZWEIG	9/11/2009	9/25/2009		-2	
136-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #110)	ELLENZWEIG	9/11/2009	9/25/2009		-2	
137-051200-0	Gilbane Building Company	Steel Piece Dwgs - F Cluster (Pack. 111)	ELLENZWEIG	9/11/2009	9/25/2009		-2	
6 138-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #112)	ELLENZWEIG	9/11/2009	9/25/2009		-2	
139-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #113)	ELLENZWEIG	9/11/2009	9/25/2009		-2	

OVERDUE

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
047-033000-0	Gilbane Building Company		ELLENZWEIG	9/15/2009	9/29/2009		-6	
140-051200-0	Gilbane Building Company	Steel Piece Dwgs - A-Wing (Pack. #114)	ELLENZWEIG	9/16/2009	9/30/2009		-7	
141-051200-0	Gilbane Building Company	Steel Piece Dwgs - B&C-Wing (Pack. #115)	ELLENZWEIG	9/16/2009	9/30/2009		-7	
142-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #116)	ELLENZWEIG	9/17/2009	10/1/2009		-8	
143-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #117)	ELLENZWEIG	9/17/2009	10/1/2009		-8	
145-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluster (Pack. #119)	ELLENZWEIG	9/17/2009	10/1/2009		-8	
009-331000-0	Gilbane Building Company	SITE: Subdrainage: Floor Cleanouts Product Data	ELLENZWEIG	9/17/2009	10/1/2009		-8	
144-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #118)	ELLENZWEIG	9/18/2009	10/2/2009		-9	
146-051200-0	Gilbane Building Company	Embed Plan D&E Wing	ELLENZWEIG	9/21/2009	10/5/2009		-12	
053-260001-0	Gilbane Building Company	SITE: Light Pole Finish Sample	ELLENZWEIG	9/21/2009	10/5/2009		-12	
147-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #120)	ELLENZWEIG	9/21/2009	10/5/2009		-12	
054-260001-0	Gilbane Building Company	Site: Electric Handhole Shop Drawing	ELLENZWEIG	9/22/2009	10/6/2009		-13	
148-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #121)	ELLENZWEIG	9/23/2009	10/7/2009		-14	

Number of Submittal Packages in this Project: ~~80~~ 58

30 September 2009 Log

**Open RFI Log

Summary Log 9·30·09 @ 9AM

	RFI #	Subject	Author Company	Date Created	Date Rqstd	Date Resp
2	0340	Elevator Rail Support Dimensions	Gilbane Building Company	6/29/2009	7/6/2009	
	0355	05B Bid Question - Pergola Gates Foundations	Gilbane Building Company	7/1/2009	7/8/2009	
10	0397	09I Bid Question - Parapet Details at Clock Tower	Gilbane Building Company	7/17/2009	7/24/2009	
4	0451	08D/07A Bid Question - Stainless Steel Flashing at Glazed Canopy (Area H)	Gilbane Building Company	7/31/2009	8/7/2009	
9	0462	Interior Expansion Joints Locations/Assemblies	Gilbane Building Company	8/4/2009	8/11/2009	
	0512	Floor Drains at Porch Areas verbal only	Gilbane Building Company	8/24/2009	8/31/2009	
	0514	Bulletin #62 Dimensional Variations	Gilbane Building Company	8/24/2009	8/31/2009	
1	0529	Beam Elevations Between Gridlines FD & GB.4	Gilbane Building Company	8/28/2009	9/4/2009	
	0531	04A Bid Question - Channel Steel Lintel Bearing at the G8 and J8 Walls	Gilbane Building Company	8/28/2009	9/4/2009	
	0547	Bedroom Mockup - Cold Water to Lavatory	Gilbane Building Company	9/2/2009	9/9/2009	
	0549	Shower Bases	Gilbane Building Company	9/2/2009	9/9/2009	
	0554	Area K Elevator Machine Beam Supports/Conflicts ↓ PEND SHOP APP	Gilbane Building Company	9/8/2009	9/15/2009	9/11/2009
5	0556	08C Bid Question - Wood Door Details & Specifications	Gilbane Building Company	9/9/2009	9/16/2009	
6	0566	Areas G- 6th Fl. Beam Elevation & D Dimension	Gilbane Building Company	9/10/2009	9/17/2009	
8	0569	08C Bid Question - Folding Door Assembly	Gilbane Building Company	9/10/2009	9/17/2009	
	0579	09A Bid Question - Partitions	Gilbane Building Company	9/11/2009	9/18/2009	
3	0599	Elevator Lobby Canopy Framing Conditions - H&J	Gilbane Building Company	9/21/2009	9/28/2009	
	0601	Specification Section 055000 Modification in Bulletin #57	Gilbane Building Company	9/22/2009	9/29/2009	
7	0608	Brace Requirements Along FG Line	Gilbane Building Company	9/22/2009	9/29/2009	
	0610	Arcade/Canopy Footings @ JA/J9-G9	Gilbane Building Company	9/23/2009	9/30/2009	

(18) OVERDUE

Total Number of RFIs for this project: 20

Submittal Packages

Summary Log In Review 9-30-09 @ 9AM

Worcester Psych Hospital
305-B Belmont St
3rd floor
Worcester, MA 01604

Project # 114461000
Tel: 508-753-4309 Fax: 508-753-5164

Gilbane Building Company

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
075-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #50)	ELLENZWEIG E-copy	8/3/2009	8/17/2009		44 ✓	
005-079200-1	Gilbane Building Company	Tremco THC-901 Traffic Joint Sealant - RESUBMIT	ELLENZWEIG	8/10/2009	8/24/2009		37	
090-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #65)	ELLENZWEIG E-copy	8/13/2009	8/27/2009		34 ✓	
098-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #73)	ELLENZWEIG E- copy	8/18/2009	9/1/2009		29 ✓	
099-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #74)	ELLENZWEIG E -copy	8/18/2009	9/1/2009		29 ✓	
100-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #75)	ELLENZWEIG E- copy	8/18/2009	9/1/2009		29 ✓	
~~044-939000-0~~	~~Gilbane Building Company~~	~~Rain Leader Downspout Boot And Cleanout Sample~~ cleared 9-30-09	~~ELLENZWEIG~~	~~8/20/2009~~	~~9/3/2009~~		~~37~~	
108-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #83)	ELLENZWEIG	8/21/2009	9/4/2009		26	
107-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #82)	ELLENZWEIG E-copy	8/21/2009	9/4/2009		26 ✓	
023-260001-3	Gilbane Building Company	SITE - Light Poles	ELLENZWEIG	8/25/2009	9/8/2009		22	
6 112-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #87)	ELLENZWEIG	8/26/2009	9/9/2009		21	
113-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #88)	ELLENZWEIG	8/26/2009	9/9/2009		21	
114-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #89)	ELLENZWEIG	8/26/2009	9/9/2009		21	
115-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #90)	ELLENZWEIG	8/26/2009	9/9/2009		21	
7 117-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #92)	ELLENZWEIG	8/27/2009	9/10/2009		20	
8 118-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #93)	ELLENZWEIG	8/27/2009	9/10/2009		20	
119-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #94)	ELLENZWEIG	8/27/2009	9/10/2009		20	
116-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #91)	ELLENZWEIG	8/27/2009	9/10/2009		20	
009-312000-2	Gilbane Building Company	SITE - Stone LEED Documentation	Symmes Maini & McKee Associates, Inc.	8/27/2009	9/10/2009		20	
120-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #95)	ELLENZWEIG	8/28/2009	9/11/2009		19	
002-055100-1	Gilbane Building Company	Stair #7, #26 & #28 Drawings and Calcs	ELLENZWEIG	9/2/2009	9/16/2009		14	
9 125-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. 100)	ELLENZWEIG	9/2/2009	9/16/2009		14	

(25) OVERDUE

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
126-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #101)	ELLENZWEIG	9/3/2009	9/17/2009		13	
127-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #102)	ELLENZWEIG	9/3/2009	9/17/2009		13	
128-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #103)	ELLENZWEIG	9/3/2009	9/17/2009		13	
129-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #104)	ELLENZWEIG	9/4/2009	9/18/2009		12	
130-051200-0	Gilbane Building Company	Steel Piece Dwgs - G&F Cluster (Pack. #105)	ELLENZWEIG	9/4/2009	9/18/2009		12	
010-078100-0	Gilbane Building Company	Metal Lath & Accessories	ELLENZWEIG	9/8/2009	9/22/2009		8	
✓ 132-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluser (Pack. #106)	ELLENZWEIG E-copy	9/8/2009	9/22/2009		8	
135-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #109)	ELLENZWEIG	9/11/2009	9/25/2009		5	
136-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #110)	ELLENZWEIG	9/11/2009	9/25/2009		5	
137-051200-0	Gilbane Building Company	Steel Piece Dwgs - F Cluster (Pack. 111)	ELLENZWEIG	9/11/2009	9/25/2009		5	
139-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #113)	ELLENZWEIG	9/11/2009	9/25/2009		5	
1 140-051200-0	Gilbane Building Company	Steel Piece Dwgs - A-Wing (Pack. #114)	ELLENZWEIG	9/16/2009	9/30/2009		0	
10 141-051200-0	Gilbane Building Company	Steel Piece Dwgs - B&C-Wing (Pack. #115)	ELLENZWEIG	9/16/2009	9/30/2009		0	
2 145-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluster (Pack. #119)	ELLENZWEIG	9/17/2009	10/1/2009		-1	
142-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #116)	ELLENZWEIG	9/17/2009	10/1/2009		-1	
143-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #117)	ELLENZWEIG	9/17/2009	10/1/2009		-1	
009- 334600	Gilbane Building Company	SITE: Subdrainage: Floor Cleanouts Product Data	ELLENZWEIG	9/17/2009	10/1/2009		-1	
144-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #118)	ELLENZWEIG	9/18/2009	10/2/2009		-2	
146-051200-0	Gilbane Building Company	Embed Plan D&E Wing	ELLENZWEIG	9/21/2009	10/5/2009		-5	
053-260001-0	Gilbane Building Company	SITE: Light Pole Finish Sample	ELLENZWEIG	9/21/2009	10/5/2009		-5	
147-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #120)	ELLENZWEIG	9/21/2009	10/5/2009		-5	
054-260001-0	Gilbane Building Company	Site: Electric Handhole Shop Drawing	ELLENZWEIG	9/22/2009	10/6/2009		-6	
148-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #121)	ELLENZWEIG	9/23/2009	10/7/2009		-7	
149-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #122)	ELLENZWEIG	9/23/2009	10/7/2009		-7	
3 150-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #123)	ELLENZWEIG	9/23/2009	10/7/2009		-7	
4 151-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack.	ELLENZWEIG	9/24/2009	10/8/2009		-8	

overdue

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
		#124)						
152-051200-0	Gilbane Building Company	Anchor Bolt Plan - Arcade Area	ELLENZWEIG	9/24/2009	10/8/2009		-8	
001-142100-0	Gilbane Building Company	Elevator 1 Shop Drawings Package (Set of 4)	ELLENZWEIG	9/24/2009	10/8/2009		-8	
154-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #126)	ELLENZWEIG	9/25/2009	10/9/2009		-9	
153-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #125)	ELLENZWEIG	9/25/2009	10/9/2009		-9	
014-333000-1	Gilbane Building Company	Rain Leader Downspout Boot And Cleanout Record Photos	ELLENZWEIG	9/28/2009	10/12/2009		-12	
034-033000-2	Gilbane Building Company	Rebar Shop Drawings - C Wing Footings - RESUBMIT FOR RECORD	ELLENZWEIG	9/29/2009	10/13/2009		-13	
155-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #127)	ELLENZWEIG	9/29/2009	10/13/2009		-13	

Number of Submittal Packages in this Project: 58

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21 October 2009 Log

**Open RFI Log

Summary Log 10/21/09 @ 8:30AM

	RFI #	Subject	Author Company	Date Created	Date Rqstd	Date Resp
1	0340	Elevator Rail Support Dimensions	Gilbane Building Company	6/29/2009	7/6/2009	
5	0397	09I Bid Question - Parapet Details at Clock Tower	Gilbane Building Company	7/17/2009	7/24/2009	
6	0462	Interior Expansion Joints Locations/Assemblies	Gilbane Building Company	8/4/2009	8/11/2009	
9	0512	Floor Drains at Porch Areas	Gilbane Building Company	8/24/2009	8/31/2009	
8	0531	04A Bid Question - Channel Steel Lintel Bearing at the G8 and J8 Walls	Gilbane Building Company	8/28/2009	9/4/2009	
7	0548R	Bedroom Mockup - Cold Water to Shower	Gilbane Building Company	10/7/2009	10/21/2009	
3	0554	Area K Elevator Machine Beam Supports/Conflicts	Gilbane Building Company	9/8/2009	9/15/2009	
	0569	08C Bid Question - Folding Door Assembly	Gilbane Building Company	9/10/2009	9/17/2009	
2	0608	Brace Requirements Along FG Line	Gilbane Building Company	9/22/2009	9/29/2009	
	0614R	Field Work @ Moment JB/J5 2nd Floor	Gilbane Building Company	10/2/2009	10/9/2009	
4	0624	Area F 100% Load Bracing Conflicts at F5	Gilbane Building Company	10/13/2009	10/20/2009	
10	0627	06A Bid Question - Acoustic Wood Wall Paneling	Gilbane Building Company	10/13/2009	10/20/2009	
	0635	06A Bid Question - Winter Garden Millwork	Gilbane Building Company	10/19/2009	10/26/2009	
	0637	05B Bid Question - Pipe Guards	Gilbane Building Company	10/20/2009	10/27/2009	
	0638	08A Bid Question - Existing Storehouse Dock Lift	Gilbane Building Company	10/20/2009	10/27/2009	
	0639	08A Bid Question - Dock Lifts	Gilbane Building Company	10/20/2009	10/27/2009	

8 OVERDUE

Total Number of RFIs for this project: 16

Submittal Packages

Summary Log In Review 10/21/09 @ 8:30AM

Worcester Psych Hospital
305-B Belmont St
3rd floor
Worcester, MA 01604

Project # 114461000
Tel: 508-753-4309 Fax: 508-753-5164

Gilbane Building Company

Number-Rev	From Company	Description	To Company		Sent	Due	Rec'd	Days +/-	Action
023-260001-3	Gilbane Building Company	SITE - Light Poles	ELLENZWEIG		8/25/2009	9/8/2009		43	
002-055100-1	Gilbane Building Company	Stair #7, #26 & #28 Drawings and Calcs	ELLENZWEIG		9/2/2009	9/16/2009		35	
137-051200-0	Gilbane Building Company	Steel Piece Dwgs - F Cluster (Pack. 111)	ELLENZWEIG		9/11/2009	9/25/2009		26	
~~142-051200-0~~	~~Gilbane Building Company~~	~~Steel Piece Dwgs - G Cluster (Pack.~~ #116)	ELLENZWEIG	E-Copy	9/17/2009	10/1/2009	✓	20	
~~144-051200-0~~	~~Gilbane Building Company~~	~~Steel Piece Dwgs - F Cluster~~ (Pack. #118)	ELLENZWEIG	E-Copy	9/18/2009	10/2/2009	✓	19	
146-051200-0	Gilbane Building Company	Embed Plan D&E Wing	ELLENZWEIG		9/21/2009	10/5/2009		16	
147-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #120)	ELLENZWEIG		9/21/2009	10/5/2009		16	
~~149-051200-0~~	~~Gilbane Building Company~~	~~Steel Piece Dwgs - C-Wing (Pack. #122)~~	ELLENZWEIG	E-Copy	9/23/2009	10/7/2009	✓	14	
4 001-142100-0	Gilbane Building Company	• Elevator 1 Shop Drawings Package (Set of 4)	ELLENZWEIG		9/24/2009	10/8/2009		13	
154-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #126)	ELLENZWEIG		9/25/2009	10/9/2009		12	
155-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #127)	ELLENZWEIG		9/29/2009	10/13/2009		8	
034-033000-2	Gilbane Building Company	Rebar Shop Drawings - C Wing Footings - RESUBMIT FOR RECORD	ELLENZWEIG		9/29/2009	10/13/2009		8	
049-220001-0	Gilbane Building Company	Plumbing: Hangers and Accessories Product Data	ELLENZWEIG		9/30/2009	10/14/2009		7	
050-220001-0	Gilbane Building Company	Plumbing: Pipe, Fittings, and Joints Product Data	ELLENZWEIG		9/30/2009	10/14/2009		7	
~~158-051200-0~~	~~Gilbane Building Company~~	~~Steel Piece Dwgs - C-Wing (Pack. #130)~~	ELLENZWEIG	E-Copy	9/30/2009	10/14/2009	✓	7	
001-078413-0	Gilbane Building Company	Plumbing: Penetration Firestopping	ELLENZWEIG		10/1/2009	10/15/2009		6	
035-033000-2	Gilbane Building Company	Rebar Shop Drawings -D, E & F Wing Footings - RESUBMIT FOR RECORD	ELLENZWEIG		10/1/2009	10/15/2009		6	
012-220001-1	Gilbane Building Company	UG Plumbing: Revised Floor Drain Type FD-A	ELLENZWEIG		10/2/2009	10/16/2009		5	
055-260001-0	Gilbane Building Company	Boiler Plant Electrical: Short Circuit and	ELLENZWEIG		10/5/2009	10/19/2009		2	

(23) OVERDUE

Submittal Packages
Summary Log In Review

	Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
			Coordination Study						
	161-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #133)	ELLENZWEIG	10/5/2009	10/19/2009		2	
	162-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #134)	ELLENZWEIG	10/5/2009	10/19/2009		2	
	041-033000-1	Gilbane Building Company	Rebar SD's - Canopy Footings @ K, H/J & G - REVISED	ELLENZWEIG	10/6/2009	10/20/2009		1	
	163-051200-0	Gilbane Building Company	Steel Piece Dwgs - G-Cluster (Pack. #135)	ELLENZWEIG	10/6/2009	10/20/2009		1	
	164-051200-0	Gilbane Building Company	Firetrol Column	ELLENZWEIG	10/6/2009	10/20/2009		1	
5	002-142100-0	Gilbane Building Company	Elevator 2/3 Shop Drawings Package (Set of 5)	ELLENZWEIG	10/6/2009	10/20/2009		1	
	165-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #136)	ELLENZWEIG	10/6/2009	10/20/2009		1	
1	166-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H-Cluster (Pack. #137)	ELLENZWEIG	10/6/2009	10/20/2009		1	
	048-230001-0	Gilbane Building Company	HVAC: Cooling Towers Product Data	ELLENZWEIG	10/7/2009	10/21/2009		0	
	001-329202-0	Gilbane Building Company	SITE: Warm Season Native Grass Record	ELLENZWEIG	10/7/2009	10/21/2009		0	
	043-033000-1	Gilbane Building Company	SOG Rebar Drawings - C, D, E, F Wings & Basement - RESUBMIT FOR RECORD	ELLENZWEIG	10/7/2009	10/21/2009		0	
	052-210001-0	Gilbane Building Company	Fire Protection System Product Data	ELLENZWEIG	10/8/2009	10/22/2009		-1	
	049-230001-0	Gilbane Building Company	HVAC: Centrifugal Water Chillers Product Data	ELLENZWEIG	10/9/2009	10/23/2009		-2	
	050-230001-0	Gilbane Building Company	HVAC: Refrigerant Monitor and SCBA Product Data	ELLENZWEIG	10/9/2009	10/23/2009		-2	
	051-220001-0	Gilbane Building Company	Plumbing: Valve Tags	ELLENZWEIG	10/9/2009	10/23/2009		-2	
	052-220001-0	Gilbane Building Company	Plumbing: Thermometers Product Data	ELLENZWEIG	10/9/2009	10/23/2009		-2	
	002-018113-2	Gilbane Building Company	LEED MRc2.2 Waste Tracking	Symmes Maini & McKee Associates, Inc.	10/9/2009	10/23/2009		-2	
7	167-051200-0	Gilbane Building Company	Steel Piece Dwgs - B-Wing (Pack. #138)	ELLENZWEIG	10/13/2009	10/27/2009		-6	
	051-230001-0	Gilbane Building Company	HVAC: Modular Indoor Air Handling Units: HV1, HV2, HV3 Product Data	ELLENZWEIG	10/13/2009	10/27/2009		-6	
	012-033000-1	Gilbane Building Company	Concrete Hardener	Symmes Maini & McKee Associates, Inc.	10/13/2009	10/27/2009		-6	
2	168-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #139)	ELLENZWEIG	10/14/2009	10/28/2009		-7	
3	169-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H Cluster (Pack.	ELLENZWEIG	10/14/2009	10/28/2009		-7	

OVERDUE

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
		#140)						
170-051200-0	Gilbane Building Company	Steel Piece Dwgs - E-Wing (Pack. #141)	ELLENZWEIG	10/15/2009	10/29/2009		-8	
019-055100-0	Gilbane Building Company	Stair Shop & Field Primer	ELLENZWEIG	10/15/2009	10/29/2009		-8	
014-053100-0	Gilbane Building Company	Decking Primer & Galvanizing Repair Paint	ELLENZWEIG	10/15/2009	10/29/2009		-8	
172-051200-0	Gilbane Building Company	Steel Primer & Galvanizing Repair Paint	ELLENZWEIG	10/15/2009	10/29/2009		-8	
6 173-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #143)	ELLENZWEIG	10/16/2009	10/30/2009		-9	
048-033000-0	Gilbane Building Company	Concrete Reinforcing & Insulation LEED Documentation	Symmes Maini & McKee Associates, Inc.	10/16/2009	10/30/2009		-9	
171-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #142)	ELLENZWEIG	10/16/2009	10/30/2009		-9	
174-051200-0	Gilbane Building Company	Steel Piece Dwgs - G Cluster (Pack. #144)	ELLENZWEIG	10/16/2009	10/30/2009		-9	
8 175-051200-0	Gilbane Building Company	Steel Piece Dwgs - H&J Cluster (Pack. #145)	ELLENZWEIG	10/16/2009	10/30/2009		-9	
176-051200-0	Gilbane Building Company	Steel Piece Dwgs - F - Cluster (Pack. #146)	ELLENZWEIG	10/16/2009	10/30/2009		-9	
001-014010-01	Gilbane Building Company	Bedroom Mock-Up - Adult Bedroom Revised Millwork Mock-Up Shop Drawings	ELLENZWEIG	10/16/2009	10/30/2009		-9	
9 066-051200-1	Gilbane Building Company	Steel Piece Dwgs - A-Wing (Pack. #42)	ELLENZWEIG	10/19/2009	11/2/2009		-12	
052-230001-0	Gilbane Building Company	HVAC: Sheet Metal and Accessories Product Data	ELLENZWEIG	10/19/2009	11/2/2009		-12	
053-230001-0	Gilbane Building Company	HVAC: Fire and Smoke Dampers Product Data	ELLENZWEIG	10/19/2009	11/2/2009		-12	
054-230001-0	Gilbane Building Company	HVAC: Fuel Distribution Pipe Product Data	ELLENZWEIG	10/19/2009	11/2/2009		-12	
055-230001-0	Gilbane Building Company	HVAC: Underground Double Wall Pipe Product Data	ELLENZWEIG	10/19/2009	11/2/2009		-12	
10 178-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H - Cluster (Pack. #148)	ELLENZWEIG	10/20/2009	11/3/2009		-13	
179-051200-0	Gilbane Building Company	Steel Piece Dwgs - C-Wing (Pack. #149)	ELLENZWEIG	10/20/2009	11/3/2009		-13	
001-013300-0	Gilbane Building Company	Submittal Register By Bid Package	ELLENZWEIG	10/20/2009	11/3/2009		-13	
11 177-051200-0	Gilbane Building Company	Steel Piece Dwgs - J&H - Cluster (Pack. #147)	ELLENZWEIG	10/20/2009	11/3/2009		-13	
010-053100-1	Gilbane Building Company	Steel Deck Shop Drawings - D-Wing	ELLENZWEIG	10/20/2009	11/3/2009		-13	
009-053100-1	Gilbane Building Company	Steel Deck Shop Drawings - C-Wing	ELLENZWEIG	10/20/2009	11/3/2009		-13	

Submittal Packages
Summary Log In Review

Number-Rev	From Company	Description	To Company	Sent	Due	Rec'd	Days +/-	Action
180-051200-0	Gilbane Building Company	Steel Piece Dwgs - F-Cluster (Pack. #150)	ELLENZWEIG	10/21/2009	11/4/2009		-14	
181-051200-0	Gilbane Building Company	Steel Piece Dwgs - D-Wing (Pack. #151)	ELLENZWEIG	10/21/2009	11/4/2009		-14	

Number of Submittal Packages in this Project: 65

Appendix C: Two-Week Look Aheads

30 September 2009 Look-Ahead

TWO WEEK LOOK AHEAD

Gilbane

Week ending 10/4/2009

Hospital Site work

- Continue road prep to adolescent entry , paving scheduled for Monday 10/5
- Camp Joy loam and hydroseed
- Start additional drainage work at Hospital Drive

Building

K Wing
- Set up crane and start steel erection of 1st floor columns and 2nd floor framing

A Wing
- Ready for steel

B Wing
- Ready for steel

C Wing
- Complete underground plumbing and electrical and inspect

D Wing
- Complete foundations, wall prep for waterproofing

E Wing
- Complete waterproofing and drainage board
- Start backfill

F Wing
- Continue Form,waterproof,rebar and pour footings and walls

HJ Basement
- Form,rebar and pour elevator # 3 and waterproof

FG Basement
- Continue FR&P interior footings and backfill of footings

Retaining Walls/Loading Dock
- Complete waterproofing , drainage mat and backfill at west retaining wall
- Continue waterproofing at west side loading dock

Week ending 10/11/2009

Hospital Site Work
- Paving at adolescent entry
- Continue additional drainage at Hospital Drive

Building:

K wing:
- Steel erection 2nd and 3rd floor framing

A Wing: Ready for steel

B Wing: Ready for steel

1

C Wing

- Backfill utilities and fine grading for SOG

D Wing

- Complete waterproofing and start backfill

E Wing

- Complete backfill and start underground plumbing and electric

F Wing

- Continue foundations

HJ Basement

- Complete underground utilities at deep basement

FG Basement

- Continue U/G plumbing and electrical

Retaining Walls /Loading Dock

- Start patching of retaining walls upon approval of patching
- Backfill west side loading dock

TWO WEEK LOOK AHEAD

Gilbane

Week ending 10/25/2009

Hospital Site Work

- Install berm at Hospital drive
- Clean out drain line at Storehouse

Building

K Wing

- Continue steel erection 4th and 5th floor framing, continue detailing and decking

A Wing

- Mobilize for steel erection and set 1st floor columns and 2nd floor framing

B Wing

- Ready for steel, start erection 11/30

C Wing

- Complete prep for SOG, tentative pour date 10/21

D Wing

- Complete waterproofing and protection board walls and start backfill

E Wing

- Complete backfill and trenching for U/G plumbing
- Start U/G plumbing and electrical

F Wing

- Complete foundation prep for waterproofing

HJ Basement

- Complete backfill and grade for slab
- Waterproof areaways

FG Basement

- Complete U/G plumbing and electrical and inspect

Retaining Walls/Loading Dock

- Continue patching at retaining walls

Week ending 11/01/2009

Building:

K wing:

- Continue detailing,decking and shooting studs
- Start install of stairs # 1&2

A Wing:

- 3rd and 4th floor framing ,start detailing

B Wing: Ready for steel, start erection 11/30
C Wing: Ready for steel, erection date 2/1/10
D Wing

1

TWO WEEK LOOK AHEAD

Gilbane

Week ending 10/25/2009

Hospital Site Work

- Install berm at Hospital drive
- Clean out drain line at Storehouse

Building

K Wing

- Continue steel erection 4th and 5th floor framing, continue detailing and decking

A Wing

- Mobilize for steel erection and set 1st floor columns and 2nd floor framing

B Wing

- Ready for steel, start erection 11/30

C Wing

- Complete prep for SOG, tentative pour date 10/21

D Wing

- Complete waterproofing and protection board walls and start backfill

E Wing

- Complete backfill and trenching for U/G plumbing
- Start U/G plumbing and electrical

F Wing

- Complete foundation prep for waterproofing

HJ Basement

- Complete backfill and grade for slab
- Waterproof areaways

FG Basement

- Complete U/G plumbing and electrical and inspect

Retaining Walls/Loading Dock

- Continue patching at retaining walls

Week ending 11/01/2009

Building:

K wing:

- Continue detailing,decking and shooting studs
- Start install of stairs # 1&2

A Wing:

- 3rd and 4th floor framing ,start detailing

B Wing: Ready for steel, start erection 11/30
C Wing: Ready for steel, erection date 2/1/10
D Wing

Appendix D: Owner – Construction Manager Agreement

Document ID: _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Contractor's DCAM Certification Number: _ _ -- _ _ _ _

Contractor's Vendor Code Number: _ _ _ _ _ _ _ _ _ _ _ _ _ _

COMMONWEALTH OF MASSACHUSETTS
CONSTRUCTION CONTRACT FOR CONSTRUCTION MANAGER AT RISK SERVICES

OWNER - CONSTRUCTION MANAGER AGREEMENT

Awarding Authority: _____
Department Code: _ _ _

This agreement ("Contract") is made as of the ____ day of _____, 20____, by and between the Commonwealth of Massachusetts acting by and through the Awarding Authority identified above with a principal place of business at

_____,

and_____,

a _____ with a principal place of business at

_____,

_____, hereinafter called the "Construction Manager or CM".

The terms used in this Owner - Construction Manager Agreement, which are defined in the General Conditions of the Contract shall have the meanings designated therein.

Preliminary Statement

A. Pursuant to M.G.L. c. 149A the Commonwealth of Massachusetts by and through its Division of Capital Asset Management (DCAM) is undertaking the construction of the New DMH Psychiatric Facility ("the Project").
B. The Construction Manager shall be liable to DCAM for all of the obligations, responsibilities and liabilities of the Construction Manager under this Contract.
C. DCAM has engaged Ellenzweig Associates, Inc. (the "Designer") under a separate agreement to provide design services for the Project.

NOW, THEREFORE, in consideration of the mutual agreements and obligations of the parties set forth below, DCAM and the Construction Manager do hereby agree as follows:

Article 1. The Work.

1.1 The Construction Manager's Responsibilities. The CM shall perform the Work as required by the Contract Documents to construct Mass. State Project No. DMH 0501, DC1, New DMH Psychiatric Facility.

1.2 Site. The Site is defined in Article I of the General Conditions.

1.2.1 Site Inspection. By executing this Agreement, the CM acknowledges that it has visited the Site and has learned as much about the Site as may reasonably learned from such an inspection. No information which would reasonably have been obtained by such a site inspection may serve as the basis for any change order proposal or claim for additional costs and/or additional time.

1.2.2 Site Conditions. Information about soil and other subsurface conditions at the Site are provided in Specifications of the Request for Proposals of this Agreement. Neither DCAM nor the Designer represents that such information is complete, accurate, or an approximate indication of subsurface conditions. No change order proposal or claim for additional costs and/or additional time resulting from the CM's reliance on such information shall be allowed except as expressly provided in the Contract Documents.

1.2.3 Site Testing By CM. Prior to the commencement of the deep and/or shallow foundation portions of the Work, the CM, if directed by DCAM, or if it elects at its own discretion, shall conduct further testing of the subsurface conditions at the Site. If such testing is performed at the direction of DCAM, or to the extent that the CM demonstrates to DCAM that further testing as proposed by the CM is likely to significantly reduce differing site condition and other costs for which DCAM may be responsible under the Contract, and DCAM approves such testing, the costs of such testing shall be paid by DCAM.

Article 2. The Contract Documents.

2.1 Contract Documents. The following documents form the Contract, are incorporated by reference herein, and are referred to as the "Contract Documents:"

-The Request for Proposals for Construction Management Services for the new DMH Psychiatric Facility – Central Region, Worcester, Massachusetts **as modified by Addenda Nos._____Dated_____, 20____.**

-The Construction Manager's Proposal

-The Owner – Construction Manager Agreement including amendments and negotiated terms

-The General Conditions of the Contract

-The Supplemental General Conditions of the Contract (Division 1)

-The Plans and Specifications prepared by the Designer, including Addenda

-All Approved Change Orders/Contract Modifications issued after execution of this Owner - Construction Manager Agreement

Article 3. Relationship of the Parties.

3.1 CM's Obligation. The CM accepts the relationship of trust and confidence between DCAM and the CM established by this Agreement and covenants with DCAM to cooperate at all times with DCAM, the Designer and any other consultants or project representatives engaged or employed by DCAM, and to utilize the CM's best skill, efforts and judgment in furthering the interests of DCAM; to furnish efficient business administration and supervision; to furnish at all times an adequate supply of workers and materials; and, consistent with the requirements of the Contract Documents, to perform the Work in the best way and most expeditious and economical manner consistent with the interests of DCAM and to make every effort to achieve time savings and construction efficiencies with respect to the Work. The CM, in performing its services under this Agreement, is an independent contractor and is not an agent or employee of, or a joint venturer with, DCAM. The CM shall endeavor to promote harmony and cooperation among DCAM, the Designer, the CM, Subcontractors, separate contractors and other persons or entities engaged by DCAM or otherwise employed in connection with the Project, as well as other public agencies having jurisdiction with respect to the Project. DCAM agrees to use its best efforts to enable the CM to perform the Work in an expeditious manner by furnishing on a timely basis information required by the CM and making payments to the CM in accordance with the requirements of the Contract Documents.

3.2 Standard of Performance. The CM represents that it is experienced and skilled in construction of projects of the type, magnitude and complexity described in the Contract Documents, that it is familiar with the special problems and requirements of construction of the type required for the Project and in the location of the Site, and that it will furnish a complete and fully operable Project as indicated by and reasonably inferable from the Contract Documents.

Article 4. Contract Time.

4.1 Commencement Date. The CM shall begin preconstruction and construction phase services pursuant to the terms and conditions included in written Notices to Proceed ("NTP") issued by DCAM.

4.1.1 Preconstruction Services. The NTP for preconstruction services shall be issued within a reasonable time following execution of the Contract. It may, in DCAM's discretion, instruct the CM to begin only certain portions of the preconstruction services.

4.1.2 Construction Services. The NTP for construction services shall be issued within a reasonable time following the execution of the GMP Amendment as defined in Paragraph 6.7.2, provided that, in DCAM's discretion, it may elect to issue such NTP prior to the execution of the GMP Amendment. If the NTP is issued prior to the execution of the GMP Amendment, DCAM may, in its discretion, limit the scope of the NTP in whatever manner it deems appropriate until the execution of the GMP Amendment or a reasonable period following such execution, at which time, such limitations, if any, shall be rescinded.

4.2 Substantial and Final Completion. The CM shall achieve Substantial Completion of the entire Work, no later than 1180 calendar days after the Notice to Proceed for Construction of the new Psychiatric Hospital, subject to any adjustments in the Contract Time approved by DCAM in accordance with the Contract Documents (the "Substantial Completion Date"). The CM shall achieve Final Completion of the Work, no later than 45 days after substantial completion of the entire work, subject to adjustments of the Contract Time approved by DCAM in accordance with the Contract Documents (the "Final Completion Date"). The schedule for the new Boiler Plants for the existing Bryan and Brudnick buildings will be determined by the CM. The CM must obtain the Certificate of Use and Occupancy for the new Boiler Plants before the demolition of the existing boiler plant starts. The CM will determine with DCAM's approval, the optimal timing of the Notice to Proceed for Construction, the duration in calendar days, and the Substantial Completion Date for the new boiler plants.

4.3 Time is of the Essence. The CM acknowledges that the times of Substantial Completion of the Work, Final Completion of the Work, any other milestones for completion of portions of construction, times for submitting proposals for contract modifications, and other times set forth in the Contract Documents are essential conditions of this Agreement.

4.4 Liquidated Damages.

4.4.1 If the CM shall neglect, fail or refuse to achieve Substantial Completion of the Work within the Contract Time, as adjusted in accordance with the provisions of the Contract Documents, the CM and the CM's surety agree, as a part of the consideration for the execution of this Contract by DCAM, to pay DCAM the amounts set forth in this Subsection 4.4.1 below, not as a penalty, but as liquidated damages to cover certain losses, expenses and damages of DCAM for such breach of contract as herein set forth. The CM acknowledges that delay in Substantial Completion of the Project will cause disruption of DCAM's operations and those of

the Department of Mental Health, the agency of the Commonwealth that will use the Project. Such disruptions, include without limitation, loss of productivity and efficiency and duplication of effort of the Department of Mental Health and of employees and contractors engaged by the Department of Mental Health and DCAM for operation of the completed facility. DCAM and the Department of Mental Health will incur other direct administrative, professional, rental, storage, moving, transportation and other costs in the event of such delay. Delay in Substantial Completion will also require DCAM to incur additional costs for compensation to the Designer and other consultants or contractors for extended or additional work on the Project. In light of the costs, damages, losses, risks and liabilities described above, the parties have agreed upon the liquidated damages stated below. Such damages have been fixed and agreed upon because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages DCAM and the Commonwealth would in such event sustain, and said amounts may be retained by DCAM on or after the scheduled date of Substantial Completion from current progress payments or any other amounts owing to the CM. The agreed liquidated damages amounts are $5,000 per day for each calendar day of delay in achieving Substantial Completion.

4.4.2 Except as otherwise expressly provided, none of the following shall constitute a waiver of the CM's or its surety's obligations to pay liquidated damages or any portion thereof:

(a) Acceptance of any portion of the Work or payment to the CM or its surety therefore;
(b) Completion of a portion of the Work or the use or occupancy thereof by DCAM or others;
(c) DCAM's requiring or allowing the CM or its surety to complete the Work.

4.4.3 Substantial Completion. As used in this Article, the term Substantial Completion shall mean Substantial Completion as defined in the General Conditions of the Contract.

Article 5. Construction Manager's Services.

5.1 Preconstruction Services. Commencing upon the date of this Agreement, unless otherwise directed in a notice to proceed issued by DCAM, the CM shall perform preconstruction services as provided in this Article and elsewhere in the Contract Documents.

5.1.1 Construction Planning. The CM shall attend regular Project meetings with DCAM and the Designer. If requested by DCAM, the CM shall schedule and lead such meetings and keep minutes of such meetings. The CM shall consult with DCAM and the Designer concerning planning for construction of the Project. The CM shall make recommendations as to the purchase and assist in expediting the procurement of long lead items, which are required for the Project to ensure their delivery by the required dates. The CM shall review and, if appropriate, make recommendations with respect to the phasing of the Work, and shall otherwise advise and assist DCAM and the Designer with respect to the division of the Work to facilitate the development of bid and proposal packages, bidding and awarding of subcontracts, allowing for scheduled sequential bid and proposal packages and taking into consideration such factors as economies, time of performance, availability of labor and materials, and provisions for temporary facilities.

5.2 Preconstruction and Construction Services. The CM shall perform its preconstruction and construction services, responsibilities and obligations concurrently as necessary during the term of this Agreement as directed by DCAM.

5.2.1 Design Review. The CM shall review, on a continuous basis, development of the Drawings, Specifications and other design documents produced by the Designer. The design reviews shall be performed with a group of Architects and Engineers, who are either employees of the CM or independent consultants under contract with the CM. Review of the documents is to discover inconsistencies, errors and omissions between and within design disciplines. The CM shall consult with DCAM and the Designer regarding the selection of materials, building systems and equipment, and shall recommend alternative solutions whenever design details affect construction feasibility, schedules, cost or quality (without, however, assuming the Designer's responsibility for design) and shall provide other value engineering services to DCAM. Without limitation, the CM shall review the design documents for clarity, consistency, constructability, maintainability/operability and coordination among the trades, coordination between the specifications and drawings, compliance with M.G.L. c.149A for procurement, installation and construction, and sequence of construction, including recommendations designed to minimize adverse affects of labor or material shortages. The CM reviews shall be performed by the project team members as approved by DCAM. The reviews shall be provided in writing with detailed notations on the drawings and specifications and coordinated with a detailed spreadsheet of the notations and recommended solutions in order to track the issues to final resolution. The CM shall attend meetings as necessary with the Designer and DCAM in order to discuss and resolve all issues.

5.2.2 Master Development Schedule. The CM shall assist DCAM to meet any scheduling responsibilities assigned by DCAM. The CM shall also coordinate and integrate its Project schedules with the services and activities of DCAM and other parties. The requirements provided herein are in addition to and not in limitation of the CM's obligation to prepare and maintain the Baseline Critical Path Method (CPM) Schedule and other schedules as provided in the Contract Documents.

5.2.3 Cost Estimates.

(a.) The study for the Project will be certified in July 2007. It is anticipated that the schematic drawings will be 50% complete in September of 2007, these documents will be the basis for the first CM detailed estimate. The CM shall prepare for the review of the Designer and approval of DCAM, three different fully detailed estimates of the Construction Cost of the Project: one each during the schematic phase, the design development phase and the construction documents phase. Each detailed estimate must be submitted with supporting data including but not limited to unit costs of all materials, equipment and labor hours required to complete the work of all sections of the specification. The CM shall prepare for the review of the Designer and approval of DCAM, one update estimate for each design phase following the detailed estimate of the Construction Cost of the Project. The update estimates will be provided at the at the completion of the schematic phase, the design development phase and the construction

documents phase As used herein, "Construction Cost" shall mean the total cost or, to the extent the Project is not completed, the total estimated cost of constructing the Project, including the Hard Cost of the Work, the General Conditions Payment, and the CM Fee. The Construction Cost does not include costs of land acquisition, existing building demolition costs, financing costs, or design fees. The CM shall provide value engineering analysis and recommendations during design and construction as directed and in order to meet the requirements of the project budget.

(b.) DCAM may, but shall not be required to, arrange for periodic estimates of Construction Cost to be performed by other consultants or staff of DCAM. The CM shall work in good faith and in cooperation and coordination with the Designer, and any other consultants or staff of DCAM involved in preparing estimates of Construction Cost, in order to reconcile any differences between cost estimates prepared by the CM and such parties, to clarify assumptions upon which cost estimates are based, and otherwise to address any concerns or questions with respect to such cost estimates raised by the Designer, DCAM or such other consultants. If in any case the agreed-upon, reconciled estimate of Construction Cost exceeds the Construction Budget established by DCAM, the CM shall advise and cooperate with DCAM and the Designer in identifying, specifying and recommending changes in, or additional specification of materials, equipment, component systems and types of construction, or other adjustments in the scope or quality of the Project (collectively, "Cost Reduction Alternatives"), including contingencies or alternative bid items, so as to facilitate revision of the design of the Project to reduce the Construction Cost so as to comply with the Construction Budget. Implementation of any Cost Reduction Alternative shall be subject to the approval of DCAM, and DCAM shall have the right, in its sole discretion, to choose which of the Cost Reduction Alternatives developed by the parties shall be implemented, provided, however, that the Designer shall not be required to incorporate Cost Reduction Alternatives into the design of the Project if doing so would result in a violation of Applicable Laws.

(c.) The process and responsibilities of the CM described in this Section 5 shall also apply to any separate cost limits within the Construction Budget that have been established by DCAM for certain phases, components or elements of the Work.

5.2.4 Permits and Approvals. Consistent with the General Conditions, the CM shall assist DCAM and the Designer in identifying all governmental permits, user fees, approvals and licenses of any kind which must be obtained and be met in connection with the construction, use and occupancy of the Project ("Permits and Approvals"). The CM shall be responsible for obtaining all Permits, user fees and Approvals. The CM shall perform the Work in accordance with all conditions, mitigation measures and other requirements of all Permits and Approvals. The CM shall obtain and pay for all permits, inspections and certificates of occupancy for the Project. All applications, requests, appeals, filings and other documents, materials and information prepared by the CM to be submitted to governmental authorities in connection with the Permits and Approvals shall be subject to the prior approval of DCAM, and shall be delivered to DCAM sufficiently in advance of the time of their proposed filing or submission so as to permit a reasonable period for the review and comment of DCAM and its consultants. If

requested by DCAM at any time, any such documents or materials to be used in connection with the Permits and Approvals may be prepared by DCAM or other persons designated by DCAM, and DCAM or other persons designated by DCAM may appear on behalf of DCAM at any hearing, presentation or conference. In addition, the CM shall promptly complete and provide such other documentation as may be required by DCAM, other agencies of the Commonwealth of Massachusetts or such other parties as DCAM may indicate, provided that if the CM believes in any instance that compliance with such requirement materially modifies, enlarges or abridges the CM's duties, obligations or rights under the Contract Documents, the CM may submit a proposal for an increase in the Contract Price and/or the Contract Time in accordance with the applicable provisions of the Contract Documents.

5.2.5 Monthly Progress Reports. On the fifth (5th) day of each month, or on such other day established by DCAM, the CM shall submit to DCAM the documents listed in this paragraph for the preceding month, in form and substance acceptable to DCAM, containing, without limitation, the following information:

(a) Project status overview including, without limitation, the following:
  (i) Progress report by division of work or area;
  (ii) Quality control/quality assurance report;
  (iii) Safety and loss control report;
  (iv) MBE/WBE and workforce participation status;

(b) Procurement status report, including, without limitation, a status of MBE/WBE participation;

(c) Project schedule update including, without limitation, a Summary Schedule (progress bar chart) from the CPM;

(d) Project cost update, including, without limitation, the following:
  (i) Cost summary;
  (ii) Cash flow update;
  (iii) List of outstanding Change Orders and Change Directives;
  (iv) List of potential changes and outstanding Change Proposal requests and CM Change Requests; and

(e) Such other reports, logs or documents as DCAM may reasonably require for the management of the Project.

5.2.6 Executive Summary Progress Report. On the fifteenth (15th) day of each month, or such other day established by DCAM, the CM shall submit to DCAM an Executive Summary Progress Report in form and content satisfactory to DCAM. Such Report shall include but not be limited to a summary of the important information from the submittals listed in Paragraph 5.2.5 and a discussion of the important issues facing the Project as of the date of the Report's submittal.

5.2.7 Subcontracts. Unless otherwise specifically approved by DCAM, all Work shall be performed by the CM pursuant to Subcontracts awarded by the CM in accordance with the General Conditions of the Contract, Appendix C: Procedures for Award of Subcontracts.

(a) The CM shall consult with DCAM with respect to proposed bidding and proposal forms and procedures for all subcontracts. The CM understands and agrees that DCAM may participate in negotiations with Subcontractors and that DCAM and its representatives shall have access to any documents submitted by all Trade Contractors and Other Subcontractors to the CM, for review as to compliance with bidding and proposal procedures and other requirements of the Contract Documents. No Subcontract or other agreement between the CM and any third party for the furnishing or supply of any labor, materials or equipment in the performance of the Work shall be entered into without DCAM's prior written approval. DCAM shall respond promptly to any request for approval of a Subcontract. Standard forms of subcontract agreement for all Trade Contractors and Other Subcontractors are attached as Appendix D to the General Conditions of the Contract. No material revisions shall be made to any such Subcontract or other agreement approved by DCAM without the prior approval of DCAM. Copies of all executed Subcontracts shall be provided to DCAM promptly.

(b) Purchases from Affiliated Entities. Except in the event of an emergency as provided herein, neither the CM nor any Subcontractor shall enter into any subcontract, contract, agreement, purchase order, or other arrangement (collectively, an "Arrangement") for the performance of any portion of the Work or the furnishing of any materials, services or equipment in connection therewith with any party or entity if such party or entity is an Affiliated Entity (as defined below), unless such Arrangement has been approved by DCAM, after full disclosure in writing by the CM and Subcontractor, if applicable, to DCAM of such affiliation and all details relating to the proposed Arrangement. The term "Affiliated Entity" means any entity related to or affiliated with the CM and/or any Subcontractor, as applicable, or with respect to which the CM and/or any Subcontractor, as applicable, has direct or indirect ownership or control, including, without limitation, any entity owned in whole or in part by the CM and/or any Subcontractor, as applicable; any holder of the issued and outstanding shares of, or the holder of any interest in, the CM and/or Subcontractor, as applicable; any entity in which any officer, director, employee, partner or shareholder (or member of the family of any of the foregoing persons) of the CM and/or any Subcontractor, as applicable, has a direct or indirect interest which interest includes, but is not limited to, that of a partner, employee, agent or shareholder.

5.3 Construction Services. Commencing upon the date of the Notice to Proceed with Construction, unless otherwise directed by DCAM, the CM shall perform Construction Services as provided in these paragraphs and elsewhere in the Contract Documents.

5.3.1 Construction Cost Monitoring. The CM shall provide a system of Project cost monitoring and reporting, and shall develop cash flow reports and forecasts in such format as approved by DCAM to coordinate with the cost loaded CPM. The CM shall identify variances between actual costs and its estimated costs and shall immediately advise DCAM whenever

projected costs exceed previous reports. Such reports and other information shall be included in the Monthly Progress Reports to be submitted to DCAM.

5.3.2 Quality Assurance/Quality Control. The CM shall prepare and submit to DCAM for its approval a Quality Assurance/Quality Control program. Such program shall provide that the CM shall be responsible for insuring that adequate quality assurance and quality control programs are developed, implemented and enforced by the CM's staff and all Subcontractors, including an experienced full-time quality manager, employed by the CM, whose sole responsibility shall be quality assurance and quality control and shall be stationed at the Project Site and who shall be responsible for reviewing and coordinating the quality control activities of all Subcontractors and monitoring the implementation and enforcement thereof in connection with all aspects of the Work. The quality manager shall report to DCAM and it's representatives on a weekly basis the status of the program for each trade, and any deficiencies, and a recommended plan for corrective action.

5.3.3 Prevailing Wage Work under this project is subject to the prevailing wage laws M.G.L.c. 149, s.26-27 H. The Schedule for prevailing wages is included in the RFP and must be completed and signed by each Offeror.

5.3.4 Criminal Offender Record Information Check All employees and/or prospective employee's of the CM, Trade Contractors and Subcontractors working on this project may be subject to a CORI (Criminal Offender Record Information) check pursuant to chapter 6 of the Massachusetts General Laws.

5.3.5 CM Responsibility for Managing Construction The CM shall be responsible for managing, coordinating, and supervising all aspects of the Work as described in this Agreement, the General Conditions, and all other Contract Documents.

5.3.6 Conditions Where CM May Perform Work. The CM may submit its qualifications to bid on trade contract or subcontract work in accordance with the provisions of the Trade Contractor Section Process set forth in the General Condition; provided that the CM firm customarily performs the work for which it submits qualifications; provided further, that the CM firm must perform the work with employees on its own payroll; and provided further, that the CM firm meets all the requirements of the selection process. The CM firm may also self perform work included in the Supplementary General Conditions (also known as "Division 1") made necessary by an emergency to protect life or to prevent serious property damage pursuant to an advance written approval by DCAM where possible. Where advance written approval is not possible due to an extreme emergency, written approval must be obtained from DCAM as soon as possible after work begins to alleviate the emergency.

5.4 General Requirements for Preconstruction and Construction Services

5.4.1 Design Related. The recommendations and advice of the CM concerning design modifications or alternatives shall be subject to the review and approval of DCAM. If the CM recognizes or discovers that any portion of the Drawings and Specifications is at variance with

Applicable Laws, the CM shall promptly notify the Designer and DCAM in writing, and if the CM fails to promptly so notify the Designer and DCAM, having recognized or discovered such variance, the CM shall be liable for an equitable portion of any loss, cost or damage sustained by DCAM on account of such variance.

5.4.2 CM's Organization and Staff. The CM shall establish an organization and lines of communication required to carry out the requirements of this Agreement in order to organize and direct the complete construction of the Project. A listing of the CM's key staff is set forth as **Exhibit GC** attached hereto and incorporated herein. All key staff shall be available for and actively participate in the performance of the services provided under the Contract Documents unless such failure is for good cause beyond the control of the CM. No substitution of any assigned and approved key staff shall be made by the CM without the prior written consent of DCAM in its sole discretion. Before any such substitution is made, the CM shall submit to DCAM the qualifications of any proposed replacement. The removal or replacement, without DCAM's consent, of any of the key staff listed in **Exhibit GC**, other than as a result of retirement, disability, death or bona fide termination of employment, shall constitute a material breach of this Agreement and DCAM reserves the right to terminate the contract and assess damages. Within thirty (30) days after execution of this Agreement, the CM shall furnish to DCAM a detailed organizational chart (the "Organizational Chart") for approval by DCAM. Such chart shall reflect the same persons as set forth in the Proposal unless otherwise approved by DCAM. The Organization Chart shall expand upon and update the General Conditions Cost Administrative Breakdown set forth in Exhibit GC, and shall identify each staff position, the anticipated start date and end date for each identified staff person and the estimated personnel cost on account of each such staff person. Upon approval by DCAM, which approval shall not be unreasonably withheld, the Organizational Chart shall supersede and replace the General Conditions Cost Administrative Breakdown set forth on Exhibit GC. The CM's management and field supervisory staffing shall be in accordance with the approved Organizational Chart. All modifications to the Organizational Chart after initial approval by DCAM must be approved by DCAM, such approval not to be unreasonably withheld. DCAM may require replacement of any member of the CM's staff with or without cause, and may require increased levels of staffing by the CM, at no increase in the Contract Price, if necessary to achieve proper production, management, administration or superintendence, or if otherwise necessary to maintain progress in accordance with the Project Schedule. By executing this Agreement, the CM certifies that the CM and each member of its key staff comply with all licensing, registration and other requirements applicable to the CM and the performance of its services hereunder pursuant to Applicable Laws. Furthermore, DCAM shall have the right to require the CM and any Subcontractor to replace any on-site personnel who it reasonably finds objectionable, with other personnel approved by DCAM.

Article 6. Contract Price

6.1 Contract Price.

6.1.1 DCAM shall pay to the CM in current funds for the CM's proper performance of the Contract and completion of the Work, the "Contract Price" consisting of the General Conditions

Payment, as defined in Section 6.2, the Hard Cost of the Work, as defined in Article 7, and the CM Fee as defined in Section 6.3. The total payments to the CM (the Contract Price) shall not exceed the Guaranteed Maximum Price agreed to by the Parties, subject to authorized additions and deductions as provided in the Contract Documents

6.1.2 For Change Orders or Contract Modifications authorized by DCAM pursuant to the Contract Documents, the Contract Price shall be adjusted as provided in Section 6.4 below and Article VII of the General Conditions and not otherwise. After agreement by DCAM and the CM on a guaranteed maximum price for construction of the Work (the "GMP") and execution of the GMP Amendment, as provided in Section 6.7, any increase or decrease in the Contract Price approved by DCAM by execution of a Change Order shall increase or decrease the GMP, accordingly.

6.2 General Conditions Payment.

6.2.1 In consideration of the performance by the CM of the work described in the Contract Documents DCAM shall pay to the Construction Manager, as full and complete compensation, except for allowances, to the Construction Manager for all General Conditions costs incurred in the performance of such work an amount equal to the payment specified in Section A of **Exhibit GC** ("General Conditions Costs"), subject to Subsection, 6.2.5 below. For purposes of payment the General Conditions Costs shall be divided into Preconstruction General Conditions Costs and Construction General Conditions Costs as specified in Section A of **Exhibit GC**. The total dollar values for Preconstruction and Construction General Conditions Costs set forth in Section A of **Exhibit GC** represent the maximum amount to be paid to the CM for all Preconstruction and Construction General Conditions Costs. The provisions in the Contract Documents concerning the anticipated schedule for the Project and the durations of the Preconstruction Period, and Construction Period, are not for the purpose of describing the compensation for General Conditions Costs and do not extend or authorize any extension of the Contract Substantial Completion date and/or the Final Completion date. The CM may make a claim for extension of the Contract Substantial Completion date and/or the Final Completion date only as provided in, and subject to the limitations specified in, the Contract Documents.

6.2.2 Preconstruction. From the commencement of the Preconstruction Period through the end of the Preconstruction Period, monthly payments on account of the General Conditions Costs shall be made. The amount of the monthly payments shall be determined by applying the percentage of completion of the Preconstruction General Conditions work set forth in Exhibit GC as approved by DCAM on the Schedule of Values, and deducting from such value any amounts previously paid to the CM on account of Preconstruction General Conditions Costs. For each month or partial month during the period from the commencement of the Preconstruction Period, through the period when Preconstruction services end, the CM shall submit a monthly invoice to DCAM requesting payment of the Preconstruction General Conditions Costs. Payment shall be processed in accordance with Article VIII of the General Conditions of the Contract.

6.2.3 Construction. During the Construction Period monthly payments to the CM on account of General Conditions Costs shall be made. The amount of the monthly payments shall be

determined by applying the percentage of the Hard Cost of the Work approved for payment by DCAM to the total amount of the Construction Period General Conditions Costs set forth in Exhibit GC, and deducting from such value any amounts previously paid to the CM on account of Construction Period General Conditions Costs. For each month or partial month during the period from the commencement of the Construction Period, through Final Completion, the CM shall submit a monthly invoice to DCAM requesting payment of the Construction Period General Conditions Costs. Payment shall be processed in accordance with the provisions of Article VIII of the General Conditions of the Contract.

6.2.4 Either DCAM, or the Construction Manager, subject to the approval of DCAM, may request that one or more specific items included in General Conditions Costs be included in a Subcontract bid or proposal package or otherwise separately procured. Whether included in a Trade Contractor bid package or Subcontractor proposal or otherwise separately procured, each such item shall be bid as an alternate and, if accepted by DCAM, the cost of such item shall be considered part of the Hard Cost of the Work, and the amount of the General Conditions Payment due hereunder shall be reduced by the total cost of such item.

6.2.5 If the Construction Manager performs additional work of the type described in Exhibit GC under a Change Order approved by DCAM, compensation, if any, due to the Construction Manager shall be computed in accordance with Section 6.4, below, and Article VII of the General Conditions of the Contract; otherwise, DCAM shall have no obligation to compensate the Construction Manager on account of the cost of the work for any amounts exceeding the total payments as set forth in Section A in **Exhibit GC.**

6.2.6 The General Conditions Costs for payment bond, performance bond and builders risk Insurance that appear in Section C.4 of Exhibit GC shall be adjusted up or down by change order, based on the difference between the GMP and the estimated Project amount carried in Exhibit GC. There will be no CM Fee attributable to any such adjustment.

6.3 Construction Manager's Fee.

6.3.1 Preconstruction. In further consideration of the performance of the Contract by the CM, DCAM shall pay to the CM a fee associated with preconstruction services as identified in Section A of Exhibit GC (the "CM Preconstruction Fee") in monthly payments. The amount of the monthly payments shall be determined by applying the percentage of completion of the Preconstruction General Conditions work as approved by DCAM on the Schedule of Values, and deducting from such value any amounts previously paid to the CM on account of the CM Preconstruction Fee. For each month or partial month during the period from the commencement of the Preconstruction Period, through the end of the period when preconstruction services end, the CM shall submit a monthly invoice to DCAM requesting payment of the CM Preconstruction Fee. Payment shall be processed in accordance with Article VIII of the General Conditions of the Contract.

6.3.2 Construction. In further consideration of the performance of the Contract by the CM, DCAM shall pay to the CM a fee associated with construction services as identified in Section A of Exhibit GC (the "CM Construction Fee") in monthly payments. The amount of the monthly

payments shall be determined by applying the percentage of the Hard Cost of the Work approved for payment by DCAM, to the total amount of the CM Construction Fee set forth in Exhibit GC and deducting from such value any amounts previously paid to the CM on account of the CM Construction Fee.

6.4 Changes in the Work. DCAM may make changes in the Work when DCAM considers it to be necessary or desirable, as further provided in Article VII of the General Conditions of the Contract.

6.5 Intentionally Omitted.

6.6 Retainage. DCAM shall retain five percent (5%) from the amount approved for payment in the monthly Applications for Payment, as provided in the General Conditions of the Contract. Such retainage shall be applied with respect to all amounts payable under the Application for Payment, including the Hard Cost of the Work, the CM Fee and the General Conditions Payment. Retainage shall be paid as provided in the General Conditions.

6.7 Guaranteed Maximum Price.

6.7.1 On the date agreed upon by DCAM and the CM, or, if no such date is agreed upon, on the date established by DCAM by written notice to the CM, which date shall be at least 20 days after the date of such written notice, the CM shall submit to DCAM a proposed GMP, which shall be the sum of the estimated total Hard Cost of the Work, the Construction Contingency (hereafter defined), total payment for General Conditions Costs, and the CM Fee. The CM shall include with the GMP proposal a written statement of its basis in form and substance satisfactory to DCAM, which shall include at least:

(a) a list of the Project design documents upon which the GMP proposal is based;

(b) a list of allowances and a statement of their basis;

(c) a list of any assumptions, qualifications and clarifications made by the CM in the preparation of the GMP proposal to supplement the information contained in the Project design documents;

(d) a statement that the proposed GMP is based on the Baseline CPM Schedule and the Substantial Completion Date specified in this Agreement;

(e) the proposed GMP, including a detailed statement of the actual and estimated Hard Cost of the Work organized by CSI (Construction Specification Institute) format with quantities, units, and unit rates, Preconstruction and Construction General Conditions Costs, allowances, Construction Contingency, Preconstruction and Construction CM Fee and other items that comprise the GMP;

(f) a schedule of applicable alternate prices;

(g) a schedule of applicable unit prices; and

(h) the time limit for acceptance of the GMP proposal (which shall not be less than 90 days).

6.7.2 The CM shall meet with DCAM and the Designer to review the GMP proposal and the written statement of its basis. In the event that DCAM or the Designer discover any inconsistencies or inaccuracies in the GMP proposal and accompanying information, they shall promptly notify the CM, which shall make appropriate revisions thereto. DCAM may elect in its sole discretion to accept or not to accept the CM's GMP proposal. The CM understands that any agreement on a GMP shall be subject to approval of DCAM. Prior to DCAM's acceptance of the CM's GMP proposal, the CM shall not incur any cost to be compensated by DCAM except as provided in this Contract or as DCAM may specifically authorize in writing. If DCAM accepts the CM's GMP proposal, DCAM and CM shall execute and deliver within fifteen (15) days after such acceptance an amendment to this Agreement, in form acceptable to DCAM and the CM, incorporating the items listed in Subparagraph 6.7.1, above, subject to any modifications agreed upon by the parties (the "GMP Amendment"). The CM shall execute and deliver together with the GMP Amendment, performance and payment (labor and materials) bonds in the form provided by DCAM, executed by a surety licensed by the Commonwealth of Massachusetts Division of Insurance. Each such bond shall be in the amount of the GMP. These bonds shall be substituted for the bonds obtained from the CM at the time of signing the contract, which said bonds shall be returned to the CM by DCAM. If DCAM does not accept the CM's GMP proposal, DCAM may elect to solicit bids or proposals for the construction of the Project from other contractors, using any solicitation method or methods chosen by DCAM, consistent with Applicable Laws and procedures, or, if DCAM determines that it is in its best interest to do so, DCAM may enter into negotiations for a contract with one or more of the offerors that submitted proposals in response to the Request for Proposals for this Contract. If DCAM does not accept the CM's GMP proposal within the time limit for acceptance specified in the GMP proposal, as it may be extended by agreement of the parties, then this Contract shall terminate upon the completion of the CM's performance of the Work then in progress or upon notice from DCAM as provided in the General Conditions.

Article 7. Hard Cost of the Work.

7.1 Hard Cost of the Work. The "Hard Cost of the Work" shall mean those costs listed in this Section. Hard Cost of the Work shall not include any item included in the General Conditions Costs.

7.1.1 Subcontract Costs. Payments made by the Construction Manager to any Subcontractor in accordance with the requirements of an approved Subcontract.

7.1.2 Costs of Materials and Equipment Incorporated in the Completed Construction

(a) Costs, including transportation, of materials and equipment incorporated or to be incorporated in the completed construction, less all discounts and rebates.

(b) Costs of materials described herein which are in excess of those actually installed, but which are required to provide reasonable allowance for waste and spoilage. Unused excess materials, if any, shall be delivered to DCAM at the completion of the Work or, at DCAM's option, shall be sold by the Construction Manager. Amounts realized, if any, from such sales shall be credited to DCAM as a deduction from the Hard Cost of the Work.

7.1.3 Intentionally Omitted

7.1.4 Emergencies and Repairs to Damaged or Nonconforming Work.

The following costs, incurred by the Construction Manager shall become a part of the Hard Cost of the Work:

(a) in taking action to prevent threatened damage, injury or loss in case of an emergency affecting the safety of persons and property, as provided in the General Conditions.

(b) in repairing damaged Work, provided that such damage did not result from the fault or negligence of the Construction Manager or the Construction Manager's personnel or any Subcontractor, and only to the extent that the cost of such repairs is not recoverable by the Construction Manager from others or the Construction Manager is not compensated therefor by insurance or otherwise.

(c) in correcting defective or nonconforming Work, provided that such defective or nonconforming Work did not result from the fault or negligence of the Construction Manager or the Construction Manager's personnel or any Subcontractor or material supplier, and only to the extent that the cost of correcting the defective or nonconforming Work is not recoverable by the construction Manager from third parties or the Construction Manager is not compensated by insurance or otherwise.

Any costs incurred by the CM which would otherwise be within the scope of this Subsection but are excluded because such costs result from the fault or negligence of the CM, the CM's personnel, any Subcontractor or any other party for whom the CM is responsible may be charged against the Construction Contingency to the extent permitted by and in accordance with the provisions of Paragraph 7.2.1, and any such costs incurred after the Construction Contingency has been exhausted shall not be reimbursable as a Hard Cost of the Work.

7.1.5 Miscellaneous Hard Costs

The following costs shall be included in the Hard Cost of the Work:

(a) Subcontractor Bond premiums.

(b) Royalties and license fees paid for the use of a particular design, process or product required by the Contract Documents in accordance with the General Conditions.

(c) Other costs incurred in the performance of the Work if and to the extent approved in advance in writing by DCAM as Hard Costs of the Work.

7.2 Construction Contingency.

7.2.1 The term "Construction Contingency" shall mean the line item included by the CM in the GMP and the Schedule of Values that is available to cover the net amount of any additional costs resulting from unforeseen conditions and events not evidenced at the time that the CM awards a Subcontract or the parties execute the GMP Amendment, as applicable, to the extent that such conditions or events do not result in or constitute a change in the Work. Any claim against the construction contingency shall be submitted in accordance with Article VII of the General Conditions. Examples of such unforeseen conditions and events include, but are not limited to, the following:

(a) unanticipated cost overruns on the CM's procurement of Subcontracts or other purchases of materials or labor costs, provided that the same are not caused by the fault, negligence, or breach of contract of the CM or any Subcontractor;
(b) expediting or acceleration costs required to meet the Baseline CPM Schedule, as long as the same are not made necessary by the fault or negligence of the CM or any Subcontractor; and
(c) such other unforeseen events and conditions as may be specified in the Contract Documents as chargeable to the Construction Contingency.

After execution of the GMP Amendment, if the contract price of any subcontract as awarded is less than the amount carried for such subcontract in the GMP breakdown, the Construction Contingency referenced in this section shall be increased by the amount of such savings.

7.2.2 Costs authorized to be paid from the Construction Contingency by Paragraph 7.2.1 shall be paid to the CM as Hard Cost of the Work only if and to the extent reasonably approved by DCAM. The Construction Contingency shall be reduced by the net amount of the additional Hard Cost of the Work resulting from the use of the Construction Contingency as authorized by Paragraph 7.2.1. The CM shall not receive any CM Fee in connection with any use of the Construction Contingency.

7.2.3 Contingency Balance. If, at the time DCAM issues the Certificate of Agency Use & Occupancy to the CM pursuant to Article VI of the General Conditions of the Contract, there is a balance in the Construction Contingency, it shall be retained by DCAM.

7.3 Non-Compensible Costs. Neither the Hard Cost of the Work nor the General Conditions Costs shall include any of the items set forth below:

(a) Salaries, bonuses and other compensation of the Construction Manager's personnel stationed at the Construction Manager's principal offices, or other offices, except the site office for this project.

(b) Expenses of the Construction Manager's principal offices, site office or other offices, except the site office for this project (including, without limitation, in-house computer costs, and other costs of doing business, services, and related expenses to maintain such offices).

(c) Overhead and general expenses of any kind, including but not limited to office or fabrication shop overhead and drafting and printing costs, except as specifically provided in **Exhibit GC**.

(d) The CM's capital expenses, including interest on the CM's capital employed for the Work.

(e) Costs of machinery and equipment owned or rented by the CM, except as specifically provided in **Exhibit GC.**

(f) Costs incurred due to the fault, negligence or breach of contract of the CM, Subcontractors, anyone directly or indirectly employed by any of them, or for whose acts any of them may be liable, including, but not limited to, death or injury to person or damage to property, the correction of damaged, defective or nonconforming Work, disposal and replacement of materials and equipment incorrectly ordered or supplied, unanticipated cost overruns incurred by the CM in the procurement of Subcontracts, materials or labor, and making good damage to property not forming part of the Work, except: (i) to the extent reimbursement is received through the recovery of insurance proceeds, or (ii) to the extent such items may be charged to the Construction Contingency pursuant to Paragraph 7.2.1.

(g) Cost for purchase and maintenance of tools, materials, supplies and facilities not consumed during construction or incorporated into the Work, except as specifically provided in **Exhibit GC**.

(h) Penalties, fines or costs imposed by governmental authorities in connection with, or resulting from any violation of, or noncompliance with Applicable Laws by the Construction Manager or any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable.

(i) Any legal fees incurred by the Construction Manager, unless the same are incurred at the written direction, or with the prior written approval, of DCAM.

(j) Travel or meal expenses and personnel relocation expenses, except as specifically provided in **Exhibit GC**.

(k) General Conditions Costs in excess of the total of all General Conditions costs as set forth in Section A in **Exhibit GC**.

(l) Any cost incurred by the CM as a result of knowing violation of or failure to comply with this Agreement or the other Contract Documents by the CM.

(j) Costs which would cause the GMP to be exceeded.

(k) Costs incurred by the CM after final payment; provided, however, that to the extent there is Contingency remaining at final payment, such Contingency shall be available to pay costs incurred during the one year period after final payment,

but only if Contingency would be available, subject to reasonable approval by DCAM, to pay such costs had such costs been incurred prior to final payment.

7.4 Discounts, Rebates, Refunds and Expenses. Cash discounts obtained on payments made by the CM shall accrue to DCAM if (a) before making the payments the CM included them in an Application for Payment and received payment therefore from DCAM, or (b) DCAM has deposited funds with the CM with which to make payments; otherwise, cash discounts shall accrue to the CM. The CM shall notify DCAM of the availability of any cash discounts so that DCAM may elect to pay or deposit such funds with the CM in order to obtain such cash discount. Such cash discounts and any other trade discounts, rebates, refunds and other amounts received from sales of surplus materials and equipment shall be credited to the Hard Cost of the Work, and the CM shall make provisions so that they can be secured and credited accordingly. DCAM anticipates an energy rebate for this Project. CM shall apply for the rebate, however, the full amount of the rebate shall be paid to DCAM.

7.5 Accounting Records

7.5.1 The Construction Manager shall check all materials, equipment and labor entering into the Work, and shall keep such full and detailed accounts and exercise such controls as may be necessary for proper accounting and financial management under this Agreement. All books and records shall be maintained in accordance with generally accepted accounting principles, consistently applied. Without limitation, the CM shall comply with the requirements set forth in Article XI of the General Conditions. DCAM and its authorized representatives shall, upon request by DCAM, be afforded copies of, and at all times shall be afforded access to, all of the Construction Manager's records, books, correspondence, instructions, drawings, receipts, invoices, vouchers, memoranda, estimates, budgets, breakdowns, accounting data, bid proposals, cost control information and any other documents and data relating to this Agreement, including data in electronic media or any other media (collectively, "records") and the Construction Manager shall preserve all such records for a period of six years, or for such longer period as may be required by law, after Final Payment. With respect to work performed by the CM's own forces on a lump sum basis, the CM shall only be required to maintain certified payrolls, documentation required by the Supplementary Conditions for Equal Employment Opportunity, Non-Discrimination and Affirmative Action, and such other records as are required by Applicable Laws or the terms of the Contract Documents.

7.5.2 Without limitation of the foregoing, DCAM shall have the right, at any time and from time to time, upon notice to the Construction Manager, to audit the Construction Manager's records in connection with the Work at the Construction Manager's offices. The Construction Manager shall facilitate any such audit by making necessary facilities available to DCAM and its accountants or other representatives.

7.5.3 Subcontractors shall have the same obligations to maintain books and records and to permit audits by the Construction Manager or DCAM as are applicable to the Construction Manager under the Contract Documents.

7.5.4 If any inspection of the Construction Manager's or any Subcontractor's books, records or other documents reveals an overcharge, the Construction Manager shall pay DCAM or, at DCAM's election, DCAM may reimburse itself by taking as a credit against future payments due the Construction Manager, an amount equal to the overcharge. If one or more overcharges is equal to or greater than two hundred thousand dollars ($200,000) in the aggregate, the CM shall also pay all administrative and auditing expenses up to an aggregate of forty thousand dollars ($40,000) incurred by DCAM in determining the existence and amount of the overcharge. Nothing contained in this provision is intended as a limitation of any other rights or remedies which may be available to DCAM and/or the Commonwealth, be they civil or criminal.

Article 8. Payments to Construction Manager.

8.1 Based upon Applications for Payment submitted by the CM, DCAM shall make payments to the CM on account of the Contract Price as provided in Article VIII of the General Conditions of the Contract, and elsewhere in the Contract Documents.

Article 9. Equal Employment Opportunity, Nondiscrimination and Affirmative Action

9.1 The CM and all of its Subcontractors shall comply at all times and in all respects with Applicable Laws affecting or regulating employment of persons in connection with the Work, and with the Supplementary Conditions and all other provisions in the Contract Documents relating to Equal Employment Opportunity, Nondiscrimination and Affirmative Action.

Article 10. Miscellaneous Provisions

10.1 Successors and Assigns. DCAM and the CM bind themselves, their partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither the CM nor any partner of the CM shall assign or transfer the Contract or sublet or subcontract it (other than subcontracting portions of the Work as expressly permitted by and in accordance with the Contract Documents), or otherwise transfer or assign any of its or their rights or obligations under all or any portion of the Contract Documents without the prior written consent of DCAM, which consent may be withheld by DCAM in its sole discretion, nor shall the CM or any partner of the CM assign any moneys due or to become due to it hereunder, without such prior written consent of DCAM. Any assignment of the Contract or any interest therein by the CM or any partner of the CM shall be void, and the assignee in such case shall acquire no rights in the Contract or in such moneys. DCAM may assign the Contract to any successor or assignee of DCAM's interests, provided that DCAM demonstrates to the reasonable satisfaction of the CM that such successor or assignee has the capability of fulfilling DCAM's obligations under the Contract.

10.2 Additional Information. Recognizing that DCAM may find it necessary during the progress of the Work to establish the current status of performance under the Contract Documents, the CM shall, without limitation of any other requirements of the Contract Documents, promptly provide upon request statements, documents or information to DCAM or others regarding the status of the Work, compliance of the Work with the Contract Documents,

compliance by the CM or any Subcontractor with the Contract Documents, the names of Subcontractors or suppliers, amounts due or to become due or amounts previously paid to Subcontractors or suppliers, estimates of the portion of the Work completed and the cost of completing the Work, and such other matters within the scope of the CM's performance under the Contract Documents as DCAM may reasonably require.

10.3 Information Confidential. The CM shall treat as confidential any information relating to the Project that is specifically designated or identified by DCAM as confidential or proprietary, and shall not permit release of such information to other parties without DCAM's prior express written authorization.

10.4 Governing Law. The Contract shall be governed by the laws of the Commonwealth of Massachusetts.

10.5 No Personal Liability; Consequential Damages.

10.5.1 No member, officer, consultant, volunteer participant, employee, agent or representative of DCAM or the Designer shall be personally liable to the CM under any term or provision of this Contract for DCAM's payment obligations or otherwise, or because of any breach hereof, the CM agreeing to look solely to the assets of DCAM or the Designer entities for the satisfaction of any liability hereunder.

10.5.2 In no event shall DCAM or the Designer be liable to the CM except for obligations expressly assumed by DCAM or the Designer under the Contract Documents, nor shall DCAM or the Designer ever be liable to the CM for indirect, special or consequential damages.

10.6 Conflict of Interest. The CM shall familiarize its employees assigned to perform services under this Agreement with the provisions of Chapter 268A of the Massachusetts General Laws (the Massachusetts conflict-of-interest statute). The CM acknowledges that DCAM is a "state agency" for purposes of the aforementioned statute and that the CM is an "interested party" for purposes of the aforementioned manual. Accordingly, the CM, its employees and agents shall not offer or provide any employee of DCAM any gift, gratuity, favor, meal, entertainment, loan or other item of monetary value. The CM warrants and represents that it currently has no interest and shall not acquire any interest, direct or indirect, which would be adverse to or conflict in any manner with the performance of its services under this Agreement or with the interest of DCAM or the Project. The CM further agrees that in the performance of this Agreement no person or entity having any such adverse or conflicting interest shall be employed or granted a subcontract. Except with DCAM's knowledge and express consent, the CM shall not engage in any activity, or accept any employment, interest or contribution that would reasonably appear to be adverse to the interests of DCAM or to compromise the CM's professional judgment with respect to the Project. The CM has a continuing obligation to divulge to DCAM all circumstances of its relationships with third parties, as well as any other interests that may have an effect on DCAM or the Project at the time of execution of this Agreement or during its effectiveness. If DCAM believes that there is or has been a conflict of interest, or the appearance of a conflict of interest, it will so notify the CM. The CM shall make full disclosure of all material facts, and shall have a period of thirty (30) days after receipt of such notice to cure the conflict of interest or the

appearance of conflict of interest, including the right to request a meeting with the Commissioner of DCAM to explain its position. If the conflict of interest or appearance of conflict of interest is not cured to the satisfaction of DCAM or the controversy otherwise resolved prior to expiration of such thirty (30) days period, the CM shall be deemed to be in default of this Agreement and DCAM may exercise any remedies available to it under this Agreement or applicable law.

10.7 Termination of Contract. The Contract may be terminated as provided in Article XVII of the General Conditions.

10.8 Exhibits. The following Exhibits are attached to and incorporated in this Agreement:

Exhibit GC	Payment for Construction Management Services
Exhibit A	Additional Insurance Provisions
Exhibit B	Forms Used During Contract Award and Execution
Exhibit C	Prevailing Wage Rates

Article 11. Approved Subcontractors. No Trade Contractors or other Subcontractors shall be used for any portions of the Work without the prior written approval of DCAM.

Article 12. Certifications. Pursuant to M.G.L. c. 62(c), s.49 (a), the individual signing this Contract on behalf of the Construction Manager hereby certifies, under the penalties of perjury, that to the best of his or her knowledge and belief the Construction Manager has complied with any and all applicable state and federal tax laws. The individual signing this Contract on behalf of the Construction Manager further certifies under penalties of perjury that the Construction Manager is not presently suspended or debarred from doing public construction work in the Commonwealth under the provisions of M.G.L. c. 29, s. 29F, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder and is not presently suspended or debarred from doing public construction work by any agency of the United States.

Article 13. Minority Business Enterprise and Women Business Enterprise Participation Goals and Minority/Women Workforce Utilization Percentages. The applicable goals, if any, for minority business enterprise and woman business enterprise participation established for this Contract are as follows:
MBE: 7.4 % of the GMP. WBE: 4 % of the GMP.

The applicable minority workforce utilization percentage is 5%.

The women workforce utilization percentage is N/A.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in triplicate under seal as of the date set forth above.

CONSTRUCTION MANAGER

By: _____

Name: _____

Title: _____

Date: _____

DIVISION OF CAPITAL ASSET MANAGEMENT

By executing this Agreement, the undersigned authorized signatory of DCAM, who incurs no personal liability by reason of the execution hereof or anything herein contained, hereby certifies under penalties of perjury that this Contract is executed in accordance with a prior approval of the Division of Capital Asset Management and Maintenance.

By: _____

Name: _____

Title: _____

Date: _____

Approved as to Form:

By: _____

Name_____

Title:_____

Date_____

Attach Exhibits GC, A, B, and C

Appendix E: Subcontract between Construction Manager and Trade Contactor

Gilbane Project No. 4461
Contract Order No. 58176-000
Vendor No. 32530

Gilbane

COMMONWEALTH OF MASSACHUSETTS
FORM FOR SUBCONTRACT BETWEEN CONSTRUCTION MANAGER AND TRADE CONTRACTOR

THIS AGREEMENT made this **8th** day of **September, *2009***, by and between ***Gilbane Building Company,*** a corporation organized and existing under the laws of ***Massachusetts,*** hereinafter called the "Construction Manager or CM" and ***M.J. Flaherty Company,*** a corporation organized and existing under the laws of ***Massachusetts,*** hereinafter called the "Trade Contractor",

1. WITNESSETH that the Construction Manager and the Trade Contractor for the considerations hereafter named, agree as follows:

A. Trade Contractor shall furnish all labor, materials, equipment and services required for the completion of all work specified in Section No. 230001 of the Specifications for HEATING, VENTILATING & AIR CONDITIONING WORK (per Bid Package #15C) and the Plans referred to therein for the Worcester – DMH Psychiatric Hospital all as prepared by Ellenzweig. All work shall be in strict accordance with the following:

1. **Request for Bids from Pre-qualified Trade Contractors issued July 13, 2009.**
2. **Division of Occupational Safety Prevailing Wage Rates issued July 9, 2009.**
3. **CM Trade Contractor Specific Scope of Work, Bid Package 15C – Heating, Ventilating & Air Conditioning Work (Section 230001) dated July 13, 2009.**
4. **Owner – Construction Manager Agreement dated June 29, 2007.**
5. **Commonwealth of Massachusetts (CM @ Risk Contract) – General Conditions of the Contract dated (revised) February 2008 (including Appendices A through E dated 03/21/07).**
6. **Supplementary General Conditions (Division 1 Specifications).**
7. **Schedule "A" – Insurance Requirements dated January 10, 2008.**
8. **Gilbane Project Safety Plan dated January 11, 2008.**
9. **DMH Psychiatric Facility Quality Program dated January 9, 2008.**
10. **Site Utilization Plan (SU.5) dated December 12, 2008.**
11. **LEED Material Documentation Sheet.**
12. **Indoor Air Quality Management Plan dated March 27, 2009.**
13. **Construction Waste Management Plan (CWMP) dated March 27, 2009.**
14. **Worcester Psychiatric Hospital Temporary Power Plan dated June 12, 2009.**
15. **Addendum No. 8 as prepared by DCAM dated July 21, 2009**
16. **Addendum No. 9 as prepared by DCAM dated July 24, 2009.**
17. **Addendum No. 10 as prepared by DCAM dated July 30, 2009.**
18. **Addendum No. 11 as prepared by DCAM dated August 6, 2009.**
19. **Addendum No. 12 as prepared by DCAM dated August 7, 2009.**
20. **Addendum No. 13 as prepared by DCAM dated August 14, 2009.**
21. **Addendum No. 14 as prepared by DCAM dated August 21, 2009.**

Gilbane

B. **The Trade Contractor shall start the work upon notice to proceed and shall execute the work with diligence and dispatch so as to maintain such schedules and milestones as established by the Construction Manager. The Trade Contractor agrees to complete portions and the whole of the work by the following anticipated dates:**

	Start	*Finish*
Submittals:	Within Two (2) Weeks Upon Notice of Award	-
Shop Drawings & Coordination Drawings:	Immediately Upon Notice of Award	04/01/10
Rough-in – Areas K & A:	05/10/10	07/09/10
Trim and Finishes – Areas K & A:	07/09/10	02/01/11
Rough-in – Areas H & J:	08/23/10	12/15/10
Trim and Finishes – Areas H & J:	12/15/10	06/21/11
Rough-in – Areas B, C & G:	10/04/10	01/14/11
Trim and Finishes – Areas B, C & G:	01/14/11	05/24/11
Rough-in – Areas F, D & E:	01/31/11	04/07/11
Trim and Finishes – Areas F, D & E:	04/07/11	10/13/11
Rough-in – Areas BA6 & BA5:	07/06/10	08/19/10
Trim and Finishes – Areas BA6 & BA5:	08/19/10	06/08/11
Rough-in – Areas BA1, BA2, BA3 & BA4:	09/13/10	02/22/11
Trim and Finishes – Areas BA1, BA2, BA3 & BA4:	02/22/11	05/10/11
Chillers and Air Handling Units Operational:	-	03/01/11*
Boilers and Cogen Operational:	-	08/01/11*
Complete All Work (except for items noted below):	-	11/29/11*
Commissioning / Punchlist / Final Inspections / Testing:	11/30/11	02/17/12
LEED EQ-3.2 – Building "Flush-out":	02/20/12	03/02/12
Certificate of Agency Use and Occupancy:	-	03/02/12*

"*" Indicates milestone dates that may be subject to Liquidated Damages in accordance with the terms of the contract between the Construction Manager and the Subcontractor as prescribed by the Owner / CM Agreement.

LIQUIDATED DAMAGES: Liquidated damages in the amount of $5,000/day will be accessed for each calendar day to the extent permitted by the terms of the Owner-CM Contract. Refer to Article 4.4 of the Owner-CM Agreement for additional information.

C. **The Construction Manager agrees to pay the Trade Contractor for the satisfactory performance of his work the total sum of:**

Twenty Three Million Seven Hundred Ninety Six Thousand Dollars and Zero Cents ($23,796,000.00)

This contract amount includes five point zero four percent (5.04%) MBE Participation ($1,200,000.00). Participation shall be in accordance with the contract documents. Refer to "The General Conditions of the Contract" for substantiation requirements. Monthly "waivers of lien" showing payment to MBE Subcontractor shall be required as a condition of payment. Failure to provide this required level of MBE Participation (5.04%) will result in penalties accessed per Appendix B of the General Conditions.

Gilbane

(a) The Trade Contractor agrees to be bound to the CM by the terms of the hereinbefore described **Plans, Specifications (including all General Conditions stated therein) and Addenda Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 & 14,** and to assume to the CM all the obligations and responsibilities that the CM by those documents assumes to the ***Commonwealth of Massachusetts – Division of Capital Asset Management,*** hereinafter called the "Awarding Authority", except to the extent that provisions contained herein are by their terms or by law applicable only to the CM.

(b) The CM agrees to be bound to the Trade Contractor by the terms of the hereinbefore described documents and to assume to the Trade Contractor all the obligations and responsibilities that the Awarding Authority by the terms of the hereinbefore described documents assumes to the CM, except to the extent that provisions contained therein are by their terms or by law applicable only to the Awarding Authority. The Trade Contractor shall preserve and protect the rights of the DCAM under the Contract Documents with respect to the Work to be performed by the Trade Contractor so that the subcontracting thereof will not prejudice such rights, and shall be subject to the Record Retention requirements as set forth in the Contract Documents.

2. The CM agrees to begin, prosecute and complete the entire work specified by the Awarding Authority in an orderly manner so that the Trade Contractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the CM, either oral or in writing, the Trade Contractor agrees to begin, prosecute and complete the work described in this Subcontract in an orderly manner and with due consideration to the date or time specified by the Awarding Authority for the completion of the entire work.

3. The Trade Contractor agrees to furnish to the CM within a reasonable time after the execution of this subcontract, evidence of workmen's compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Awarding Authority by the CM.

4. The CM agrees that no claim for services rendered or materials furnished by the CM to the Trade Contractor shall be valid unless written notice thereof is given by the CM to the Trade Contractor during the first ten (10) days of the calendar month following that in which the claim originated.

5. The Trade Contractor agrees that it shall enter into similar agreements, as this, with its Subcontractors, except to the extent that provisions contained herein are by their terms or by law applicable only to the CM and/or Contractor.

6. The CM agrees that it has provided to the Trade Contractor, prior to the execution of this Subcontract, copies of the Contract Documents to which the Trade Contractor will be bound by this Subcontract. The Trade Contractor agrees that it shall similarly make copies of such Contract Documents available to its Subcontractors.

7. In the event of termination of the Contract due to the default of the CM or for any other reason, the DCAM shall have the right (but shall have no obligation) to assume, and/or accept assignment of and further assign to a general contractor or construction manager or other third party who is qualified and has sufficient resources to complete the Work, the rights of the CM under the Subcontract with such Trade Contractor. In the event of such assumption or assignment by the DCAM, the Trade Contractor shall have no claim against the DCAM or such third party for work performed by such Trade Contractor or other matters arising prior to termination of the Contract, and the DCAM or such third party, as the case may be, shall be liable only for obligations to the Trade Contractor arising after such assumption or assignment.

8. Nothing contained herein, shall be construed to create any contractual relationship between the Trade Contractor and the DCAM.

9. This agreement is contingent upon the execution of a Contract for Construction Management Services between the CM and the Awarding Authority for the complete work.

Appendix F: Comparison of Original and Revised Meeting Rubrics

Original Meeting Rubrics

Participation

Person asking / affiliation	Subject	Relevant to position

Focus

Person/ Affiliation	Action (takes notes, uses documents, checks emails, takes phone calls, side conversations)	Effect of Action

Interaction

Person/ Affiliation	Speaking in Meetings	Effect	Reaction	Importance

Revised Meeting Rubrics

Participation

Agenda section	Person asking / affiliation	Subject	Relevant to position

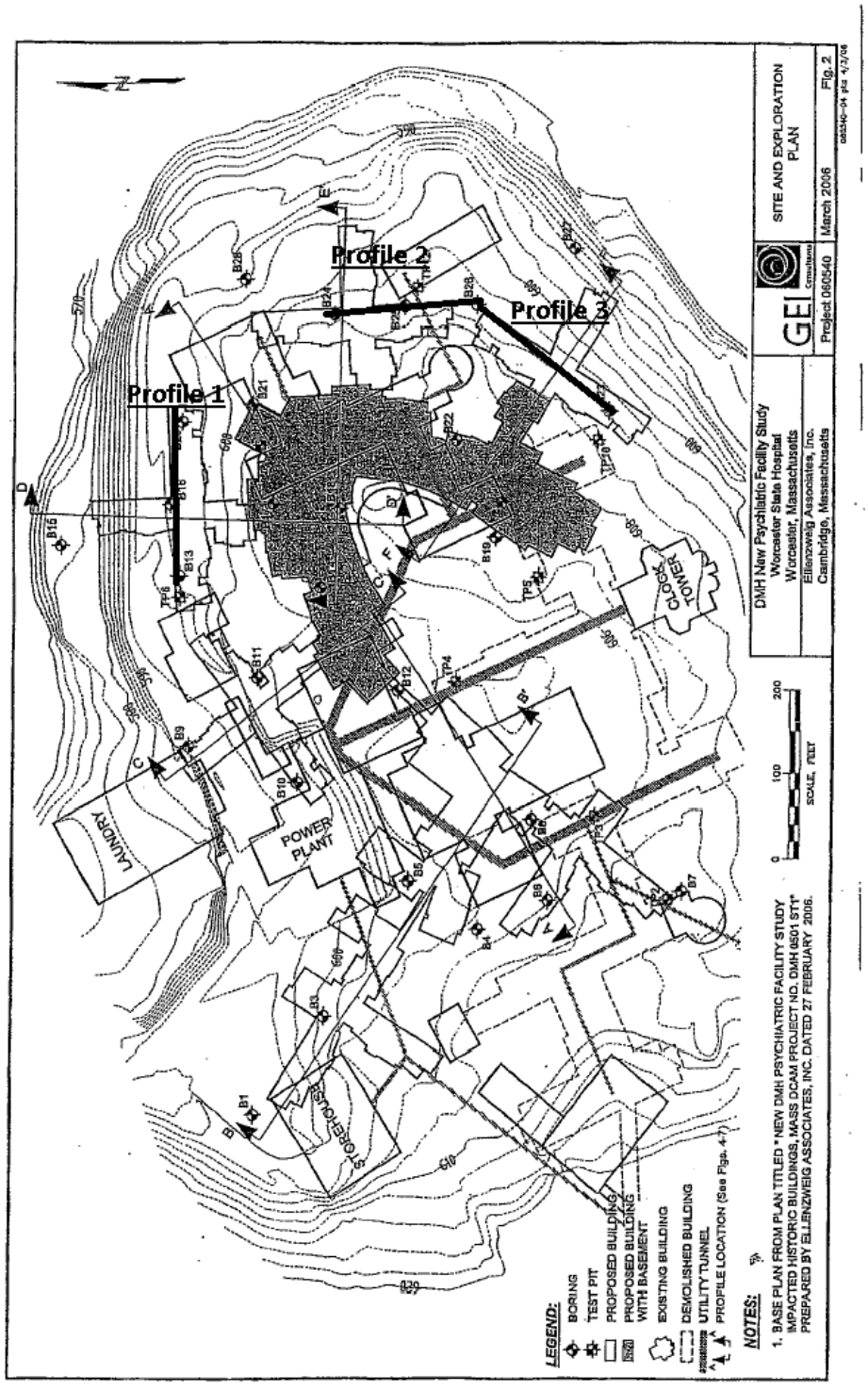
<u>Focus</u>

Item Number	Person/Affiliation	Action (takes notes, uses documents, checks emails, takes phone calls, side convos	Effect of Action

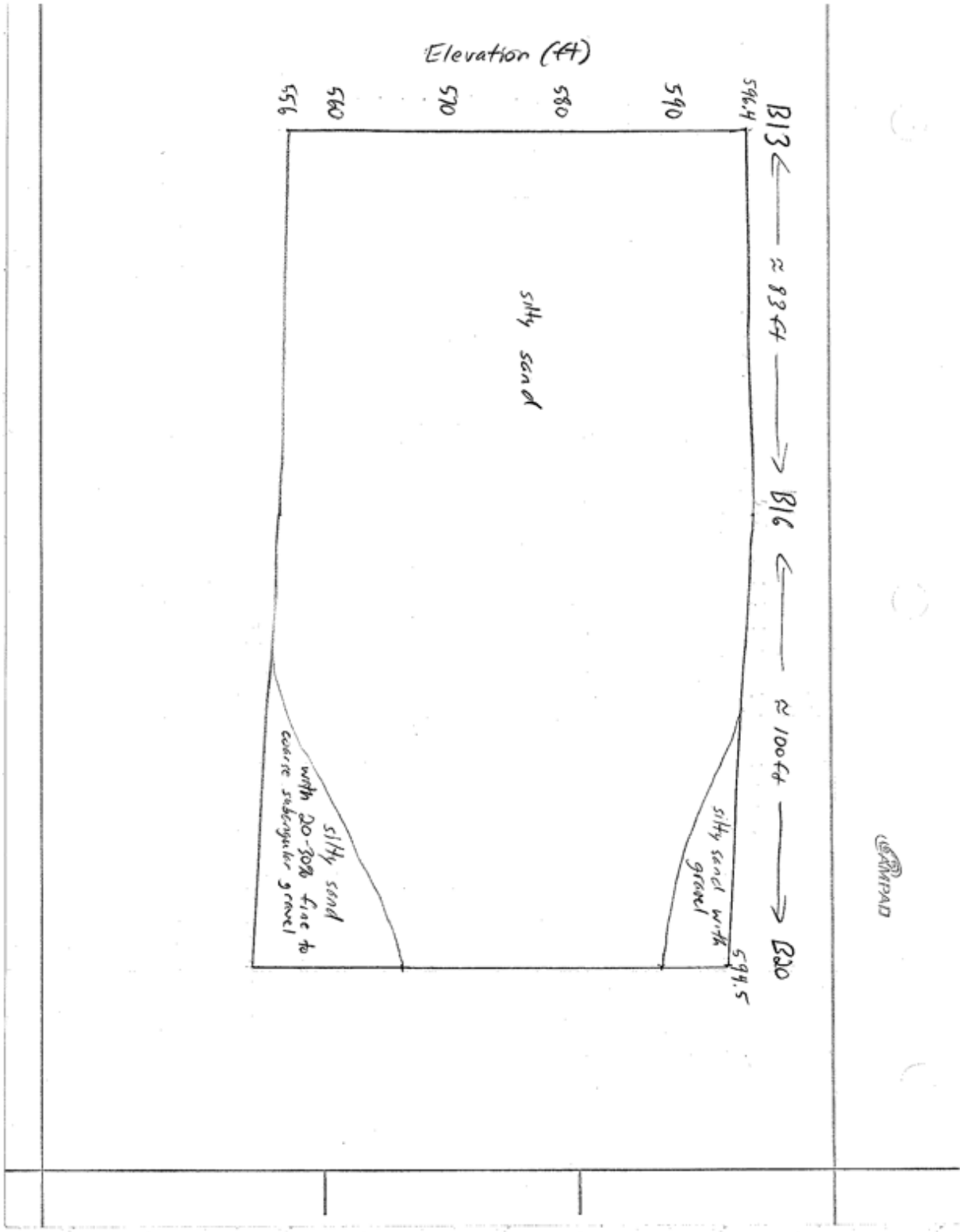
Interaction

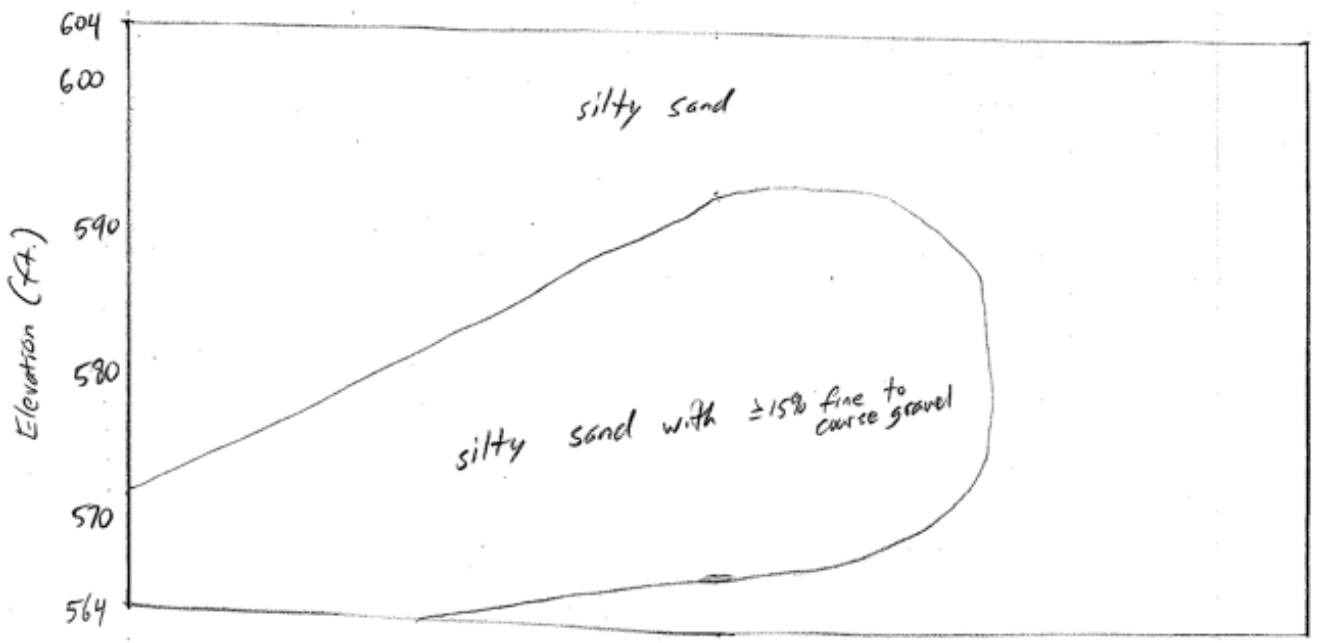
Item Number	Person/ Affiliation	Interacting With?	How They Interact	Importance / Effect

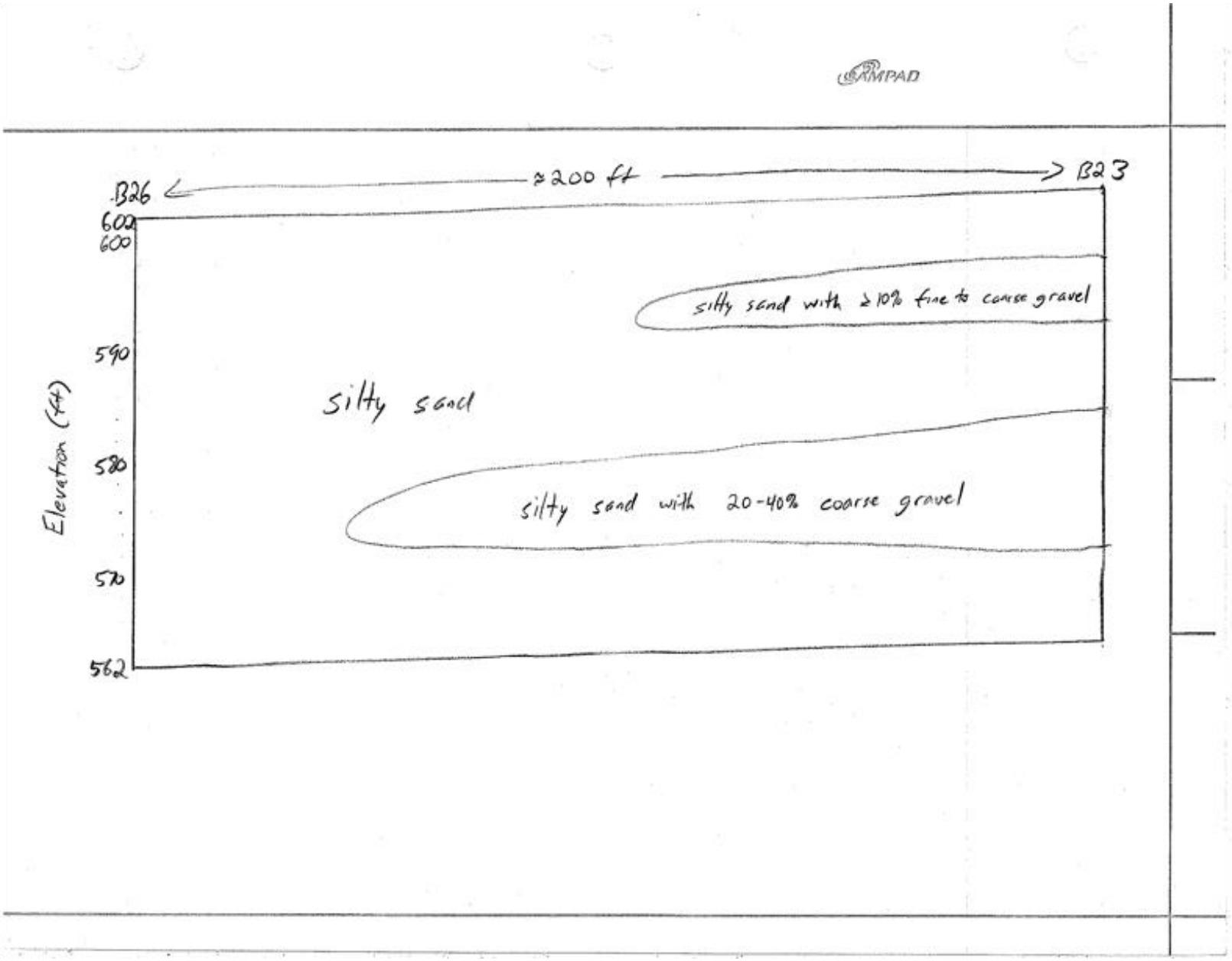
Appendix G: Boring Log/ Soil Profile Map



Appendix H: Soil Profiles




B24
≈ 42 ft
B25
≈ 42 ft
B26
604
600
590
580
570
564
Elevation (ft.)
silty sand
silty sand with ±15% fine to coarse gravel


RAMPAD
B26
≈200 ft
B23
602
600
590
580
570
562
Elevation (ft)
silty sand with ≥10% fine to coarse gravel
silty sand
silty sand with 20-40% coarse gravel

Appendix I: Construction Logs on Pour Dates

Daily Details

Detailed, Grouped by Date

Worcester Psych Hospital
305-B Belmont St
3rd floor
Worcester, MA 01604

Project # 114461000
Tel: 508-753-4309 Fax: 508-753-5164

Gilbane Building Company

Date: Thursday 9/10/2009

Number	Temp @ 08:00 AM	Temp @ 12:00 PM	Temp @ 04:00 PM	Precip	Cumul Precip	Wind Velocity
572	51	62	63	0	0	12

Conditions: Partly Cloudy, Clear

Reported By Company
Gilbane Building Company

Reported By
John Roche

Notes:

FH&S Poured A wing slab approx 280 yards

(mdf) DBO2 safety inspection conducted. KMD working in mock up room. Francis Harvey had 2 workers at the boiler plant until noon time, completing rock removal and loam placement per the RCL.

KMD Plumbing – Continue with the mock-up room plumbing. Begin the replacement of the two rain leaders for the Storehouse loading dock roof. Check on F. Harvey as they pour A-Wing for any damage to the underground piping during the A-Wing slab pour. Steve marked out the deep section of C-Wing for Dow to excavate for the underground. Dow is scheduled to start excavation on Friday.

Ostrow Electric – Complete the conduits from the Elliot Box to the utility Transformer. Charlie met with Bob Rayla, Jim Hoffmann, and Matt to discuss the 8 versus 10 conduits from the Elliott Box to the Transformer. It was agreed to just install what the utility wants and shows on their drawing, 8 @ 4" conduits. The 10 @ 4" will not fit in the 25" x 15" bottom opening that is provided with the Transformer. The portion of the duct bank for the Co-Gen conduits that were re-routed was poured this afternoon, as well as the duct bank for the conduits from the Elliot Box to the Transformer.

N B Kenney – George Landry and Ed Waldman were here this morning to address the ongoing problem with minor fuel oil leaks on the piping to and from the fuel oil filtration unit. The end result was that they could not complete their task today and will have to return next week. George is going to pre-fab/weld some replacement piping, fittings and valves.

Bristol Fire Protection – 2 men today. They completed the 6" riser connection in C-Wing for the sprinkler feed.

Visitors:

Ed Waldman - Waldman Sales
Keith & Jonathan - HGI
Joe McEvoy - State Building Inspector

A-WING S.O.G. = APPROX 14,800 SF

Daily Details

Detailed, Grouped by Date

Worcester Psych Hospital
305-B Belmont St
3rd floor
Worcester, MA 01604

Project # 114461000
Tel: 508-753-4309 Fax: 508-753-5164

Gilbane Building Company

Date: Tuesday 9/22/2009

Number	Temp @ 06:00 AM	Temp @ 12:00 PM	Temp @ 04:00 PM	Precip	Cumul Precip	Wind Velocity
584	59	69	69	0	0	18

Conditions: Fog, , Overcast

Reported By Company	Reported By
Gilbane Building Company	John Roche

Notes:

Quality meeting & Trade meeting held today.

Slab at B wing poured today.

KMD Plumbing – Steve is continuing with the underground in C-Wing. He got another man this morning – Woody. Steve had to replace another clean out in B-Wing after it was hit by one of the screeds. The concrete was removed and the line flushed out. Charlie pointed out to Steve that a 3" rain leader coming out of C-Wing at the northwest corner is at the same elevation as the duct bank coming out of the basement into C-Wing. He is going to have to core a hole higher up to clear the duct bank.

Ostrow Electric – Not on site today

Visitors:

B-WING S.O.G. = APPROX 14,800SF

Appendix J: Lin Associates Crack Findings

LIN ASSOCIATES, INC.
CONSULTING ENGINEERS

Site Visit Report

REPORTED BY:	Bob Lie	DATE:	9-18-09
DATE OF VISIT:	9-18-09	JOB NO.	2007014
WEATHER:	Sunny, 70º	RE:	DMH Psych Facility Worcester, MA.
KEY PERSONS CONTACTED	EAI - Peter Pogorski, Jim Hoffman DCAM - Neil Johnson, Charles Wilsie, Mark Bontempo	PURPOSE OF VISIT	Executive Meeting at Site

OBSERVATIONS AND FINDINGS:

Following Executive Meeting attended by DCAM, Gilbane, Ellenzweig and Lin, the undersigned walked the site to discuss:

1. Loading Dock platform at Store House. EAI proposes eliminating the stair at the west end of the loading dock that is located at the south end of the building. This platform is used as loading dock primarily at its east end where the building overhead door is located. Discussed alternative of encasing the concrete stair with concrete wall and deck anchored to the sair to lengthen the platform.
   EAI to send existing drawings of the Store House building and the proposed extension of the loading dock. Lin will provide structural details.
2. Observed the slab on grade for the housings that are already placed and cured.
   - A • Slab on grade are generally very well placed. Diamond shape exclusions are provided at column locations. Saw cut control joints are evident on the slab.
   - B • Several diagonal cracks were noted during the visit. These cracks can be categorized as follow:
     - Shrinkage cracks less than 10 mils wide. No repair is required.
     - Shrinkage cracks greater than 10 mils wide. Rout out cracks, remove all loose concrete and clean. Fill cracks with semi-rigid epoxy filler, e.g. SikaDur 35 Hi-Mod LV.
     - Cracks due to settlement of sub-grade. Grind to even out shoulders of cracks. Rout, remove loose concrete and clean cracks. Fill cracks with semi-rigid epoxy filler, e.g. SikaDur 35 Hi-Mod LV.
     - All repairs to be done when slab are protected from weather.
   - C • To minize shrinkage cracks, place additional diagonal #5 bars, top and bottom of slab, at all re-entrant corners including tip of diamond shape exclusion without control joint.

   CONCRETE ITEMS
3. PV arrays.
   - PV arrays will be mounted at about 30º angle on top of steel grillage cantilevered front and back from steel posts similar to purgola structures. Steel posts are spaced at about 16' on center and supported by concrete footings. EAI to provide drawings.
   - One location is adjacent to sloped embankment and the other location is located behind newly installed segmental retaining walls.
   - Will coordinate with geotechnical consultant on proper foundation type and its design parameters.

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