GFS-1001

New Worcester North High School: Construction Management and Constructability Analysis

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

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Abstract

This project presents three main deliverables concerning the construction of North High School in Worcester, Massachusetts. These are: a construction management analysis, a construction cost estimate developed by using a Building Information Model, and an alternative design of the retaining wall located near the corner of the auditorium and Building B. In addition, an earned value analysis of two steel oil tank replacements in South Portland, Maine was also conducted.

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Acknowledgments

Our Major Qualifying Project team would like to thank all of the individuals that contributed to us during the duration of our project. Our team would especially like to thank our advisors, Professor Guillermo Salazar and Professor Paramasivam Jayachandran for their help and guidance to completing the project. Our team would also like to thank the Gilbane team that was working on the North High School project, including William Kearney Jr., Melissa Hinton and Don Venerus, for providing us valuable information, including the architect's drawings, and allowing us to attend owner meetings.

Capstone Design Experience Statement

In order to complete the capstone design requirements for this Major Qualifying Project, the group conducted an alternative design for a retaining wall located near the corner of the Building B and the auditorium of the new Worcester North High School in Worcester, Massachusetts. The retaining wall performs load carrying capabilities during construction and at the same time protects lower lying houses from any potential soil falling off of the sixty foot cliff that the wall would be built into. The alternative design for the retaining wall included economic factors as well.

The alternative design of the retaining wall consisted of investigating the advantages and disadvantages different types of retaining walls, determining the vertical and horizontal pressures against the wall as well as the type of soil located on the construction site, and performing a structural analysis. The vertical surcharge of the wall was determined by using the live loads that are typically carried by fire lanes.

The proposed solution for the wall is a cantilever retaining wall with counterforts. Adding counterforts to the wall adds more strength without making the heel slab very long. Also, counterforts are typically added to embankments that are greater than eight meters in height. As some parts of the embankment at the construction site exceeds sixty feet, it was necessary to add counterforts to the retaining wall.

The economic aspects of the proposed solution for the retaining wall was compared with the one actually implemented in the site primarily in terms of the total amount of material and cost required to build both solutions. The economic issues surrounding this retaining wall are rather important as the type of wall was changed from a semi-gravity retaining wall to a smaller in size counterfort retaining wall, costing an estimated $10,000 less.

The proposed design addressed the constructability aspects of the retaining wall and the safety aspects of the design process as well. We addressed safety and constructability issues that included wall overturning, base sliding, and soil bearing capacity failures. After investigating these different constructability issues and calculating factor of safety values, we found that our solution exhibits structurally sound qualities and is publically safe as well. The key to successful engineering is analyzing the situation from a public safety point of view, and determining whether a conservative or an aggressive approach should be used for that particular situation.

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Chapter 1- Introduction

Anywhere in the United States, whether it is in the warm, tropical atmosphere of Florida or the frigid, arctic air of Alaska, structures have been a necessity of living for thousands of years and will continue to be in the future as well. The construction industry is one of the largest industries in the nation contributing to around 5% of the United States' gross domestic product in 2007(http://www.bea.gov/). Currently with a tight economy, it is more important than ever for management to keep construction projects on time and within budget.

In the construction industry, project management involves the organizing and working with people to identify problems and determine solutions to situations that eventually occurs within the work site. With more sustainable times ahead, many owners are looking to save money on energy, water, waste disposal, and also reducing their carbon footprint and these changes generally reflect on the engineer and designer's ability to stay within a project scope. Not only do managers need to solve problems, but they also need to be a good motivator and communicator in order for a project to become successful. Projects use methods and tools to perform traditional management functions such as earned value analysis, scheduling, estimating, and now there is an increasing use of virtual construction and Building Information Modeling (BIM) to assist the managers in meeting the time, cost, and quality objectives of the project.

In 1980, students and faculty of Worcester North High School moved from Salisbury Street in Worcester, Massachusetts to what was then called a temporary location at an old middle school building at 150 Harrington Way. This "temporary location" would serve as such for a period close to 30 years as plans for a new high school building were delayed several times due to lack of funding because the immediate need for a new school was not highly prioritized. Often seen during the last decade, the old middle school building was having trouble withstanding a

growing student population and could not keep up with the major changes in technology that have occurred over the years. Finally in 2003, the project was given the go ahead with the funding coming solely from the city of Worcester. The project for a new Worcester North High School broke ground in 2008 and has an estimated completion date for the fall of 2011. After the bidding process was completed, the city of Worcester selected The Gilbane Building Company as the professional construction manager, Maguire Group Inc. as the owner's project manager, and the city's own architect group, Worcester Architectural Services as the designer.

The 72 million dollar project includes 2 buildings, an auditorium, and gymnasium encompassing a total of 225,000 square feet. A project of this size in the heart of Worcester, Massachusetts requires efficient coordination between the owner, designer, general contractor, and subcontractors in order to be on time and on budget. Since construction started in 2008, there have been many issues with design and subcontractors which may have impacted the cost and schedule of the project

The focus of the report was to investigate and analyze the challenges of the construction of the new Worcester North High School. These are a construction management analysis, a construction cost estimate developed by using a Building Information Model, and an alternative design of the retaining wall located near the corner of the auditorium and building B

Chapter 2 - Background

This chapter presents the general information that is associated with the project. The planning and development of a new high school demands a lot of time, coordination effort, and money. The first part of this chapter discusses some of the history of the old Worcester North High School and the reasons behind the need for building a new, state of the art high school. Also included in this chapter are the general concepts developed for the management of the project, including the parties involved and the type of contract agreed upon between the owner and general contractor.

2.1 Development of Previous Worcester North High Schools

North High School is a four year public high school and is located on 150 Harrington Way in Worcester, Ma. North High is one of five public high schools that are in the city of Worcester and it is responsible for the education of 1,124 students as of October 1st, 2009. North High School is home to a diverse student population with 40.0% Hispanic, 31.7% White, 19.9% African American, 7.8% Asian or Pacific Islander, and 0.6% Native American. North High School also has a large percentage of its students, 22.2%, receiving special education services. All previous statistics are stated as of October 1st, 2009 by Principal Matthew Morse.

The building in which North High School currently inhabits was built in 1971 to be a Junior High School for the city; however in 1980 it became North High School. Prior to the move to the current site, North High School was located on Salisbury Street but after the move this building was closed and sold to a private developer. The move to Harrington Way was considered to be a temporary solution at the time. In 2000 the Worcester City Council agreed to the construction of a new North High School. The completion of the new North High School is

expected to be done by September 2011, in time for the 2011-2012 school year and finally finishing a 30 year period that was spent in the temporary building.

2.2 Demand for a New High School

The community in the temporary building was long overdue for a new high school. In the year 2000 the Worcester City Council deemed the current building old and worn down, and they decided to go ahead with the plan to construct a new high school. Recent malfunctions of the current building were reported in the press (Worcester Telegram & Gazette, 2007). According to the article; Lauren E. Morocco, 17, and Kamerin J. Perkins, 18, both seniors, said they're happy future generations won't be subjected to the conditions of the current building, with its broken floor tiles, moldy ceiling tiles, small lockers built into classrooms instead of hallways and lights occasionally sparking (http://www.thefreelibrary.com).

In 2008 Worcester North High School set out to develop an improvement plan for its students from 2008 to 2010. Part of this plan included the building of a new, modern high school that could supply all of its students the proper classrooms and equipment to succeed. As stated in North High School's improvement plan mission statement, "The design plans for a new North High School will provide a facility that thoroughly supports our conversion to smaller learning communities."

2.3 Development of the Worcester North High project

Troubles for the building of a new North High School in Worcester started with the move to a temporary building meant for middle school students in 1980. This switch has lasted for almost 30 years because of lack of funding to build a new high school. Then in the year 2000, the Worcester City Council gave the go-ahead to the building of a new North High School, a project that was long overdue. The original estimated cost for the new Worcester high school was $50

million in 2000. This project was slow to start and ran into delays. With the rising construction costs from 2000 to 2006 the estimated cost for this project jumped to roughly $78 million.

Then in 2006 the Massachusetts School Building Authority took over the school building aid. The new authority made changes to the states reimbursement schedule for new school projects, changing a Massachusetts's city reimbursement for new schools from 90% to 70%. This new ruling left the city of Worcester with a $23.6 million funding gap for the new North High School. The North High project seemed to be dormant again.

In October of 2006 the city manager of Worcester, Michael V. O'Brien, revived the new Worcester North High School project. He unveiled a new plan starting with the reduction of square footage in the school. The plan stated 40,000 square feet was to be removed from the design of the new North High School. This reduction left North High School with 190,000 square feet. Reductions were made in public rooms and classrooms in the building. The reduction shrunk parts of the atrium, reduced seating accommodation in the auditorium from 700 to 425 seats, and the gymnasium capacity to 1,295 people. The 16% shrinkage of the building lowered the overall projected cost from $78 million to $72.8 million. The redesign of the school delayed the project start date by 2 ½ months, town officials however were still confident they could make up this time and stay on schedule to finish in September of 2011 for the beginning of the school year.

The new arrangement set up a new financing plan which would have the state of Massachusetts contribute $45 million to the new North High School's project cost. The plan had the city responsible for the remaining $27 million. Out of the city's responsibility $15 million of this would come from the state as part of a 2% interest loan. The other $12 million the city is responsible for was to be borrowed at a higher undisclosed interest rate.

2.4 Project Organization

The City of Worcester is the owner of the new North High School in Worcester. The construction is being managed by Gilbane Building Company. The contractual arrangement between the owner and the contractor is Construction Management (CM) at risk. CM at-Risk is a delivery method which entails a commitment by the construction manager to deliver the project within a Guaranteed Maximum Price (GMP). The architect on the job is Architectural Services, an entity of the city. The Maguire Group is a consultant to the city of Worcester for the design of the project. There are also many subcontractors associated with the project. An organization chart is shown in Figure 1.

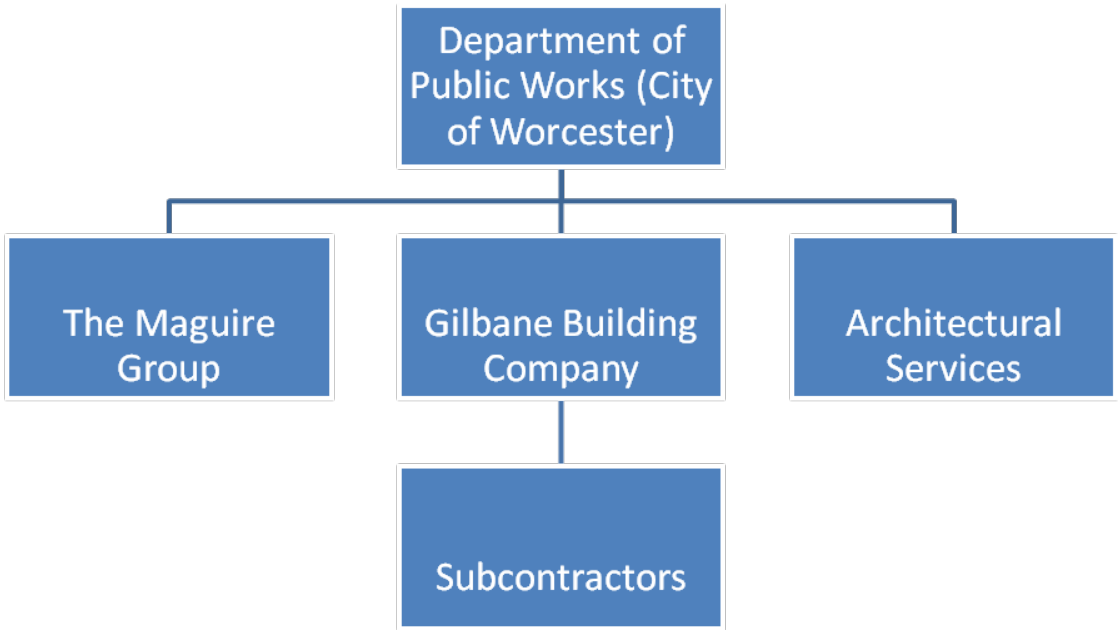

Figure 1: Organizational Chart of the Worcester North High project

The agreement between Gilbane Building Company and the City of Worcester for the construction of the new North High is divided into two phases. The first phase includes site work, concrete, and steel amendments worth roughly $13 million dollars using a GMP contract. Major site work was completed by Marion Brothers, Inc. from 2008 to March of 2009. The cast-in-place concrete was completed in early spring 2009 by Francis Harvey & Sons, Inc., while the cast-in-place flat work was completed by October 2009 by JL Marshall and Sons. The structural steel was completed by United Steel, Inc., in November of 2009. The second phase will be a GMP contract negotiated between the two parties. At the time of the completion of this study a GMP had yet to be agreed upon between the two parties. The project is broken down into 2 phases because it is a fast track project, which means construction starts before the final design is complete. This allows the contractor, Gilbane to start construction on the early parts needed for the building, that is, site clearing and excavation, concrete, steel erection, rough-in plumbing and electrical.

The sub-contractors hired on this job are being selected through the filed sub-bid process. Massachusetts General Laws require what is known as the “filed sub-bid” system for selecting certain subcontractors on various public construction projects. The Law requires that contractors submit construction bids in two phases. First, subcontractors must submit their bids to the Awarding Authority, which will compile a list of all sub-bids received. The Awarding Authority will send the list to all interested general contractors. Interested contractors will then need to submit their bid including any filed sub-bidders that will be used on the work. It’s important to note that the general contractor is not obligated to use the lowest bidder. In the case of North High, Gilbane needs to get approval by the owner before contracting any sub-contractors.

2.4.1 Gilbane Building Company

Gilbane Building Company is a leading construction management firm, based in Providence RI, providing a full slate of facilities-related services for clients in the healthcare, education, government, convention/cultural, mission-critical, corporate, sports/recreation, life sciences, transportation, and criminal justice markets. Gilbane is a highly respected firm in the construction industry with annual revenues that top $3.5 billion and is # 18 on the top contractors in the US according to ENR (http://enr.construction.com/toplists/Contractors/001-100.asp). The main individuals working on this project from Gilbane include:

- **Project Executive** – William Kearney
- **Project Manager** – Tony Iaccarino
- **Field Superintendent** – Al Abdella
- **Project Engineer** – Don Venerus
- **Project Engineer** – Melissa Hinton

2.4.2 The Maguire Group

The Maguire Group is one of the nation's leading Architectural, Engineering, Planning and Construction Management firms. They are assisting the owner in both the engineering and construction phases of the work. They mainly help the city of Worcester on major decisions when it comes to cost. Other projects they have worked on in the city of Worcester include WPI's new Gateway education facility and Union Station. Some of the main individuals working on this project from the Maguire group include:

- **Vice President of Project Management** – Tony DiLuzio
- **Project Manager** – Ted Fiffy

2.4.3 The City of Worcester-Architectural Services

The city of Worcester is the owner and architect for this project. It is unusual to come across a party assuming the responsibly of both the owner and the designer/architect, but the city of Worcester decided that this type situation would work best for this project. Architectural Services is a subdivision of the Department of Public Works or Worcester, meaning they are city employees. Architectural Services provides professional services for the design and construction of City of Worcester owned buildings. Since its creation in 1993, this group has completed over 150 assignments. Major individual associated with this project from the city of Worcester include:

- **Designer/Architect** – Eric Twickler
- **Principal of Worcester North** – Matthew Morse
- **Assistant Commissioner of Public Works** – Paul Moosey

2.5 Construction Manager at Risk

As described briefly above, CM at-Risk is a delivery method which entails a commitment by the construction manager to deliver the project within a Guaranteed Maximum Price. The construction manager acts as construction consultant to the owner in the development and design phases. In addition to acting in the owner's interest, the construction manager must manage and control construction costs to not exceed the GMP, which would be a financial hit to the CM Company. If the contractor completes the job under the GMP, the savings goes back to the owner, or in many cases, shared among the owner and the contractor. This would be determined at the beginning of the project and stated in the contract between the two parties.

This type of project delivery system allows the Owner, Construction Manager and Architect/Engineer to work as a unified team. It is advantageous to include the Construction

Manager at the start of the project to gain the full benefits of their construction knowledge for the team. It is also important that all team members understand their duties and responsibilities required for a successful project. Before design of a project is completed the CM is involved with estimating costs of constructing a project based on hearing from the designer and Owner on what is going to be built.

2.6 Project Objectives and Expectations

A major decision that parties involved with the project, especially the general contractor, is establishing a clear difference between the wants versus the needs. A meeting with Melissa Hinton, who is a project engineer for Gilbane, further discussed the importance of choosing between wants and needs. The types of decisions made in this area of the design process could be the difference between performing under budget or over budget (Hinton, 2009).

Major decisions that were discussed in the meeting were deciding on solar water heaters, smart boards, and a high powered air conditioning unit. The problem with choosing these commodities is that they are great to have in the near term but will not give a financial return until the long term. With a tight economy currently, there are hundreds of these decisions that the project team (contractor, architect, owner) have to make. All parties are involved because an architect will present an idea or concept, the contractor will review the financial impact it will have on the project and give input to the owner on what to do or present alternatives and then it is ultimately up to the owner to make the decision. (Hinton, 2009).

2.7 Prior Challenges

Problems are a common in the construction industry. Ranging from the effects of the national economy on the budget of projects to faulty designs of the structure, poor workmanship

by the subcontractor and flawed materials arriving on-site. Delays are a common occurrence during construction and project managers must be diligent to keep the project on schedule. Every construction project has to deal with dilemmas whether they are long term or day to day and this was also a common theme for the Worcester North High Project.

Chapter 3 - Project Scheduling and Safety

The activities that are necessary to build the project are interconnected in terms of their sequencing of execution so a schedule based on the order they can be completed in the most economically logical and physically logical procedure to achieve a fast completion time. Schedules are developed to determine the time and order of execution of each of the activities. Cash flow analysis is an extension of the use of the schedule in which the cost associated to each activity is projected over time.

The summary of the original North High School project schedule dated March 3, 2009, contained 15 main activities that last from the start date, March 2009, until the final estimated early completion date, May 11, 2011. The updated schedule as of September 18, 2009, had a changed estimated early completion date of September 8, 2011. This final date has since changed again to August 29, 2011. Changes to the schedule have been made again as of January 22, 2010. The chart below shows the 13 project milestones and their anticipated completion dates. Figure 2 is a chart displaying the information in Table 1.

Item	Proposed Completion as of 3/12/2009	As of 9/18/2009	As of 1/22/2010
Final GMP Submitted	6/8/2009	11/18/2009	3/11/2010
Final GMP Approved	8/7/2009	1/18/2010	5/10/2010
Interior Framing Complete	3/22/2010	4/28/2010	5/14/2010
MEP Rough-In Complete	8/11/2010	6/24/2010	7/19/2010
Exterior Skin Complete	7/14/2010	10/27/2010	11/30/2010
Elevators Complete	7/19/2010	11/24/2010	12/6/2010
Site-Work + Landscape Complete	8/11/2010	11/24/2010	12/29/2010
Roof Complete	1/28/2010	11/24/2010	12/29/2010
Finishes Complete	11/22/2010	1/6/2011	1/14/2010
General Punch List Complete	3/16/2011	3/17/2011	3/25/2011
Project Substantial Completion	3/16/2011	3/17/2011	7/21/2011
Certificate of Occupancy	3/16/2011	3/17/2011	7/21/2011
Project Final Completion	5/11/2011	9/8/2011	9/16/2011

Table 1: Comparison of Construction Schedules

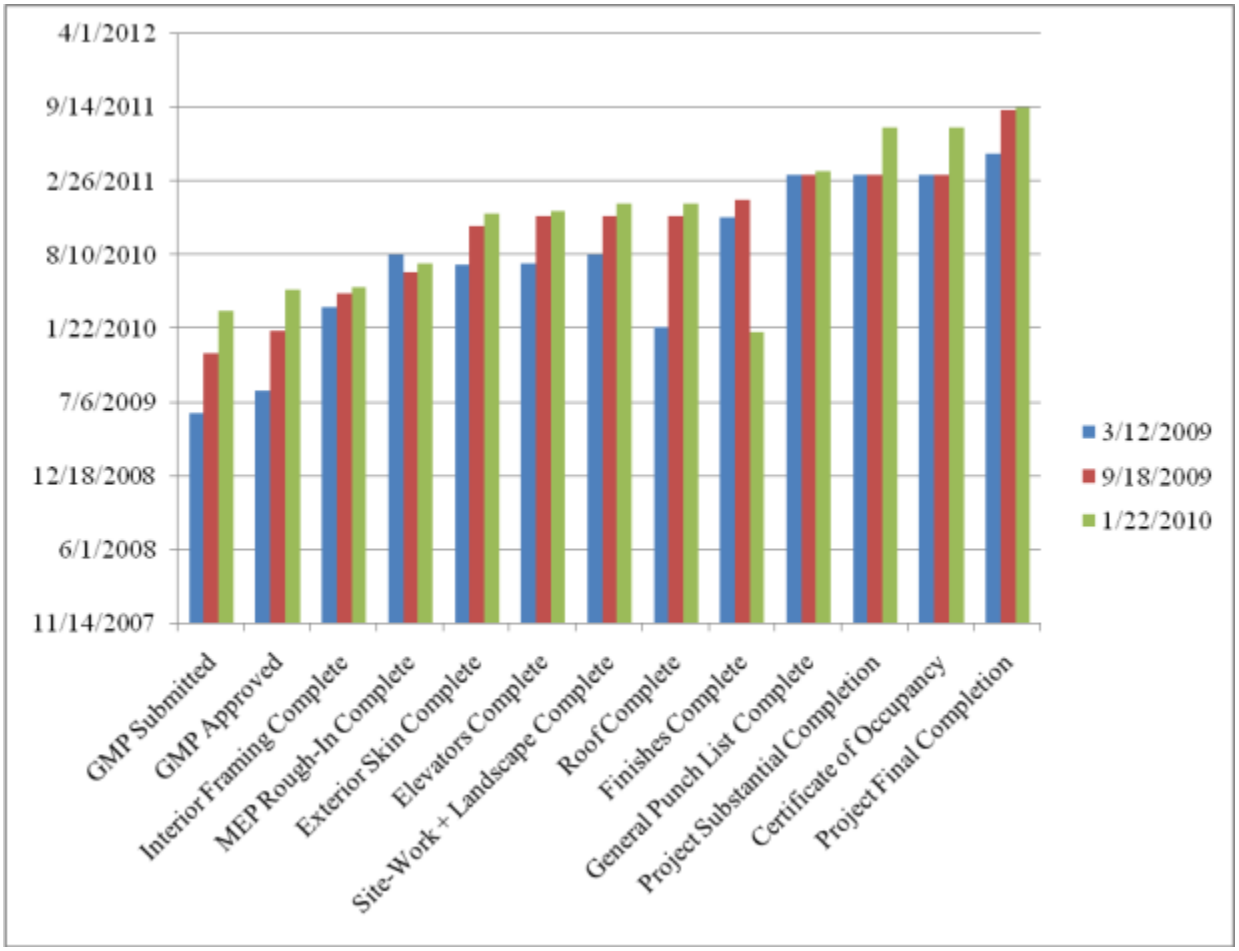

Figure 2: Construction Schedule Change Comparison

The most up to date schedule as of January 22, 2010 now shows the final completion date to be September 16, 2011. Along with the final completion date of the project, other critical items have been delayed. A major reason for the delay of the project is the city architect, City of Worcester Architectural Services, who has been unable to answer request for information (RFI's) from subcontractors in a timely manner. In an attempt to pick up the pace of the project activities the Construction Manager Gilbane Building Company, accelerated the installation of gypsum board in building A and B instead of wrapping the building for the winter season. The reason wrapping the building, or closing the building in, is essential is because workers will not be able to work on interior installations during the cold New England winter months.

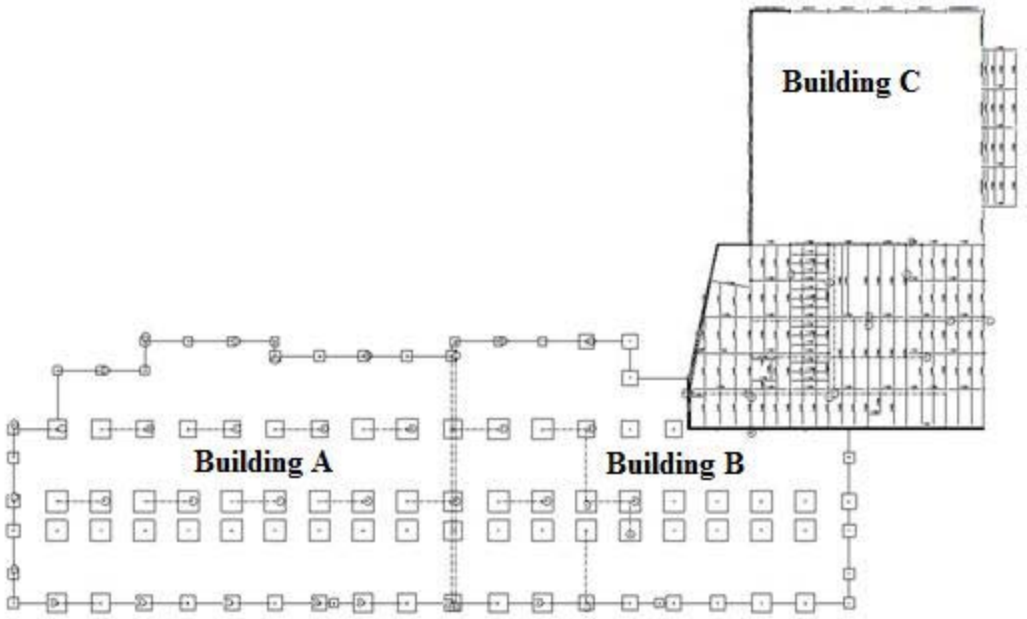

Figure 3: Floor Plan

The process used by Gilbane Building Company to deliver the North High School project was a fast track method. In the preconstruction phase of the North High School project, two main activities were performed. The architect/engineer designed North High School including Building A and B which is predominantly classrooms and Building C which includes an auditorium and gymnasium. The construction document phase began after development of the detailed design by the architect. Construction documents are extremely critical because these are needed in order to put out and receive bid from construction subcontractors. Since this project is based on the fast track method the procurement phase started upon completion of schematic designs. The construction phase of North High School contains 12 critical activities. Please refer to Appendix A for a schedule of the project. Site work included excavation and tree removal of the site to make room for the four-story high school, gymnasium and auditorium. The concrete foundations were poured and the structural steel was erected. Metal decking with cast in place concrete floors was used for the floors of the second, third and fourth floors. Following the

erection of the shell of the building, exterior studs were installed and the exterior skin and exterior roof followed. The summary of activities also included the installation of elevators, exterior metal panels and windows, interior framing, finishes and commissioning. The completion phase of the project is known as the close out phase. As you can see below this is the milestone summary as of March 2009.

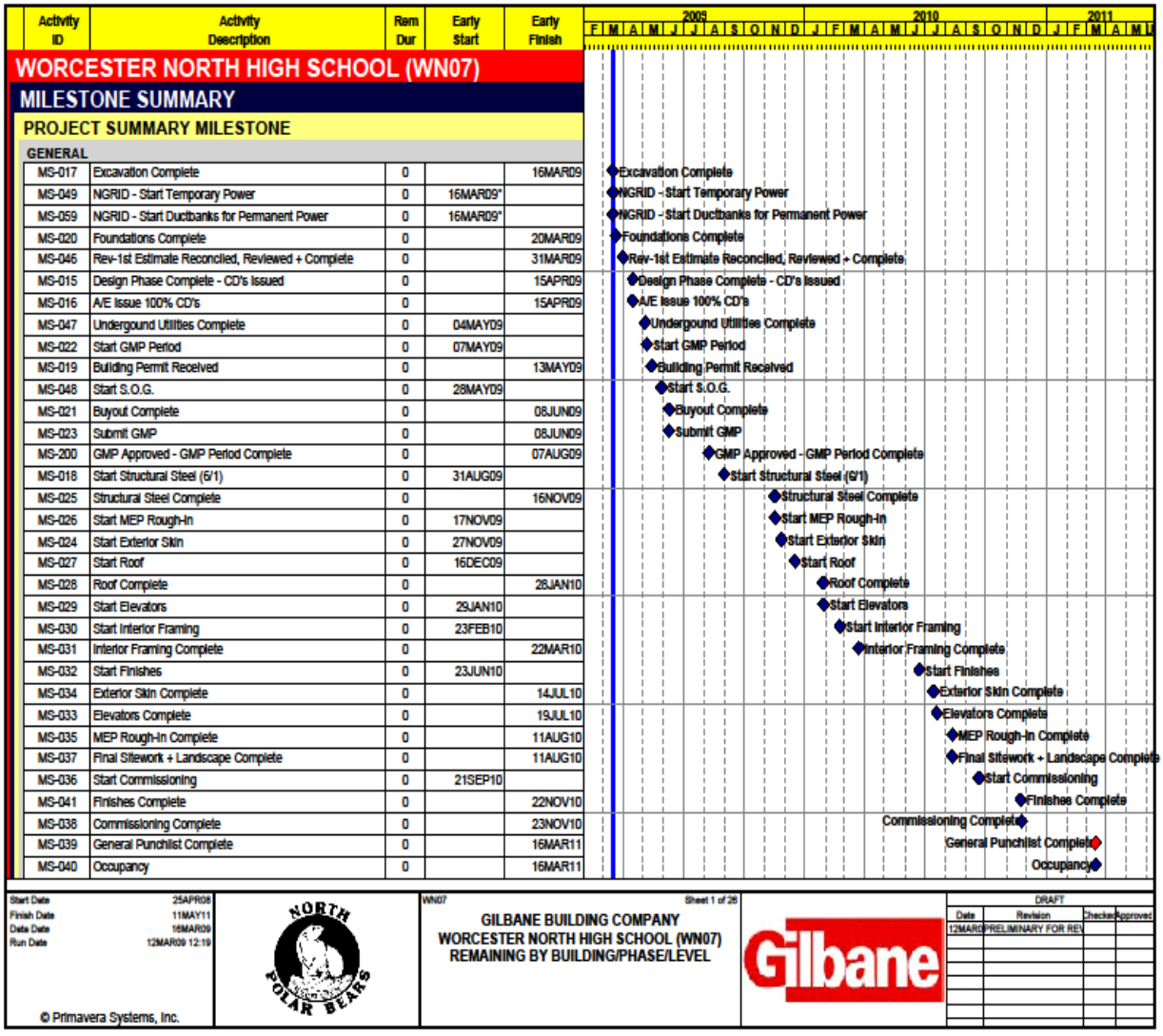

Figure 4: March 2009 Milestone Schedule

3.1 Safety

Safety in the construction industry has changed drastically in the past 20 years. Very rarely do you see men climbing 15 stories above ground level on steel beams without harnesses or sites where construction workers aren't wearing hard hats. Regulations have been set at stricter standards and firms are taking it very seriously. To work for certain owners or even in certain industries, such as the petro-chemical industry, a superb safety record is a must to even be allowed to bid on projects. On a lot of sites, such as Gilbane's North High, new workers must go through a site safety orientation that covers all general safety rules and any site specific rules that may exist. If you are a visitor on site you must be accompanied by someone who has been orientated and familiar with the site. The safety regulations have led to the upbringing of "tool box" meetings and "activity plans" where the foreman goes over with the crew in the morning that activities of the day and the hazards that are accompanied with the tasks. These types of meetings and plans are nearly required on most any large jobsite.

Gilbane Building Company also has an organized monthly man hour report that includes deliveries, visitors and man hours. In this report drug tests are tracked with positive and negative results, incidents and the percentage rate of occurrences are followed, lost time is counted and the project schedule value analysis is calculated. Four workers have tested positive for a banned substance out of 163 since Decemeber 2008. The data has tracked 50,421 man hours as of December 2009 and has recorded only 2 incidents, both in the previous 5 months. It's important to note howevere there have been no lost time incidents on the project. This information can be found in Appendix F.

Chapter 4 – Using BIM (Building Information Modeling)

Estimating the cost of construction projects is an extremely important aspect of project management. An estimate of a single job can directly affect the profits made by a construction firm. When a project is awarded the budget is developed from the estimate and the owner expects the contractor to meet their budget. At the same time, if the estimator doesn't accurately estimate a job, the firm may not win that many competitive bidding jobs. There are many different ways to estimate jobs when finding the material quantities, from doing it by hand on smaller jobs to using software to do the take-offs. One the defined quantities are calculated a unit price for each of these quantities is assigned and a total cost estimate is developed. The type of project makes the difference whether you can do the take off by hand or are able to use some software. On civil engineering projects, take-offs are usually done by hand because civil engineering projects encompasses so many different structures. In estimating commercial work, it's easier to do the material take-off with Building Information Models because commercial work is all very similar in that they contain columns, girders, foundations, etc. This software uses an object orientated-parametric 3D technology that makes it possible to extract the quantities directly from the BIM.

Figure 5: North High 3-D Revit Model

The software program that was used by our MQP team to develop the building model of North High School is called Revit Structures. Revit Structures was developed by Autodesk in 2008 that was meant to be used as a program to extract quantities of work for the model that in turn becomes part of the components of a cost estimate. The development of the Revit model came in stages from the grid lines and elevation settings to the final elements and final review. North High School was broken into three main sections; buildings A, B and C. The first buildings developed were buildings A and B of North High School, which are predominately classrooms, because of their structural similarity. Then following the completion of buildings A and B, building C was developed. Building C houses the auditorium, locker rooms, weight room and gymnasium. This model is based on 2D drawings provided to us by Gilbane generated by the architect.

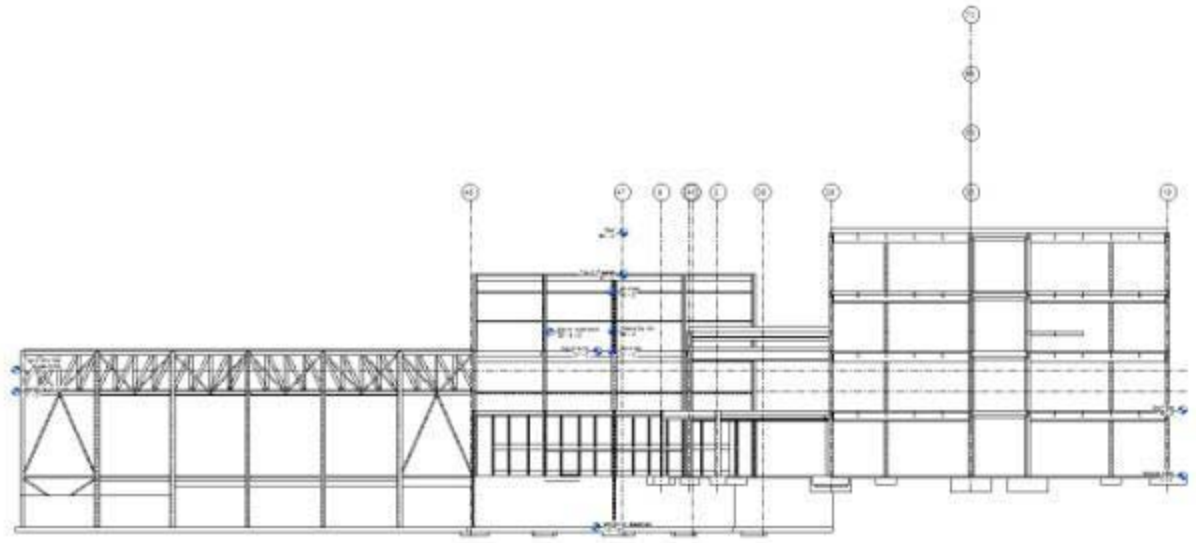

Figure 6: Revit 3D Model Street View (North Elevation)

4.1 Getting Started

The first step in building the North High School model was to develop grid lines and establish elevation levels. The elevation levels were created in order to clarify a correlation between the architectural drawings developed by Architectural Services and our Revit model. The North High School Revit model has 12 elevation levels in all, ranging from the ground floor to the top of the auditorium parapet. After an element is added to a particular level it can be viewed from a 2D view options, the software is created to initially offer north, south, east and west views showing the vertical picture of the element.

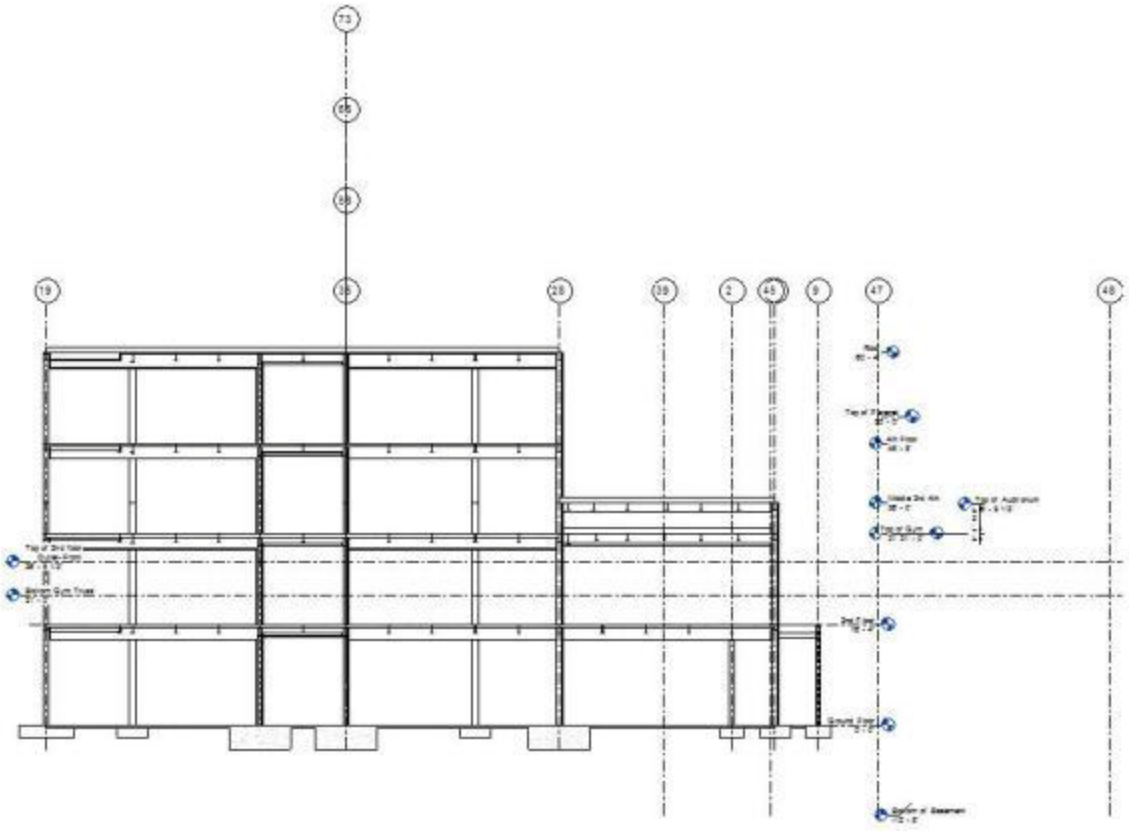

Figure 7: Revit Model Elevation Levels (Cross section)

Other viewing options are the 3D views, different 3D views can be developed manually and the standard view is offered initially. The 3D views can be rotated at will using A navigation cube is located in the upper right hand portion of the screen; this cube can be used to change the 3D view to investigate and visualize different parts of the model.

4.2 Foundation

Following the implementation of grid lines and elevation levels the next step of the BIM development process was to insert column footings. This function was very simple and completed by following the specifications and making sure each individual footing property matched the specified size. With the footings in place, there weren't any foundation walls to be

inserted for buildings A and B. The foundation wall for building C was implemented later in the process because it had complex elevation changes.

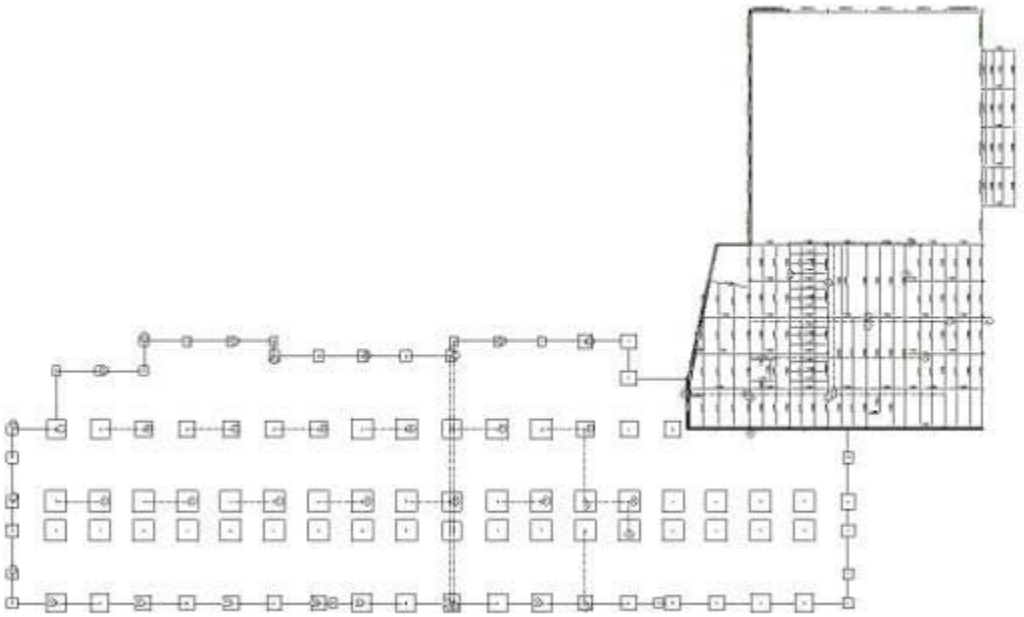

Figure 8: 2D Ground Floor Plan

4.3 Steel

Once the foundation was completed, the steel columns were placed in REVIT in compliance with the specifications of the project. The columns in buildings A and B were predominately similar. Building C was more advanced in the difficulty of the design. Building C includes the auditorium and gymnasium. The auditorium included the stage, arena seating, and a parapet. Overall over 2500 steel beams were used in the construction of North High School.

4.4 Quantity Take-Off/Cost Estimate

The cost estimate for North High School was developed by using the architectural plans and specifications. The drawings that were used to complete the take-off are comprised of the four floor levels of buildings A and B, the three levels of the auditorium and the gymnasium. The

materials that were quantified included concrete and steel. The cost estimate for North High School was created by using pricing from the 2010 version of R.S. Mean's method of Building Construction Cost Data. The R.S. Mean's Construction Cost Data book contained the average prices for different types of material that are used in construction, the book also contains a location factor that adjusts costs to the specified area the project is in. The location factor for Worcester is 109.5.

4.5 Concrete and Steel Quantity Takeoff

The concrete and steel takeoff was performed by Revit Structures using the Schedule function. Revit counted each individual piece of steel or concrete element and created a list of information containing the type of element, the volume and the length. From this all that needed to be calculated was collecting each element into groups of the same element. After the steel elements were properly grouped the tonnage had to be calculated. The tonnage of steel was found by following a few steps. The total length was found by adding up the lengths of each piece of steel with the other pieces of steel in their respective group. Then pounds were found by multiplying the pounds per linear foot with the total length. After each group had a total amount of pounds they were all added together and multiplied by 1.1 to take in account for the connections, this gave the overall weight of the steel in pounds. Tonnage was then found by dividing the weight in pounds by 2000. North High School ended up containing 944.16 tons of structural steel according to the Revit model. Table 2 shows the steel quantity take-off.

Type	Total Length	Lbs/Ft	Lbs
HSS5X5X5/16	2705.777	19.08	51626.22516
W8X10	27.458	10	274.58
W8X18	54.229	18	976.122
W10X12	2878.51	12	34542.12
W10X15	1380.083	15	20701.245
W10X22	555.458	22	12220.076
W12X14	1691.635	14	23682.89
W12X16	42.2	16	675.2
W12X19	200.281	19	3805.339
W12x26	2363.198	26	61443.148
W12X30	74.667	30	2240.01
W12X35	37.333	35	1306.655
W12X40	168	40	6720
W14X22	4335.01	22	95370.22
W14X30	2506.688	30	75200.64
W16X26	15749.27	26	409481.02
W16X31	205.927	31	6383.737
W16X36	325.416	36	11714.976
W18X35	2596.5	35	90877.5
W18X40	368	40	14720
W18X50	218.667	50	10933.35
W18X60	140	60	8400
W18X76	18.25	76	1387
W18X97	69.167	97	6709.199
W21X44	165.167	44	7267.348
W21X48	246.573	48	11835.504
W24X55	2518.083	55	138494.565
W24X62	540.833	62	33531.646
W24X68	82.583	68	5615.644
W24X76	346.667	76	26346.692
W27X84	322	84	27048
W30X99	4749.667	99	470217.033
W30X116	105	116	12180
W33X118	277.333	118	32725.294
*Multiply by 1.1 for connections		Lbs	1716652.978
		Lbs	1888318.276
		Tons	944.159

Table 2: Steel Takeoff

The concrete quantities were grouped into rectangular footings, wall foundations, and foundation slabs. The structural foundation schedule that was developed by Revit did not automatically group the concrete items into families, this was completed manually. Overall there was 113,385.03 cubic feet in the Revit model, the total cubic feet converted to cubic yards is 4200 cubic yards. This was found by dividing the cubic feet by 27.

Structural Foundation Schedule			
Family and Type	Quantity	Volume	Unit
Rectangular Footing	128	742	CY
Wall Foundation	9	28	CY
Foundation Slab	7	3430	CY
	Subtotal	4200	CY

Table 3: Concrete Takeoff

4.6 Steel Estimate

The estimate of the structural steel for North High School, budgeted for by Gilbane Building Company, was $2,890,000. The actual award amount was $2,870,000 to United Steel, Inc. As of 10/28/2009 change orders had raised the total cost of the structural steel to $3,163,901. The quantity developed by the Revit model found to have 944.159 tons of steel and using RS Means Building Construction Cost Data 2010 the average price for steel by ton for a high school was $3,216 for bare costs. For the Revit estimate the location factor of Worcester, Ma factored into the cost was 109.5. Using the price given by RS Means costs, the overall Revit model estimate for structural steel came to $3,324,875. The Revit estimate ended up being 4.84%, or $160,974, higher than the actual cost Gilbane Building Company was required to pay. These numbers are considering that North High School falls directly in the middle of minimum and maximum sized high schools.

Variable	Price
Average $ per Ton	$ 3,216.00
Steel Tonnage	$ 944.16
Location Factor	110%
Revit Estimate	$ 3,324,875.00
Gilbane Cost (10/28/09)	$ 3,163,901.00
Difference	$ 160,974.00

Table 4: Steel Estimate

4.7 Concrete Estimate

The concrete for North High School was grouped into three main families; rectangular footings, wall foundations, and foundation slabs. Using RS Means, prices were found for the cost per cubic yard of the specific concrete. The average price for 4000 PSI concrete with no additives was $113 per cubic yard according to RS Means. Each of the three groups have different specifications in their mixes and require certain additives, this can be seen by the varying prices. The Revit model found that North High School had a volume of 4200 CY of concrete and breaking the total amount into three groups and assigning different prices to them the overall estimated cost was $814,740. Table 5 displays the concrete estimate.

Structural Foundation Schedule				
Family and Type	Price Per CY	Volume	Unit	Cost
Rectangular Footing	$ 277.70	742	CY	$ 206,053.40
Wall Foundation	$ 371.80	28	CY	$ 10,410.40
Foundation Slab	$ 152.83	3430	CY	$ 524,206.90
	Location Factor		110%	$ 74,067.07
		4200	CY	$ 814,737.77

Table 5: Concrete Estimate

Chapter 5 - Earned Value Analysis

This part of the report performs an earned value analysis that was not conducted on the new Worcester North High School construction project; however, it was performed on a steel tank bottom replacement job by Cianbro Corporation in South Portland, Maine. The main reason for this decision is based on the level of detail available to conduct the analysis. The North High School project is being managed by Gilbane Building Company who does not self-perform the construction work. Therefore, labor utilization reports are not detailed enough whereas in the case of the steel tank replacement project, Cianbro Corp. self-performs the work, and the detailed documentation needed for the analysis was readily available to one of the authors.

5.1 Earned Value Analysis

Earned Value Analysis (EVA) is a technique project manager's use on all types of construction projects. This analysis is used to determine more accurately if a given project is on schedule and within budget. (Professional Construction Management, Donald S. Barrie, Boyd C. Paulson) Earned Value analysis uses three fundamental factors:

- **Planned Value**: This consists of the planned work, along with the authorized budget, within the authorized time-frame, which in total forms the project baseline.
- **Earned Value**: This is the real work that has been completed in relation to the Planned Value. A budgeted amount is earned as a task is completed up to the total Planned Value.
- **Actual Costs**: These are the actual costs incurred in the project regardless of the Planned and Earned Value.

The analysis uses the concept of quantity to complete to perform the analysis and to tie all three values together. An estimate is completed at the beginning of the project which was discussed in a previous chapter. In the estimate quantities of work are put together and money is

allocated to the given quantity of work; such as cubic yards of concrete, square footage of brick, tons of steel etc. Throughout the project the management team has to update the quantity of work completed to determine the percent complete. The analysis is performed by looking at the time and money it took to complete the given quantity of work put in place (percent complete) and to forecast the time and money it will take to perform the "quantity to complete." It's important to use the correct units of measurement for work completed in each activity as this could lead to major errors in the budget forecast; for example if the budget is estimated in tons of steel; tons of steel needs to be entered in for the quantity completed, not pounds or kilograms.

From this analysis a project manager can tell if the job is over or under budget and behind or ahead of schedule on lump sum projects. Below is a simple example.

From The Budget:

Formwork estimated at 300 WH's for 1200 SF (total quantity) or **.25** WH/SF

At a given time "x" the Planned Work was the following:

120 WH to complete **480 SF**. Quantity to complete would equal 720 SF.

The Actual Work at time "x":

130 WH to complete **600 SF** (quantity completed, 600 SF to complete; 50% complete)

Earned WH = .25 (from budget) X 600 (SF completed) or **150 WH's**

Cost Variance: 150 WH (Earned) – 130WH (Actual) = **20 WH Under Budget**

Schedule Variance: 150 WH (Earned)–120 WH (Planned) = **30 WH Ahead of Schedule**

This type of analysis is extremely useful for large general contracting firms who self-perform all or most of their work. This analysis is useful in developing project projections for the end of the job. This analysis can be used for every portion of the job, from pouring concrete to

the amount of consumables used to overhead on the job. Not only does this analysis help out the current project but can also help estimate future work that is similar.

For pure construction management firms who do not self-perform any work, the technique is used a bit differently; as they are not so much concerned about budgetary numbers from activity to activity, as they usually contract out packages of work on a lump sum basis, as much so as the schedule. From looking at what a sub-contractor has completed versus what work he has left, the project manager can determine what the production rate of a certain activity is and from that project how much longer it will take the contractor to complete the work. This gives the project manager a leg up on any negotiations with the sub-contractor to bring more people on site if they are falling behind on their work.

The project manager is also concerned about how much more or less he is paying the sub-contractor to what it should be paying. At the beginning of the job, when a sub-contractor is brought in, they will usually give the CM what is called a schedule of values. This schedule of values allocates values for the various parts of the work. Mobilization, excavation, backfill and demobilization are typical activities you may find on an earthwork sub-contractors schedule of values. The sub-contractor will associate a cost to each of those different activities and use this as the basis for submitting and reviewing progress payments. It is up to the project management team to confirm the percent complete on the schedule of values by verifying in the field what has been done. This usually does not need to be an exact science but the project manager needs to make sure that the sub-contractor isn't asking for money for work that hasn't been completed at the time of payment.

5.2 Project Background

For the EVA analysis of this report, we looked at steel tank bottom replacement job being performed in South Portland, Maine. The project consisted of replacing the steel bottoms of two 150’ diameter oil tanks and installing a foundation and a leak detection system. For this to be performed the old floor (bottom?) had to be cut away from the tank shell and the entire shell had to be jacked up 3’ in the air with the use of twenty-four 70 ton air bags. Pictures can be found in Appendix H. This allowed for the excavation to take place for the concrete ring-wall. Inside the tank shell a center sump and leak detection piping was installed to detect if any leaks occurred. On top of the old steel floor an 80mm liner was installed to act as a diaper if a leak were to occur. On top of the liner, rings of cathodic protection were laid to prevent rusting of the new floor. One foot of sand was then installed over the liner and cathodic protection which the new floor was to lay on. The General Contractor (GC) self performed the jacking of the tanks, with the consulting of a professional tank-jacking sub-contractor, the leak detection piping and the concrete work. The GC crews were also needed to assist the sub-contractors on-site. The earthwork, liner, cathodic protection and steel floor work has all been sub-contracted out to various contractors. A “picture slideshow” of the project can be found in the Appendix H.

5.3 Project Plan

Although a smaller project, this type of self-performed lump sum work creates a lot more overlooking with the actual work of the job then than a pure CM job. Not only does the project manager have to manage the self performed work but also the work of the sub-contractors. Responsibilities such as deciding how many workers the job needs from month to month, what sort of hours they are going to work, the buyout of materials and management of equipment on-site make the job more a little more involved. These items need to be combed over with a

magnifying-glass weekly because any sort of mistake comes directly out of the contractor's pocket. While overseeing the work, the project manager has to make tough decisions regarding budget and schedule. For example, if an activity is falling behind schedule, is it worth to work the overtime and pay the extra money to get back on schedule?, or does he believe they'll be able to make it up somewhere else on the schedule and continue to work 40 hour weeks? Items like this arise all the time and have to be managed correctly, while also managing sub-contractors on-site.

To getter a better understanding of both types of management we looked at activities that were self performed by the General Contractor which included all the concrete related work of the project. The concrete work included the buyout of all materials required on-site; the concrete itself (5000 psi and 2000 psi), the reinforcing steel and the formwork and all of its accessories. The estimate and schedule of these activities will be discussed in the analysis section.

For the GC's jobs, the project team develops a unit analysis report at the beginning of the job. This report includes what they call phases; these phases include work to be performed, OH costs, equipment costs, burdens, etc. In each phase they break the phase down into sub phases. These sub-phases include regular labor, overtime labor, materials, etc. In each phase there are a total number of units (yards of concrete, square footage of formwork, etc) and a budgeted amount for each sub phase they get from the estimate. Also in each phase are columns for costs to date and projected final costs. When entering the costs to date, the engineer/project manager also has to enter the quantity of work completed. Doing this the report will calculate the production rate and this will be used to determine the projected final costs based on the percentages. This will be elaborated on further on in this section. This report is extremely important to the management team as it tells them whether the job is over or under budget. The

project team however, has to do a good job of updating the quantities in each phase of the report because if not, this could yield falsie projections in the projected final column.

5.4 Means/Methods

The design of the ring-wall was a simple design, it contained a footing and the wall was to be 3’ tall by 2’ wide around the perimeter of the tank, approximately 472 feet. Where bedrock was encountered above the base of the footing elevation, the ring-wall or footing was to be constructed on the bedrock. The top of the wall contained a ¾” chamfer that also contained a slope, special screeds had to be constructed to get this finish. The reinforcing steel in the foundation was relatively large rebar, #6 and # 9 bars. Number 6 bar weighs 1.5 lbs/ft while number 9 bar weighs 3.5 lbs/ft. A drawing of the wall can be seen in Figure 7. Cianbro does a lot of concrete work but this was the first time doing one of these projects so there was an expected learning curve throughout the project. The good part of this job was that two tanks needed to be modified so whatever worked and didn’t work on the first could be changed accordingly for the second tank.

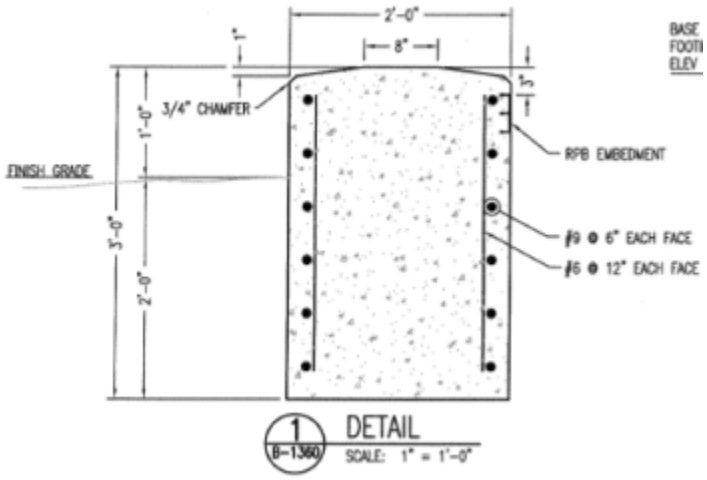

Figure 9: Foundation Detail

Once the tank shell was jacked in the air and the excavation was complete, the Cianbro crews needed to pour the footing. Although the footing could have conformed to the excavated trench, it was decided that it would be more cost effective to have the crew spend a day forming up the footing then paying for much more concrete to fill the trench. The formwork was very rough and made out of plain pieces of plywood. Access around the tank was limited so the use of a pump truck was incorporated. The pour started at 7am, was finished by 10am and 86 yards of 2000psi concrete were used. The concrete crew consisted of a man on the end of the pump hose, 2 men on a vibrator and 2 men backfilling the form so they wouldn't blow out. A picture can be seen in Figure 8 below.

Figure 10: Concrete Pour

Figure 11: Concrete Footer Finish

Although the pour only lasted 3 hours, it was important for the management team to have planned other activities for the crews to do the rest of the day. If not, the crews would still get paid for 10 hours of work for that day in the pouring concrete phase which could really hurt the budget on a small project like this. In self-performed work, the planning of work from day to day is extremely crucial for a successful project.

Once the footing was cured, the formwork was removed and the formwork for the wall was put into place. To get the layout of the wall, a tape was pulled from the center of the tank to the inside of the wall every 18 feet. Once the marks were around the perimeter of the footing, a previously made cut-out of the radius was laid and the inside of the wall was marked out on the footing. The inside formwork was put up first and this took 2 days. The rebar was next to been installed and this took 3 days. The #9 bars came in 30’ lengths and with a weight of 3.5 lb/ft; these pieces were quite heavy and needed four guys to put up and tie. The installation of the rebar took 3 days. Once the rebar was complete the outer formwork was put up and the crews

were ready to pour. For the first tank, 2 concrete pumps and two finishing crews were used. After completing this with no problem it was decided to only use one pump truck and one finishing crew on the second tank, see Figure 11. The first tank took less time out of the day but the second tank was more cost efficient as we used less work hours than the first tank and the job only had to pay for the use of one pump truck instead of two. Photos of the concrete pour can be seen below and more can be found in the Appendix H.

Figure 12: Tank #2 Concrete Pour

Figure 13: Concrete Hose

Figure 14: Concrete Finishing

5.5 Project EVA Analysis

Throughout the duration of the project each week the management team will updates its "unit analysis reports" better known as earned value reports. For each week the project manger or engineer will look at the number of hours used for a given activity and update the quantity completed for that week. Based on the quantity completed to that point and the WH's used it will determine a new unit/hour number and apply that to the quantity to complete to get the estimated number of work hours to complete the job. By doing this every week the project management team can make sounder decisions on the project.

For this study the team looked at the concrete portion of the job in South Portland. Below is a breakdown of budgeted work hours for each tank and the total quantity of units for each activity. The duration of the concrete portion was estimated at 14 days; by the book this means we should have had 7 men on site to complete the work in that time period.

Activity	Budget WH's	Unit	Quantity
Formwork	612	SF	2850
Rebar	166	Tons	7
Placing	230	Yards	360
Total	1008		

Table 6: Budget Work Hours

For the first tank, everything went accordingly to plan with the actual WH's used nearly identical to the budgeted work hours This doesn't tell the whole story though, not only does the management team need to look at the number of hours used but the wages rates as well. At first glance it will look good if your budgeted hours are the same as your actually WH's but if your actual wage rate is $5.00 more than your budgeted wage rate, your budget will be shot. To keep confidentiality a wage rate of $25.00 was used for the budgeted actual wage rate and the actually wage rate was used at $26.25 (Note: the actual wage rates were 1.05% higher than the budgeted wage rates for the actual job and this is how the $26.25 was determined.) As described above in the means and methods section the concrete portion of the first tank took 10 days. A spreadsheet giving a good synopsis of the first tank completed can be seen below.

Day	Budgeted WH's	Actual WH's	Earned WH's	Actual Cost	Budgeted Cost
1	72	101	101	$2,662	$1,800
2	144	203	202	$5,324	$3,600
3	216	304	303	$7,985	$5,400
4	288	406	404	$10,647	$7,200
5	360	507	505	$13,309	$9,000
6	432	608	606	$15,971	$10,800
7	504	710	707	$18,632	$12,600
8	576	811	808	$21,294	$14,400
9	648	913	909	$23,956	$16,200
10	720	1014	1008	$26,618	$18,000
11	792				$19,800
12	864				$21,600
13	936				$23,400
14	1008				$25,200
	Delta	-6		Delta	($1,418)

Table 7: Tank 24 Actual Cost/Budget Cost

Analyzing these data shows that the concrete activities were 4 days ahead of schedule, 6 hours over budget that equals out to $1,418 over budget. On a project this size, 6 hours and

$1,418 is not a bad loss; time is money and getting ahead of schedule by 4 days is economically more beneficial than $1,418. A graph displaying these different items can be seen below.

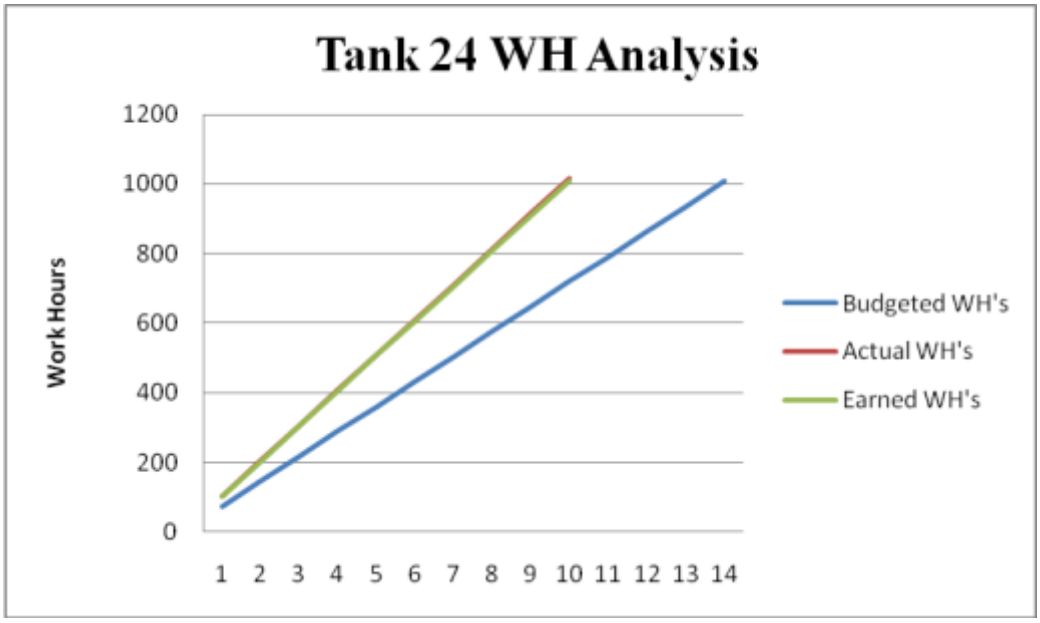

Figure 15: Tank 24 WH Analysis

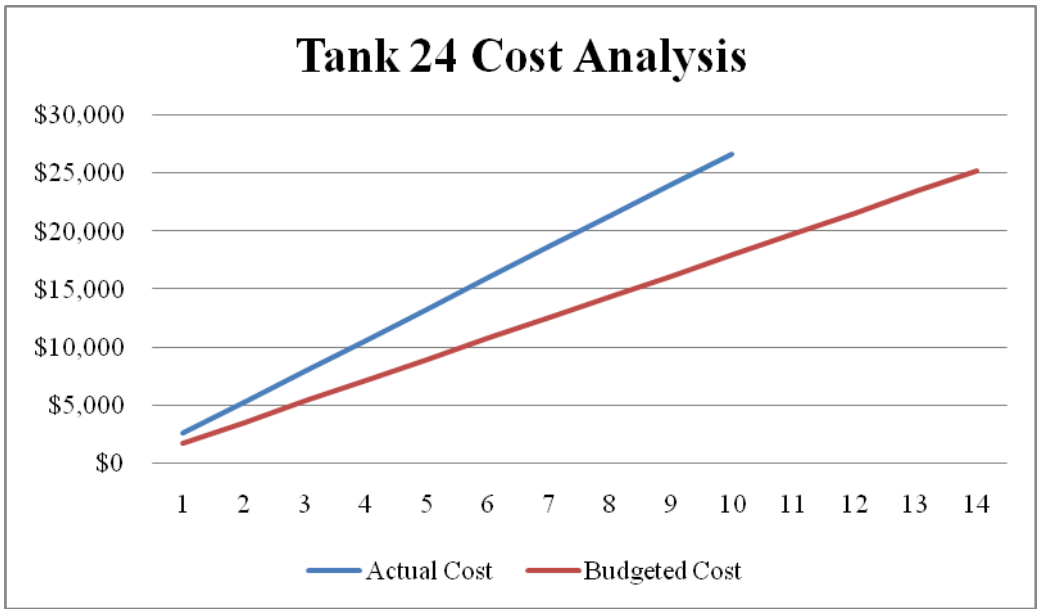

Figure 16: Tank 24 Cost Analysis

The second tank went a lot smoother than the first as there was a “learning curve” from the first tank; the craftspeople knew what to expect and what problems to look for on the second tank. Not only did the “learning curve” assist the craftspeople but also management team. The management team realized that the amount of work needed to be put in place didn’t require as much labor as estimated so the crew was cut down by 3 workers. Getting ahead of schedule on the first tank also made it easier to make this decision as there was some “float” in the schedule. The second tank took longer than the first tank to complete but saved a lot of WH’s and still finished on schedule. The spreadsheet can be seen below.

Day	Budgeted WH's	Actual WH's	Earned WH's	Actual Cost	Budgeted Cost
1	72	61	78	1531	1800
2	144	122	155	3050	3600
3	216	183	233	4575	5400
4	288	244	310	6100	7200
5	360	305	388	7625	9000
6	432	366	465	9150	10800
7	504	427	543	10675	12600
8	576	488	620	12200	14400
9	648	549	698	13725	16200
10	720	610	775	15250	18000
11	792	671	853	16775	19800
12	864	732	930	18300	21600
13	936	796	1008	19900	23400
14	1008				25200
	Delta	398		Delta	9950

Table 8: Tank 23 Actual Cost/ Budget Cost

Breaking this spreadsheet down shows that the concrete work on the second tank was 1 day ahead of schedule and 398 work hours under budget; equivalent to $9,950. This means the schedule was done in 93% of the time estimated and used only 79% of the budget.

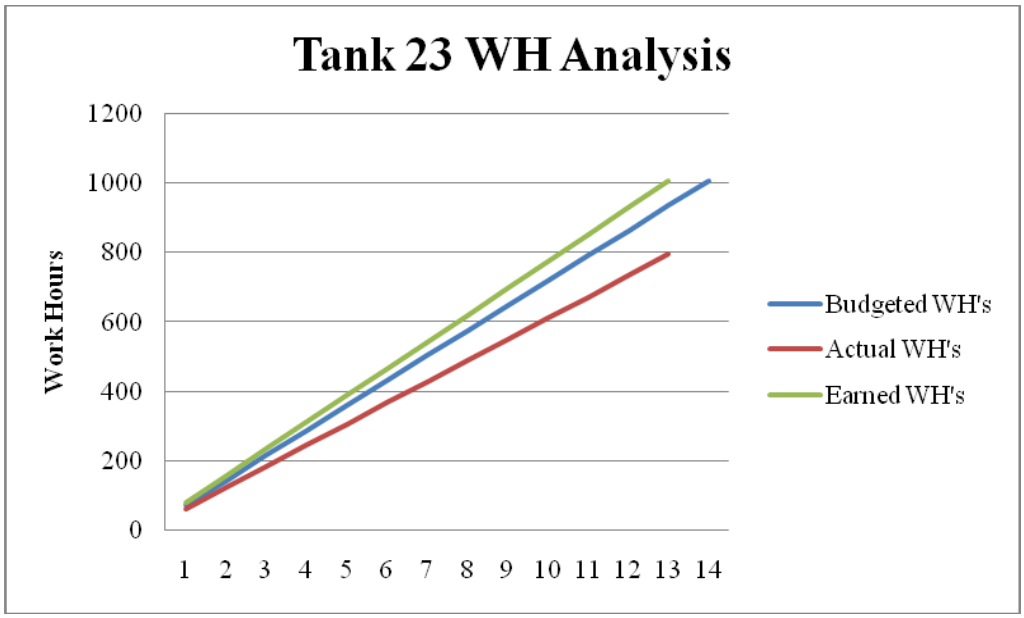

Figure 17: Tank 23 WH Analysis

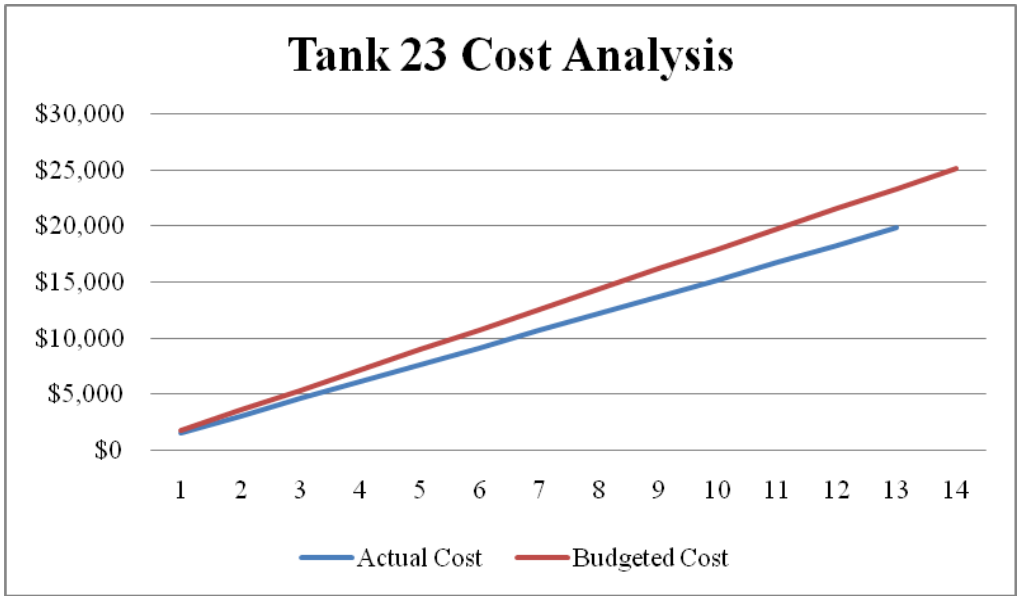

Figure 18: Tank 23 Cost Analysis

Looking over the entire concrete portion of the job combining both tanks the activity ended up being 392 WH's ahead of budget, equivalent to $8,532 and 5 days ahead of schedule. Please note that there is more to the budget that includes cost of materials which also is included

in the budget that was not included in this analysis. This analysis just shows a snapshot of a piece of work on a project. This analysis applies to every aspect of the job. It's important to quantify everything that will be billed to the job and is quantifies with a correct unit of measurement; this goes for equipment, small tools, consumables, fuel, etc. These items are usually designated in the OH area and should be quantified in weeks of the job as these items are usually spread out evenly across the duration of the project.

To understand the "time is money" concept we looked at the OH savings associated with beating the schedule. Analyzing the budget it was found that the OH budget was $680,000 spread out over 180 days. This equals to $3,778 per day. (The OH phase includes OH labor, equipment, burdens, small tools, consumables etc.) With the schedule being 5 days ahead of schedule this equals out to a savings of $18,890. The total savings of this activity is the direct savings and the OH savings combined together which equaled out to $27,422.

Chapter 6 – Design and Constructability Analysis of New Retaining Wall

This chapter is dedicated to the analysis and design of an alternative retaining wall at the new Worcester North High School. During the design process, there were many different considerations on what type of retaining wall to use to stabilize the area around the 60 foot cliff that is located in around the back side of the construction site. Cullinan Engineering, an engineering firm located in Auburn, Massachusetts, designed the retaining wall that is currently in place at the construction site. The designers chose a semi-gravity retaining wall, which relies mostly on its' own weight to support compression forces, but has some steel reinforcement. The goal of this chapter is to determine the feasibility of choosing a cantilever retaining wall with counterforts instead of a semi-gravity wall and to compare the economic value of each type of retaining wall. The design process and equations were taken from Arthur Nilsen's textbook *Design of Concrete Structures*.

6.1 Original Retaining Wall Design-Pre Construction Phase

The construction of the new high school was to be built alongside the old high school and a steep cliff shown in Figures 19 and 20. During the pre-construction phase of the design, the engineers at Architectural Services chose a design of riprap to protect the school and soil from the cliff, which at its highest point along the school is around 60 feet, shown in Figure 20. There is a need for some type of retaining wall against the cliff because there is a road that travels around the back of the school and along the cliff. To avoid the soil from sliding due to the live loads that travel along the road during construction and post-construction, retaining walls are placed for the safety of the site. Not knowing how close the road was to the cliff, the engineers suggested that major live loads were not to be included in the design and simple riprap would be a sufficient and cost effective solution to holding back the soil at the cliff.

Figure 19: Approximate Area of Construction

Figure 20: Approximate Area of Cliff

Riprap is a layer made of stones, as seen in the figure below, which is intended to protect the soil from erosion do to runoff from rain. Some limitations of riprap include that it is limited by steepness of slope that are greater than 2:1 because it has the potential of loss due to sliding. Riprap is extremely cost effective, with prices ranging anywhere from 35$ to 60$ per cubic yard. Again, the pre-construction thought of engineers was that the road behind the school was far enough away from the cliff to prohibit any more complicated designs than riprap.

Figure 21: Riprap

6.2 Retaining Wall Changes- During Construction

During the site work and excavation for the new Worcester North High School, it was clearly evident that the riprap first designed would not be able to hold the construction loads that would be applied to the area during construction. Figure 22 shows that the corner of the building is only 21 feet from the cliff and that riprap would no longer be a valid solution to the 60 foot

drop-off. This would have been extremely dangerous for construction vehicle traveling around this corner.

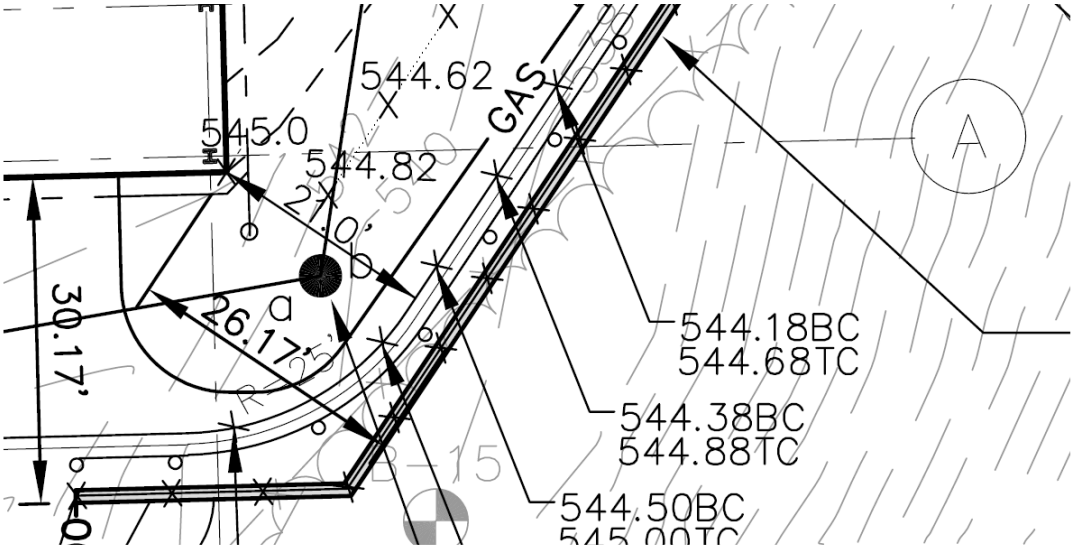

Figure 22: Plan View of New Retaining Wall

Figure 23: New Semi-Gravity Retaining Wall

Since the new design for retention was to be more complicated than ordinary riprap, Cullinan Engineering was hired to design the new wall. There are many different options Cullinan could have chosen for the design of the wall. The three most common types used is a standard gravity retaining wall, and semi-gravity retaining wall, and a cantilever retaining wall. These options are displayed in Figure 24.Gravity walls are constructed with plain concrete or stone masonry and they depend on their own weight and soil resistance for stability. Typically this type of construction is not economically conducive to high wall design. In some cases, a small amount of steel is used for the construction of a gravity wall, thus making it a semi-gravity wall. Placing steel in the gravity wall will significantly reduce the size of the wall section because it strengthens the concrete in tension, thus saving money. A cantilever wall is made out of reinforced concrete that has a thing stem and base slab.

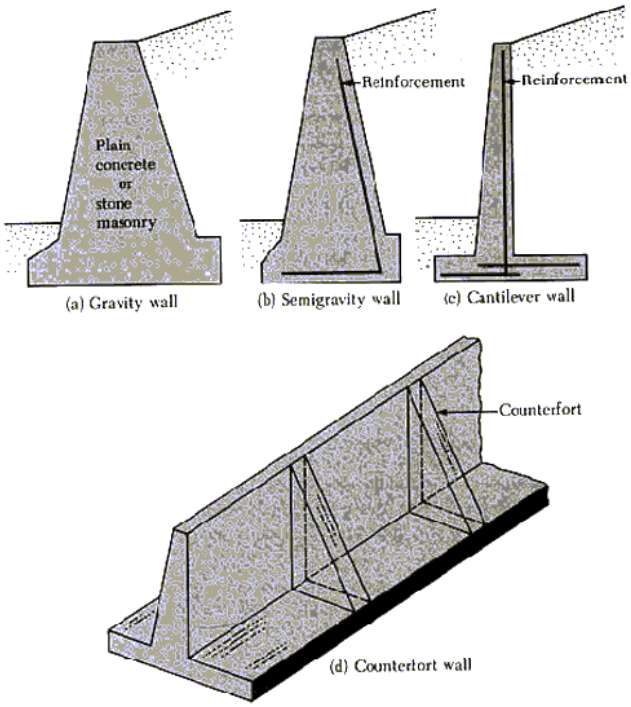

Figure 24: Cross Sections of Different Retaining Walls

Cullinan Engineering chose a semi-gravity wall for this design as seen in Figure 25. The wall is not the same height around the corner of the road, because the cliff is not the same height. The Cliff drops off drastically the further north it is. This means that the retaining wall does not have to be the same height, but in intervals of height instead. At its highest point, the wall is 14.5 feet and that is where the cliff is at its greatest length of around 60 to 65 feet. Moving northward along the road, the wall significantly drops to lengths of 10 feet and eventually 7 feet.

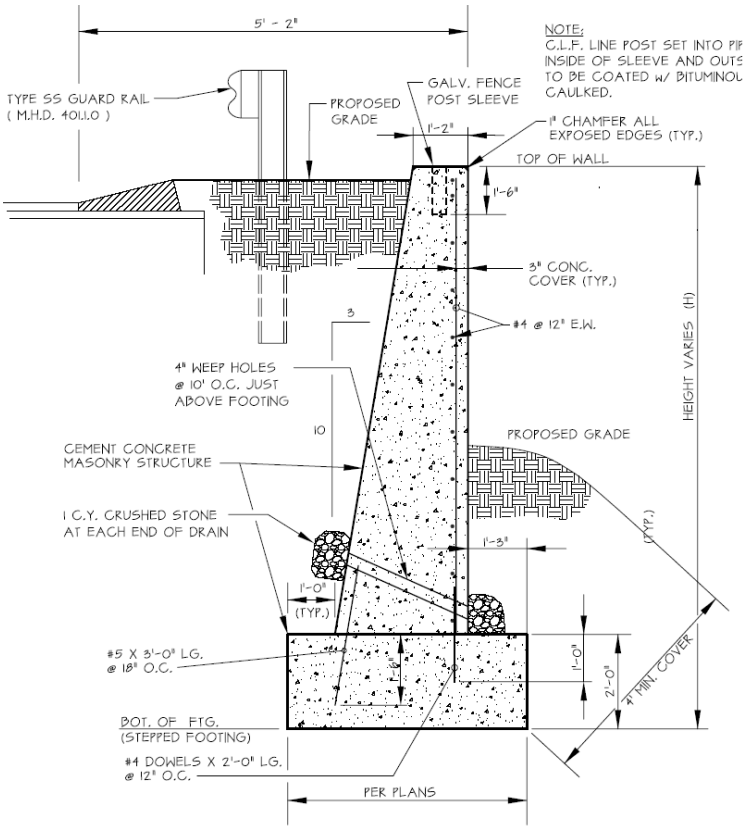

Figure 25: Cullinan's Retaining Wall Design

6.3 New Cantilever Retaining Wall Design with Counterforts

The proposed alternative solution for the retaining wall design is driven by several factors; ground water and soil conditions, cost and required wall height. The first step in designing the retaining was to obtain information on the earth's lateral pressure in the area. The basic soil parameters include:

- Soil unit weight
- Angle of internal friction (for sands)
- Cohesion and plasticity indices (for clays)
- The water table location.
- Ledge location

From here we were able to size the wall and check for stability; this will include checks for wall overturning, base sliding, and soil bearing capacity failures. After the wall is sized, each wall member was checked for adequate strength and steel reinforcing was determined.

A cantilever retaining wall with counterforts was the type of wall that was chosen for this design. A counterfort retaining wall is very similar to a cantilever wall, except that it has one additional feature. This wall has a triangular shaped cross section spaced at typically one foot which connects the top of the wall to the back of the footer. This added support wall is hidden within the earthen or gravel backfill of the wall. The footer, retaining wall and support wall must be tied to one another with reinforcing steel. The support walls add a great deal of strength to the retaining wall. The supports make it virtually impossible for the wall to become detached from the footer. Counterforts are usually used for high walls with heights greater than 24 to 26 feet. In

this case, the wall is only 10 feet high, but this type of design is also used for situations where high lateral pressures occur; where the backfill is heavily surcharged, in this case like North High where the area in close proximity to the wall will be used as a fire lane.

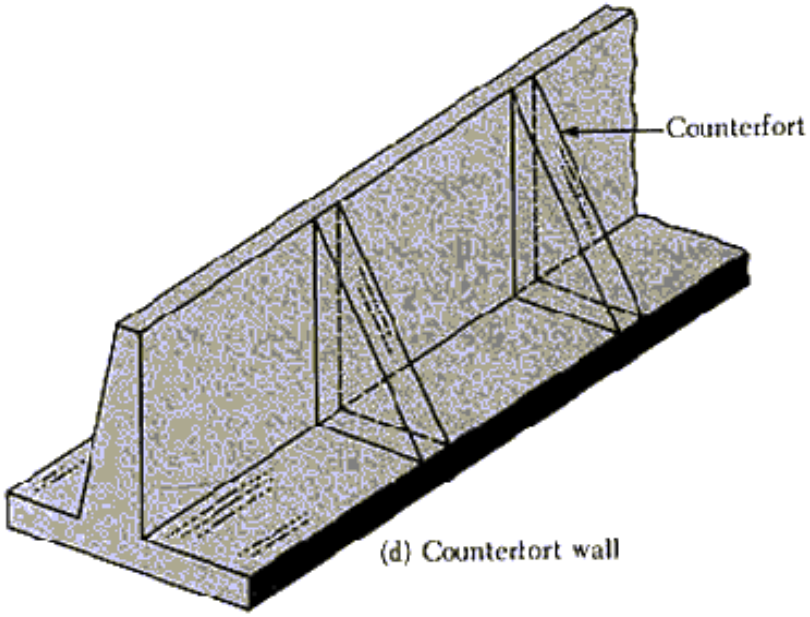

Figure 26: Typical Counterfort Wall

6.4 Preliminary Design

The first step in our design was to size the members, since we already had drawings of the current retaining wall it was relatively easy to realize what the height would need to be. We used the height of the current retaining wall to gather all of our dimensions, such as footing size, wall thickness and support sizes. These dimensions were based on a function of the retaining wall height from equations found in the foundation engineering handbook. Since the highest point of the current retaining wall at North High School is 14.5 feet, we estimated our height to

be a little lower than that at 10 feet. Once we had all of the dimensions of the wall we started the preliminary design on the wall.

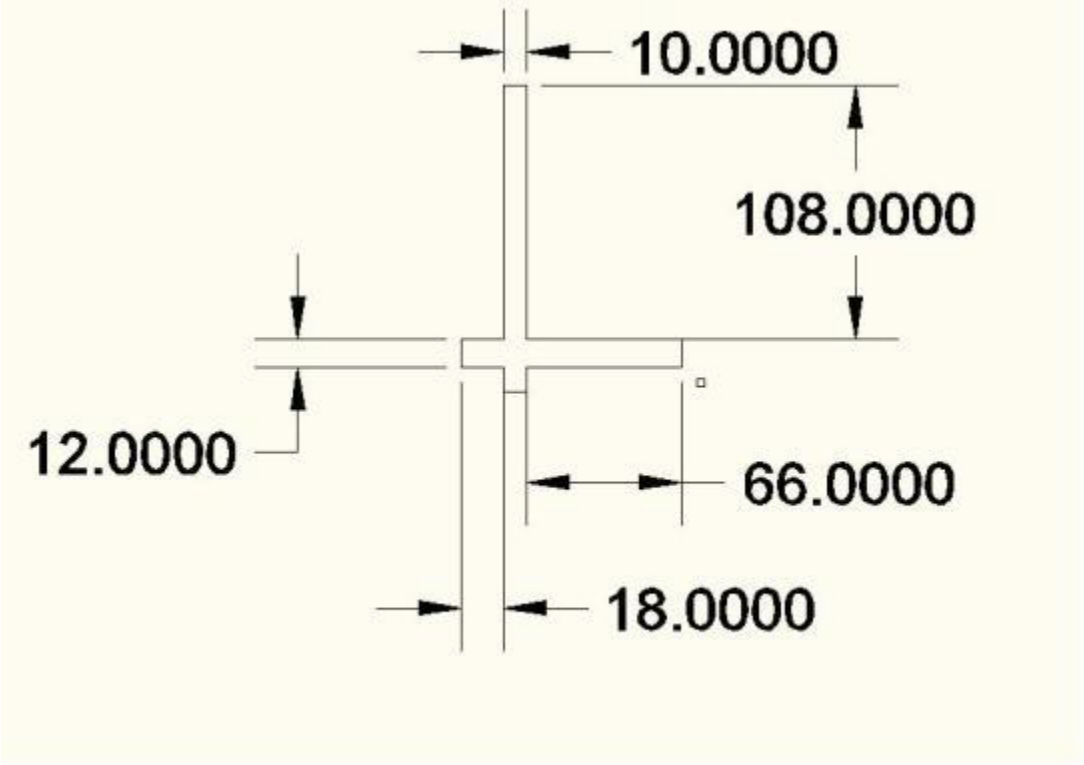

Figure 27: Preliminary Design of Retaining Wall (Cross section, in inches)

6.4.1 General Pressures on the Wall

Implementing various equations found in *The Design of Concrete Structures* by Arthur Nilsen, we started the calculation process. The first step in calculating the general pressures on the retaining wall is determining the dead loads and live loads using the equations:

$$U=1.4D+1.7L$$

Typically the equation above uses factored numbers to increase the safety of the design. Since there are no dead loads acting on the top of the wall, we only used the live loads for calculating the surcharge acting on the wall. The road running along the wall is intended for a fire lane which typically carries live loads of 225 psf (pounds per square foot, found in The Design of

Concrete Structures) to 250 psf. Using the above equation, we found the total surcharge of 425 psf.

After calculating surcharge, the next step was to determine the equivalent height of the surcharge, h'. The equivalent height of the surcharge acts as an increased height in the soil pressure on the back of the wall as seen in figure 28. The following equation was used for calculating the equivalent surcharge height:

h'= Total Surcharge/ Unit Weight of Soil

The soil report indicated the underlying soil at the construction site as glacial till, we categorized the soil from soil reports as silty sand, sand and gravel with high clay content. Properties of this soil include 120 to 130 pounds per cubic foot for the unit weight, and 0.3 to 0.4 for the coefficient of friction. Inserting the appropriate values into the equation, we calculated a equivalent surcharge height of 3.27 feet for the new retaining wall.

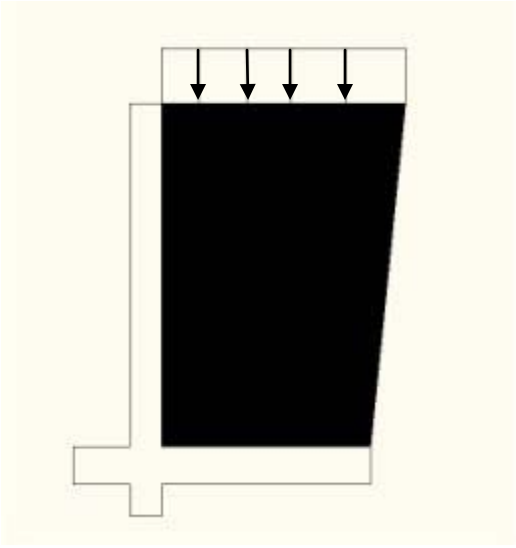

Figure 28: Pressure on the Wall Due to the Surcharge

6.4.2 Further Investigation and Shear Calculations

Using the values calculated above, the earth pressure acting horizontally on the wall was then calculated using the following equation:

$$P=.5*(C_{ah}*w*h*(h+2h')$$

C_{ah}= soil coefficient

w= unit weight of soil

h=effective height

h'= effective surcharge height

From there, the moment arm and total moment was calculated and finally the thickness of the arm. We calculated the arm thickness dimensions and shear values for both a 10 foot and a 12 foot wall. For the 10 foot wall we calculated an arm thickness of 10 inches and a shear value away from the base of 4,310 lbs, which is much lower than the factored shear value of the wall at 12,902 lbs. The 12 foot wall was much of the same. We calculated that an arm thickness of 10 inches would also be acceptable and that the shear force from the soil was 5594 lbs which is also lower than the factored shear value. Comparing each option, it was found more economical to choose the 10 foot wall over the 12 foot wall at that certain point in the design. Once the preliminary design was completed, the stability and reinforcement steel was determined.

6.5 Stability Investigation

With the wall now having dimensions for the height and arm thickness, it was time to investigate the external stability of the structure. According to Nilsen, a wall may fail in two different ways: (1) its individual parts may not be strong enough to resist the acting forces on it, and (2) the wall as a whole may be bodily displaced by the earth pressure, without breaking up

internally. Using the weights of the soil and retaining, a component weight table was formed with not only the component weight but resulting moment from each part as well. We split up the retaining wall and soil into 6 different sub-weights as seen below and in figure form in Appendix D.

	Weight (lbs)	Moment Arm (ft)	Moment (ft-lbs)
W1	1125	1.92	2160
W2	1175	3.92	4606
W3	104	1.92	199.68
W4	5940	5.083	30,193
W5	360	0.75	270
W6	3714	4.16	15,466
Totals	**12,417**		**52894.68**

Table 9: Component Weights of Retaining Wall

Using the calculated values of this table, the factor of safety against overturning was determined with the weights, moments and the bearing pressures. We found that the factor of safety against overturning was 3.99 which is adequate according to the theories of Nilsen's book, a value of 3 is an appropriate value for this. Following this procedure, we determined the total resistance due to sliding to be 4809 lbs using values calculated from the friction at the toe, heel, key and passive earth pressure. Dividing 4809 lbs by the total soil pressure of 3305 lbs, we found that the Factor of Safety against overturning was 1.45 which is also adequate.

6.6 Steel Reinforcement

After completing the preliminary design and the stability checks throughout the retaining wall, the steel reinforcement could then be designed again using moments and equations from Nilsen. The bending moment in the arm decreases rapidly with increasing distance from the bottom. The first part of the retaining wall we design steel for was the arm and key. The moment at the bottom section of the arm was already determined in previous calculations and from there, we could use the following equation to receive a proportion of moment, height, and width:

$$M_u/\Phi*b*d^2$$

With this value, which was calculated to be 340.6, we turned to graph A.1b in Nilsen's book. Graph A. 1b in Nilsen's book shows the relationship with the ratio above and the required steel ratio, ρ, for any given strength of steel. The graphs and tables are shown in Appendix D. Lastly, the area of steel was calculated with the following equation:

$$A_s= \rho*b*d$$

Having the same approach with the toe and heel slabs, steel reinforcement was successfully designed for the retaining wall.

One problem that was encountered during the design of the heel slab was that the shear force from the soil on the heel was greater than the factored shear force of the heel by about 900 lbs. In order to raise the factored shear of the heel slab, we had to increase the overall thickness of the slab to 13 inches instead of the original 12 inches. Increasing the height increased the factored shear by around 1,300 lbs, which in turn made the heel slab adequate against shear forces. The table below shows the calculated values for the steel reinforcement.

Part of Retaining Wall	**Vertical Bars**	**Horizontal Bars**
Arm and Key	#4 Bars @ 24" O.C. Outside Face	#4 Bars @ 20" O.C. Outside Face
	#7 Bars @ 24" O.C. Inside Face	#4 Bars @ 16" O.C. Inside Face
	#7 Bars @ 12" O.C. Starting 4.5' from top Inside Face	
Heel	#6 Bars @ 9" O.C.	#10 Bars @ 8" O.C.
Toe	#6 Bars 12" O.C.	#3 Bars @ 12" O.C

Table 10: Vertical and Horizontal Bars

6.7 Design of Counterforts

Counterforts are useful for cantilever retaining walls because they tie the slab and base together thus reducing shear moments and bending moments that are acting on the wall. Since the current retaining wall at the construction is around 84 feet long, we designed the cantilever wall with counterforts for only 42 feet which is half of the total length of the wall. We chose to design only half because the cliff height drops off from significantly from 60 to 65 feet to only around 30 feet towards the North. Since the cliff height is so low, a smaller wall could be designed to make the wall more economical. Figure 29 shows a plan view of our newly designed retaining wall with counterforts.

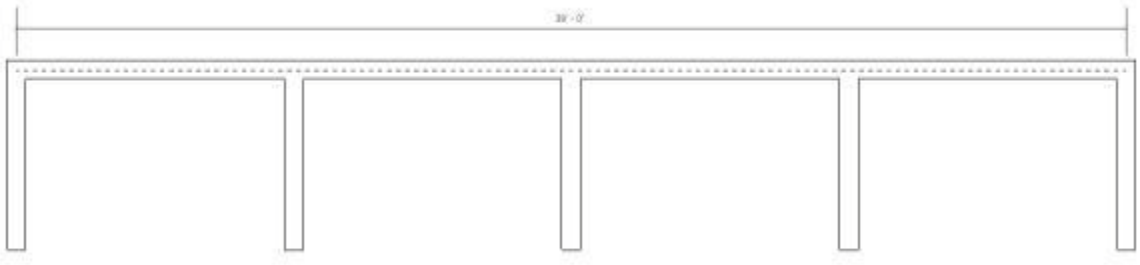

Figure 29: Plan View of Counterfort Wall

After determining the length of the wall and dimensions in between counterforts from previous projects and theories, which was 9.5 feet, we designed the horizontal and vertical reinforcement bars using the following equations:

$$M_u = P * l^2 / 10$$

$$A_h = M_u / \Phi f_y * (jd)$$

$$A_v = V_u / \Phi f_y d$$

Inserting values into the equations above, it was found that the horizontal reinforcement bars would have to be much larger than the vertical reinforcement bars. The placement and types of bars are seen in the table below.

Horizontal Reinforcement
#8 Bars @ 12" O.C. from 2' above top of heel to top wall
#9 Bars @ 12" O.C. from 2' above top of heel to top of heel
Vertical Reinforcement
#3 Bars @ 24" O.C. to 9' below top of wall
#3 Bars @ 30" O.C. from 9' below top of wall to bottom of heel

Table 11: Horizontal and Vertical Reinforcement

Cross sections of the cantilever wall and counterforts are shown on pages 131 and 135 respectively in the appendices.

6.8 Analysis of Retaining Wall Cross Sections

Now that all of the dimensions of the retaining wall were designed, it was necessary to analyze and compare the cross sections of the retaining wall designed by Cullinan Engineering and the wall designed above. By dividing each wall into sections to calculate the area and then multiplying the area by total length to get volume, we could compare the total volume of each wall to analyze cost. The table below details the cross sectional areas and volumes of each wall.

	Cross Sectional Area	**Total Length**	**Volume**
Semi-Gravity Retaining Wall	45.827 sq. ft	42 ft	**71.30 cubic yds**
Cantilever Retaining Wall	16.560 sq. ft	38.67 ft	640 cubic ft
Counterforts	41.03 sq. ft	3.34 ft	137 cubic ft
Cantilever Retaining Wall With Counterforts			**28.77 cubic yds**

Table 12: Volume of Cross Sectional Area

Comparing the total volume of each 42 foot wall, we found that the total volumes of the semi-gravity wall designed by Cullinan Engineering was almost 3 times more than the 42 foot

cantilever wall with counterforts. Although cantilever walls use much more steel than semi-gravity walls, the cost of steel would not come close to the amount of money saved with the reduction of concrete. Using a price of roughly $200 per cubic yard, the choice of a cantilever retaining wall with counterforts would save almost $10,000 for a 42 foot wall. By completing this analysis, we realized that there are so many different options in design and whichever option is chosen can severely impact the economic value of the project. All calculations and diagrams can be found in Appendix D.

Chapter 7 - Results and Conclusions

7.1 North High Estimate

The North High School estimate developed by tracking quantities using BIM an accurate accumulation of information compared to the actual costs Gilbane Building Company was charged for. The Revit model, which was created by using the Architect's drawings that were obtained from Gilbane Building Company, calculated that 944.16 tons of steel were used in the structural framing of North High School. Using the information that was provided by R.S. Means Construction Cost Data on the current cost per ton of steel for a High School, an estimated cost for the steel was found to be $3,324,875. As of October 28, 2009, Gilbane Building Company had already committed $3,163,901 to United Steel Incorporated.

Variable	Price
Average $ per Ton	$ 3,216.00
Tonnage	$ 944.16
Location Factor	110%
Revit Estimate	$ 3,324,875.00
Gilbane Cost (10/28/09)	$ 3,163,901.00
Difference	$ 160,974.00

Table 13: Cost of Steel Difference

The concrete that was quantified by the Revit model came to be 4200 cubic yards that would be used in the foundation walls, rectangular footings and foundation slabs. Using R.S. Means Construction Cost Data, the price for the 4200 cubic yards of concrete came to be $814,738. The cubic yards of concrete were broken into three groups when the estimated price was created. The groups footings, wall foundations, and slabs; each had varying prices.

Structural Foundation Schedule				
Family and Type	Price Per CY	Volume	Unit	Cost
Rectangular Footing	$ 277.70	742	CY	$ 206,053.40
Wall Foundation	$ 371.80	28	CY	$ 10,410.40
Foundation Slab	$ 152.83	3430	CY	$ 524,206.90
	Location Factor		110%	$ 74,067.07
		4200	CY	$ 814,737.77

Table 14: Concrete Estimate per CY

7.2 Earned Value Analysis

The example of the steel tank replacement job in South Portland, Maine shows how critical it is to track work on a construction project, especially general contracted work. With the use of earned value analysis the management team can make important decisions during the duration of the job that will hopefully positively impact the budget and schedule. The job we analyzed shows how making decisions based on how the job is progressing can save quite a bit of money for the company, in this case, $27,000 on just the concrete portion of the job. It's important to note that without the use of the earned value analysis these decisions wouldn't be able to be made, or at least made correctly.

7.3 Retaining Wall

The capstone design project completed in this report investigated an alternative design of a retaining wall located near the corner of Building B and the auditorium of the new Worcester North High School. For the investigation, we discussed some of the advantages and disadvantages of each type of retaining wall considered, determined the soil properties and earth

pressures, performed a structural analysis of the wall, and addressed some economic aspects of each design.

The main reason for a retaining structure in this location is to protect the underlying houses from any sliding of soil due to live loads or precipitation. During the pre-construction design phase of the project, engineers did not know the proximity of the edge of the cliff to the corner of the building and the surrounding road. The engineers assumed the retaining structure would be far enough away from the road and the corner of the building that simple riprap would suffice the design. However, during construction it was seen that the road would be constructed only a few a feet from the retaining structure. Since riprap cannot hold the live loads traveling on the road, a sub-contractor was hired to redesign a retaining wall. As construction continued, it was of high priority of the engineers at Cullinan Engineering to design a retaining wall fast. The change order log that the new retaining wall would cost the project around $250,000.

Having the economic aspect on high priority, we tried to not only design a retaining wall to withstand the appropriate loads, but to also try and decrease the overall cost of this part of the project. In order to try and save cost on concrete, we decided to design a cantilever wall with counterforts spaced 9.5 feet apart. The dimensions of our retaining wall include an arm that is 10 inches thick and 10 feet long, a toe that is 13 inches thick and 1.5 feet long, a key that is 10 inches thick and 10 inches long, and a heel that is 1.5 feet thick and 5.5 feet long. Also, we designed counterforts that would be 8 inches thick. Since cantilever walls require the use of steel reinforcement because of the wall's slenderness, we designed that aspect of the wall as well. The following tables include our design of steel reinforcement.

Part of Retaining Wall	Vertical Bars	Horizontal Bars
Arm and Key	#4 Bars @ 24" O.C. Outside Face	#4 Bars @ 20" O.C. Outside Face
	#7 Bars @ 24" O.C. Inside Face	#4 Bars @ 16" O.C. Inside Face
	#7 Bars @ 12" O.C. Starting 4.5' from top Inside Face	
Heel	#6 Bars @ 9" O.C.	#10 Bars @ 8" O.C.
Toe	#6 Bars 12" O.C.	#3 Bars @ 12" O.C

Table 15: Steel Reinforcement

Horizontal Reinforcement
#8 Bars @ 12" O.C. from 2' above top of heel to top wall
#9 Bars @ 12" O.C. from 2' above top of heel to top of heel
Vertical Reinforcement
#3 Bars @ 24" O.C. to 9' below top of wall
#3 Bars @ 30" O.C. from 9' below top of wall to bottom of heel

Table 16: Counterfort Steel Reinforcement

Since the cliff at the new Worcester North High School is not the same height, we could have designed the wall with smaller heights as the steepness of the cliff lowered. However, this was not feasible. In order to compare our design to Cullinan's design, we used an over length of 42 feet for the wall, using our maximum height and their maximum height over that entire span. It was found that the cantilever wall would save 30 square feet in cross sectional area and a

volume of around 42 cubic yards for the 42 feet of length as compared to the semi-gravity wall.

Although the cantilever wall would have much more reinforcing steel than the semi-gravity wall, it would be insignificant compared to the cost saved due to the decrease in the amount of concrete.

7.4 Gilbane/Owner Architect Meetings

Throughout the 6 months working on this project, we also attended weekly meetings to gain a perspective on how the construction management process really works. The firms that attended this meeting were Gilbane, the construction manager at risk, The Maguire Group, the owner's consultant, and Worcester Architectural Services, the owner architect. The main focus of these meetings was not only about the design of the building, but scheduling, request for information, and change orders. After attending these meetings, we found that the construction management process of North High was filled with headaches and conflicts.

Often times during the meeting, it seemed like Worcester Architectural Services was always behind schedule compared to Gilbane and The Maguire Group. At one of the meetings, it was stated that Worcester Architectural Services had 42 outstanding RFI's that were to be answered, which is generally high compared to a normal project. Throughout the project, The Maguire Group was usually the mediator between Gilbane and Worcester Architectural Services.

One example of a conflict throughout the 5 months we attended meetings was with Guaranteed Maximum Price or GMP. Generally the GMP cannot be decided until most of the building is designed in order for the construction manager to receive a fair price. Since Worcester Architectural Services was behind schedule on the design, the GMP contract deadline date was pushed back from mid November 2009 to mid March 2010.

Also, throughout the project there were many issues between Gilbane and Worcester Architectural Services that had to do with the drawings and plans being issued. One major issue with the plans that happened was with the some of the toilet designs in buildings A and B. Worcester Architectural Services had designed the piping of the toilets to come through the floor instead of the wall in the bathroom. After giving the incorrect plans to Gilbane, Gilbane awarded the job to a subcontractor, who then received the incorrect plans. These issues were two of many that we observed occurred throughout the project.

Works Cited

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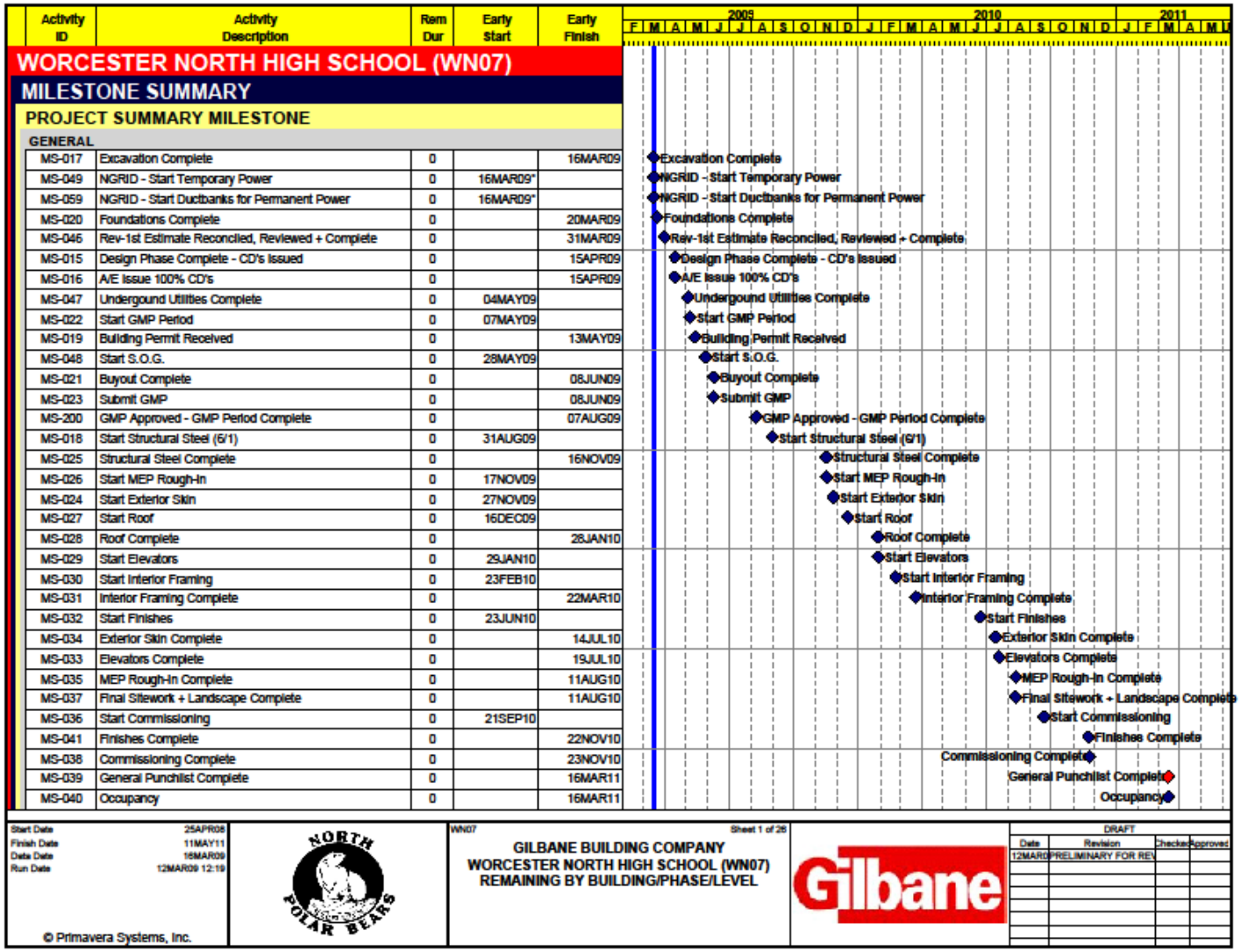
http://www.thefreelibrary.com/First+step+for+new+North+High%3B+Long-stalled+$72M+school+breaks+ground.-a0168421746

http://enr.construction.com/toplists/Contractors/001-100.asp

http://www.stormwaterauthority.org/assets/Riprap.pdf

http://www.bea.gov/

Appendix A: Project Schedule as of March, 2009



Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
WORCESTER NORTH HIGH SCHOOL (WN07)				
MILESTONE SUMMARY				
PROJECT SUMMARY MILESTONE				
GENERAL				
MS-017	Excavation Complete	0		16MAR09
MS-049	NGRID - Start Temporary Power	0	16MAR09*	
MS-059	NGRID - Start Ductbanks for Permanent Power	0	16MAR09*	
MS-020	Foundations Complete	0		20MAR09
MS-046	Rev-1st Estimate Reconciled, Reviewed + Complete	0		31MAR09
MS-015	Design Phase Complete - CD's Issued	0		15APR09
MS-016	A/E Issue 100% CD's	0		15APR09
MS-047	Undergound Utilities Complete	0	04MAY09	
MS-022	Start GMP Period	0	07MAY09	
MS-019	Building Permit Received	0		13MAY09
MS-048	Start S.O.G.	0	28MAY09	
MS-021	Buyout Complete	0		08JUN09
MS-023	Submit GMP	0		08JUN09
MS-200	GMP Approved - GMP Period Complete	0		07AUG09
MS-018	Start Structural Steel (6/1)	0	31AUG09	
MS-025	Structural Steel Complete	0		16NOV09
MS-026	Start MEP Rough-In	0	17NOV09	
MS-024	Start Exterior Skin	0	27NOV09	
MS-027	Start Roof	0	16DEC09	
MS-028	Roof Complete	0		28JAN10
MS-029	Start Elevators	0	29JAN10	
MS-030	Start Interior Framing	0	23FEB10	
MS-031	Interior Framing Complete	0		22MAR10
MS-032	Start Finishes	0	23JUN10	
MS-034	Exterior Skin Complete	0		14JUL10
MS-033	Elevators Complete	0		19JUL10
MS-035	MEP Rough-In Complete	0		11AUG10
MS-037	Final Sitework + Landscape Complete	0		11AUG10
MS-036	Start Commissioning	0	21SEP10	
MS-041	Finishes Complete	0		22NOV10
MS-038	Commissioning Complete	0		23NOV10
MS-039	General Punchlist Complete	0		16MAR11
MS-040	Occupancy	0		16MAR11

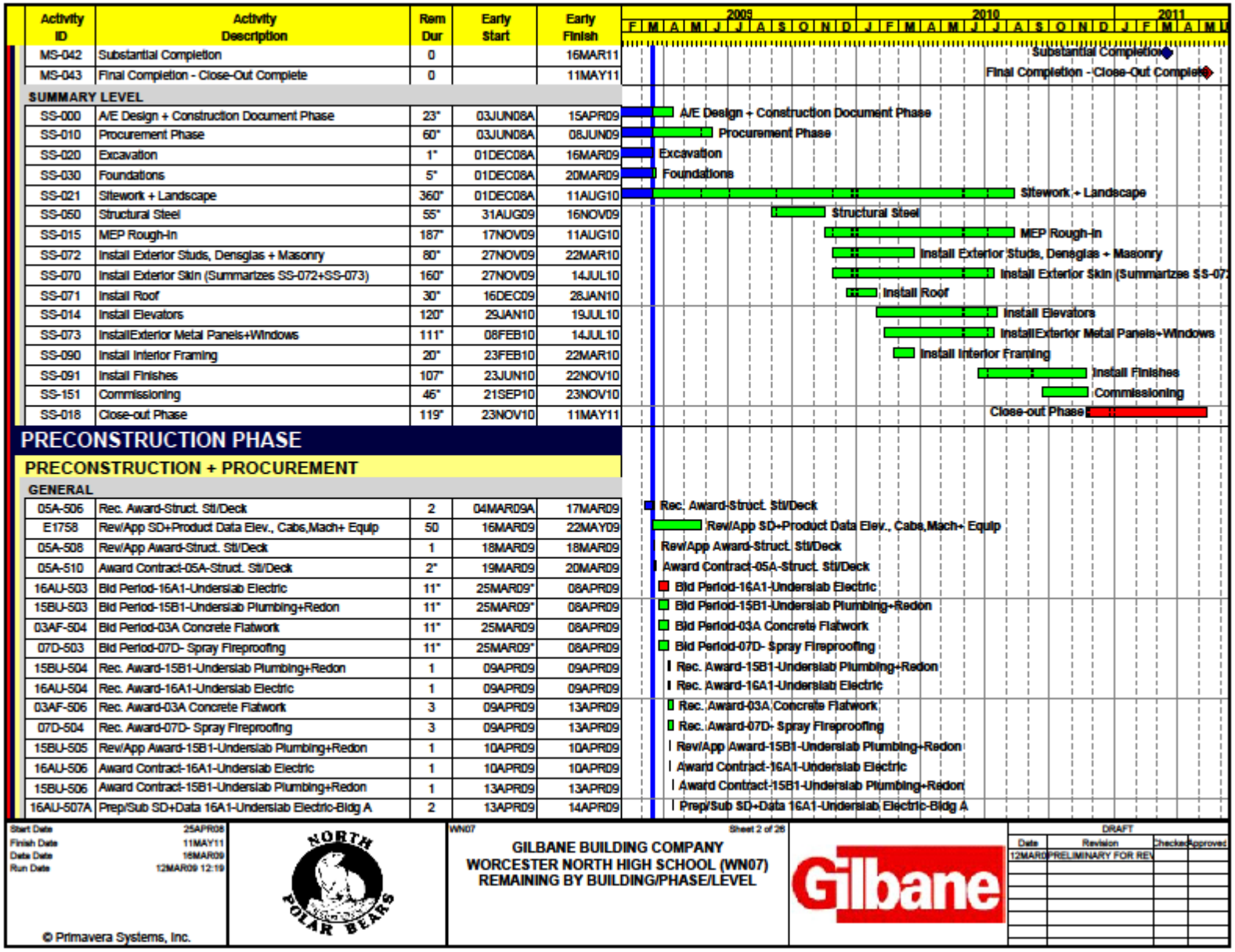
Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
Run Date 12MAR09 12:19

WN07 Sheet 1 of 28

GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		



Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
MS-042	Substantial Completion	0		16MAR11
MS-043	Final Completion - Close-Out Complete	0		11MAY11
SUMMARY LEVEL				
SS-000	A/E Design + Construction Document Phase	23*	03JUN08A	15APR09
SS-010	Procurement Phase	60*	03JUN08A	08JUN09
SS-020	Excavation	1*	01DEC08A	16MAR09
SS-030	Foundations	5*	01DEC08A	20MAR09
SS-021	Sitework + Landscape	360*	01DEC08A	11AUG10
SS-050	Structural Steel	55*	31AUG09	16NOV09
SS-015	MEP Rough-In	187*	17NOV09	11AUG10
SS-072	Install Exterior Studs, Densglas + Masonry	80*	27NOV09	22MAR10
SS-070	Install Exterior Skin (Summartzes SS-072+SS-073)	160*	27NOV09	14JUL10
SS-071	Install Roof	30*	16DEC09	28JAN10
SS-014	Install Elevators	120*	29JAN10	19JUL10
SS-073	InstallExterior Metal Panels+Windows	111*	08FEB10	14JUL10
SS-090	Install Interior Framing	20*	23FEB10	22MAR10
SS-091	Install Finishes	107*	23JUN10	22NOV10
SS-151	Commissioning	46*	21SEP10	23NOV10
SS-018	Close-out Phase	119*	23NOV10	11MAY11
PRECONSTRUCTION PHASE				
PRECONSTRUCTION + PROCUREMENT				
GENERAL				
05A-506	Rec. Award-Struct. Stl/Deck	2	04MAR09A	17MAR09
E1758	Rev/App SD+Product Data Elev., Cabs,Mach+ Equip	50	16MAR09	22MAY09
05A-508	Rev/App Award-Struct. Stl/Deck	1	18MAR09	18MAR09
05A-510	Award Contract-05A-Struct. Stl/Deck	2*	19MAR09	20MAR09
16AU-503	Bid Period-16A1-Underslab Electric	11*	25MAR09*	08APR09
15BU-503	Bid Period-15B1-Underslab Plumbing+Redon	11*	25MAR09*	08APR09
03AF-504	Bid Period-03A Concrete Flatwork	11*	25MAR09	08APR09
07D-503	Bid Period-07D- Spray Fireproofing	11*	25MAR09*	08APR09
15BU-504	Rec. Award-15B1-Underslab Plumbing+Redon	1	09APR09	09APR09
16AU-504	Rec. Award-16A1-Underslab Electric	1	09APR09	09APR09
03AF-506	Rec. Award-03A Concrete Flatwork	3	09APR09	13APR09
07D-504	Rec. Award-07D- Spray Fireproofing	3	09APR09	13APR09
15BU-505	Rev/App Award-15B1-Underslab Plumbing+Redon	1	10APR09	10APR09
16AU-506	Award Contract-16A1-Underslab Electric	1	10APR09	10APR09
15BU-506	Award Contract-15B1-Underslab Plumbing+Redon	1	13APR09	13APR09
16AU-507A	Prep/Sub SD+Data 16A1-Underslab Electric-Bldg A	2	13APR09	14APR09

Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
Run Date 12MAR09 12:19

NORTH POLAR BEARS

WN07 Sheet 2 of 28

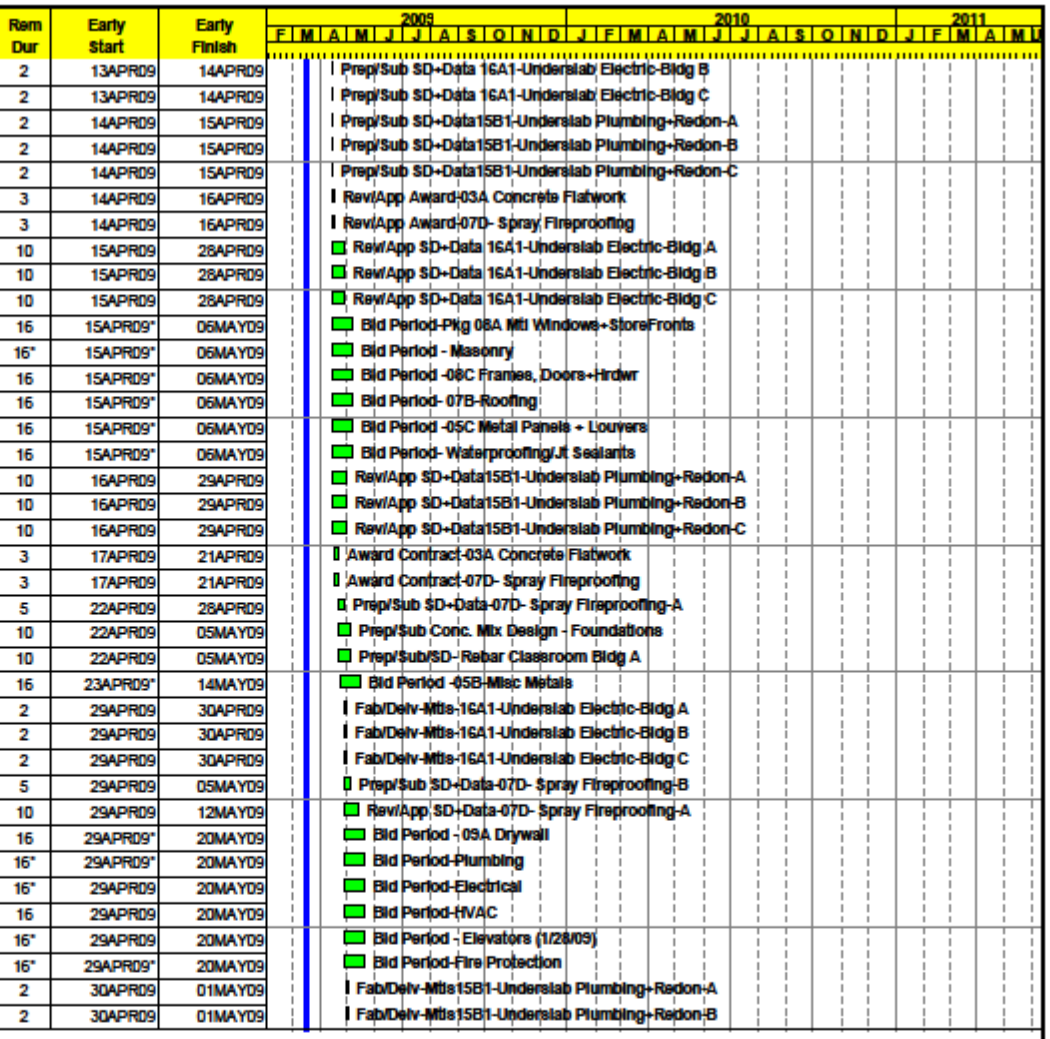
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

Gilbane

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
16AU-507B	Prep/Sub SD+Data 16A1-Underslab Electric-Bldg B	2	13APR09	14APR09
16AU-507C	Prep/Sub SD+Data 16A1-Underslab Electric-Bldg C	2	13APR09	14APR09
15BU-507A	Prep/Sub SD+Data15B1-Underslab Plumbing+Redon-A	2	14APR09	15APR09
15BU-507B	Prep/Sub SD+Data15B1-Underslab Plumbing+Redon-B	2	14APR09	15APR09
15BU-507C	Prep/Sub SD+Data15B1-Underslab Plumbing+Redon-C	2	14APR09	15APR09
03AF-508	Rev/App Award-03A Concrete Flatwork	3	14APR09	16APR09
07D-505	Rev/App Award-07D- Spray Fireproofing	3	14APR09	16APR09
16AU-508A	Rev/App SD+Data 16A1-Underslab Electric-Bldg A	10	15APR09	28APR09
16AU-508B	Rev/App SD+Data 16A1-Underslab Electric-Bldg B	10	15APR09	28APR09
16AU-508C	Rev/App SD+Data 16A1-Underslab Electric-Bldg C	10	15APR09	28APR09
08A-504	Bid Period-Pkg 08A Mtl Windows+StoreFronts	16	15APR09*	06MAY09
04A-504	Bid Period - Masonry	16*	15APR09*	06MAY09
08C-504	Bid Period -08C Frames, Doors+Hrdwr	16	15APR09*	06MAY09
07B-504	Bid Period- 07B-Roofing	16	15APR09*	06MAY09
05C-504	Bid Period -05C Metal Panels + Louvers	16	15APR09*	06MAY09
07C-504	Bid Period- Waterproofing/Jt Sealants	16	15APR09*	06MAY09
15BU-508A	Rev/App SD+Data15B1-Underslab Plumbing+Redon-A	10	16APR09	29APR09
15BU-508B	Rev/App SD+Data15B1-Underslab Plumbing+Redon-B	10	16APR09	29APR09
15BU-508C	Rev/App SD+Data15B1-Underslab Plumbing+Redon-C	10	16APR09	29APR09
03AF-510	Award Contract-03A Concrete Flatwork	3	17APR09	21APR09
07D-506	Award Contract-07D- Spray Fireproofing	3	17APR09	21APR09
07D-507A	Prep/Sub SD+Data-07D- Spray Fireproofing-A	5	22APR09	28APR09
03AF5120	Prep/Sub Conc. Mix Design - Foundations	10	22APR09	05MAY09
03AF512A	Prep/Sub/SD- Rebar Classroom Bldg A	10	22APR09	05MAY09
05B-504	Bid Period -05B-Misc Metals	16	23APR09*	14MAY09
16AU-509A	Fab/Delv-Mtls-16A1-Underslab Electric-Bldg A	2	29APR09	30APR09
16AU-509B	Fab/Delv-Mtls-16A1-Underslab Electric-Bldg B	2	29APR09	30APR09
16AU-509C	Fab/Delv-Mtls-16A1-Underslab Electric-Bldg C	2	29APR09	30APR09
07D-507B	Prep/Sub SD+Data-07D- Spray Fireproofing-B	5	29APR09	05MAY09
07D-508A	Rev/App SD+Data-07D- Spray Fireproofing-A	10	29APR09	12MAY09
09A-504	Bid Period - 09A Drywall	16	29APR09*	20MAY09
15A-504	Bid Period-Plumbing	16*	29APR09*	20MAY09
16A-504	Bid Period-Electrical	16*	29APR09	20MAY09
15C-504	Bid Period-HVAC	16	29APR09	20MAY09
14A-504	Bid Period - Elevators (1/26/09)	16*	29APR09	20MAY09
15-504	Bid Period-Fire Protection	16*	29APR09*	20MAY09
15BU-509A	Fab/Delv-Mtls15B1-Underslab Plumbing+Redon-A	2	30APR09	01MAY09
15BU-509B	Fab/Delv-Mtls15B1-Underslab Plumbing+Redon-B	2	30APR09	01MAY09



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GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

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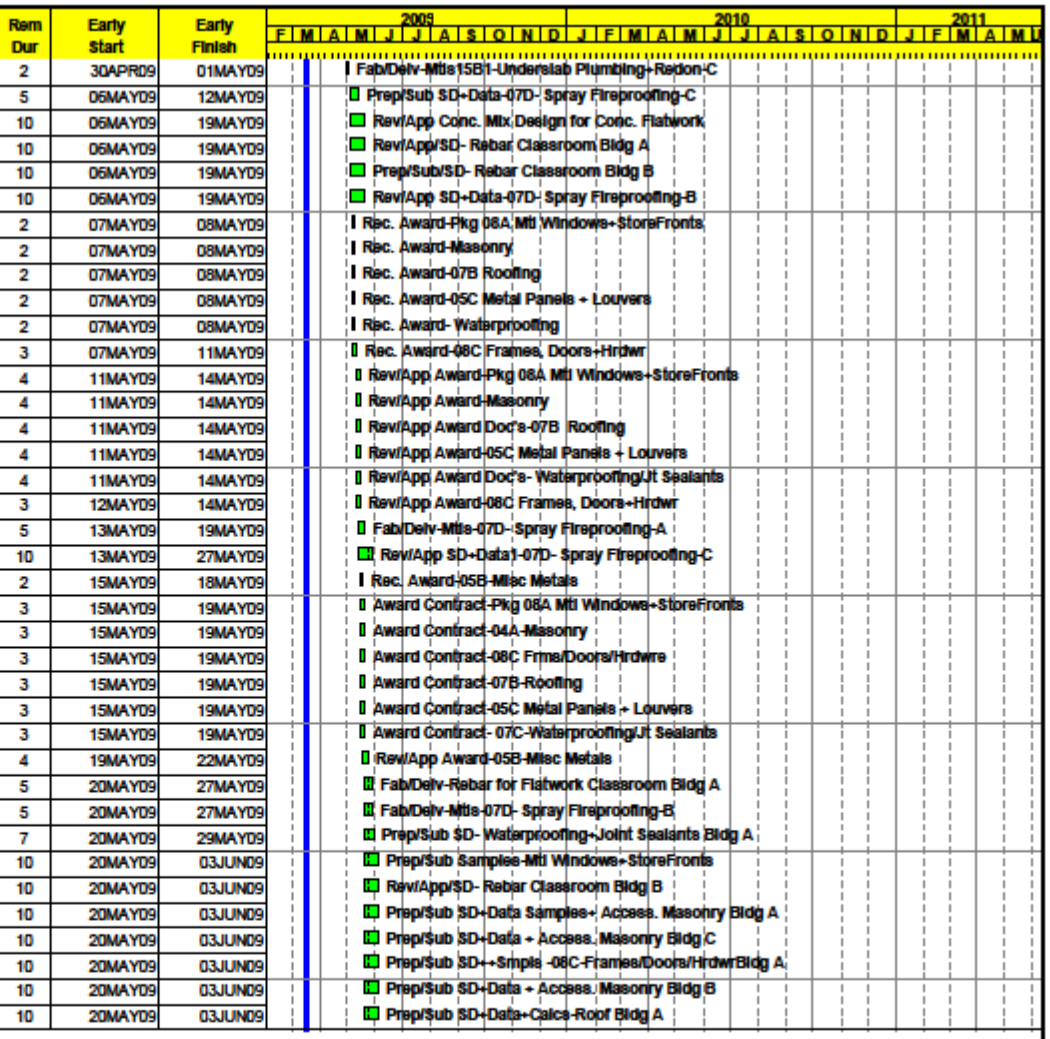
Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
15BU-509C	Fab/Delv-Mtls15B1-Underslab Plumbing+Redon-C	2	30APR09	01MAY09
07D-507C	Prep/Sub SD+Data-07D- Spray Fireproofing-C	5	06MAY09	12MAY09
03AF5140	Rev/App Conc. Mix Design for Conc. Flatwork	10	06MAY09	19MAY09
03AF514A	Rev/App/SD- Rebar Classroom Bldg A	10	06MAY09	19MAY09
03AF512B	Prep/Sub/SD- Rebar Classroom Bldg B	10	06MAY09	19MAY09
07D-508B	Rev/App SD+Data-07D- Spray Fireproofing-B	10	06MAY09	19MAY09
08A-506	Rec. Award-Pkg 08A Mtl Windows+StoreFronts	2	07MAY09	08MAY09
04A-506	Rec. Award-Masonry	2	07MAY09	08MAY09
07B-506	Rec. Award-07B Roofing	2	07MAY09	08MAY09
05C-506	Rec. Award-05C Metal Panels + Louvers	2	07MAY09	08MAY09
07C-506	Rec. Award- Waterproofing	2	07MAY09	08MAY09
08C-506	Rec. Award-08C Frames, Doors+Hrdwr	3	07MAY09	11MAY09
08A-508	Rev/App Award-Pkg 08A Mtl Windows+StoreFronts	4	11MAY09	14MAY09
04A-508	Rev/App Award-Masonry	4	11MAY09	14MAY09
07B-508	Rev/App Award Doc's-07B Roofing	4	11MAY09	14MAY09
05C-508	Rev/App Award-05C Metal Panels + Louvers	4	11MAY09	14MAY09
07C-508	Rev/App Award Doc's- Waterproofing/Jt Sealants	4	11MAY09	14MAY09
08C-508	Rev/App Award-08C Frames, Doors+Hrdwr	3	12MAY09	14MAY09
07D-509A	Fab/Delv-Mtls-07D- Spray Fireproofing-A	5	13MAY09	19MAY09
07D-508C	Rev/App SD+Data1-07D- Spray Fireproofing-C	10	13MAY09	27MAY09
05B-506	Rec. Award-05B-Misc Metals	2	15MAY09	18MAY09
08A-510	Award Contract-Pkg 08A Mtl Windows+StoreFronts	3	15MAY09	19MAY09
04A-510	Award Contract-04A-Masonry	3	15MAY09	19MAY09
08C-510	Award Contract-08C Frms/Doors/Hrdwre	3	15MAY09	19MAY09
07B-510	Award Contract-07B-Roofing	3	15MAY09	19MAY09
05C-510	Award Contract-05C Metal Panels + Louvers	3	15MAY09	19MAY09
07C-510	Award Contract- 07C-Waterproofing/Jt Sealants	3	15MAY09	19MAY09
05B-508	Rev/App Award-05B-Misc Metals	4	19MAY09	22MAY09
03AF516A	Fab/Delv-Rebar for Flatwork Classroom Bldg A	5	20MAY09	27MAY09
07D-509B	Fab/Delv-Mtls-07D- Spray Fireproofing-B	5	20MAY09	27MAY09
07C-512A	Prep/Sub SD- Waterproofing+Joint Sealants Bldg A	7	20MAY09	29MAY09
08A-5131	Prep/Sub Samples-Mtl Windows+StoreFronts	10	20MAY09	03JUN09
03AF514B	Rev/App/SD- Rebar Classroom Bldg B	10	20MAY09	03JUN09
04A-512A	Prep/Sub SD+Data Samples+ Access. Masonry Bldg A	10	20MAY09	03JUN09
04A-512C	Prep/Sub SD+Data + Access. Masonry Bldg C	10	20MAY09	03JUN09
08C-512A	Prep/Sub SD++Smpls -08C-Frames/Doors/HrdwrBldg A	10	20MAY09	03JUN09
04A-512B	Prep/Sub SD+Data + Access. Masonry Bldg B	10	20MAY09	03JUN09
07B-512A	Prep/Sub SD+Data+Calcs-Roof Bldg A	10	20MAY09	03JUN09



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GILBANE BUILDING COMPANY
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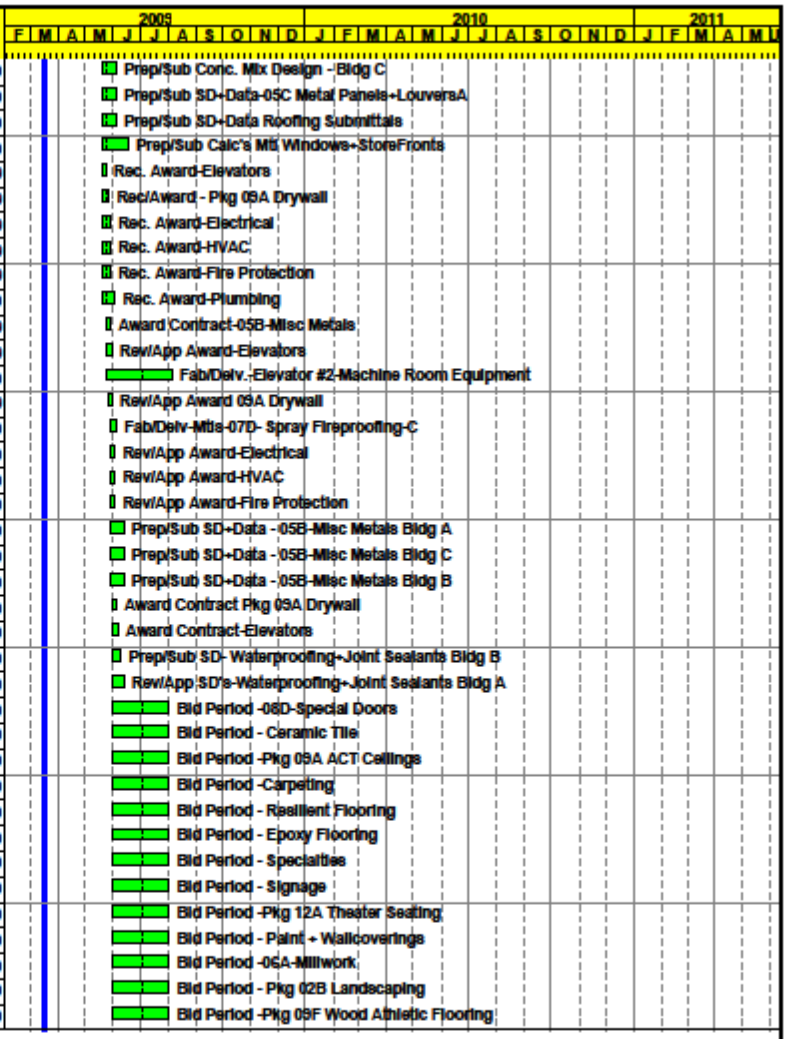
Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
03AF512C	Prep/Sub Conc. Mix Design - Bldg C	10	20MAY09	03JUN09
05C-512A	Prep/Sub SD+Data-05C Metal Panels+LouversA	10	20MAY09	03JUN09
07B-5130	Prep/Sub SD+Data Roofing Submittals	10	20MAY09	03JUN09
08A-5130	Prep/Sub Calc's Mtl Windows+StoreFronts	20	20MAY09	17JUN09
E1700	Rec. Award-Elevators	2	21MAY09	22MAY09
09A-506	Rec/Award - Pkg 09A Drywall	3	21MAY09	26MAY09
16A-506	Rec. Award-Electrical	5	21MAY09	28MAY09
15C-506	Rec. Award-HVAC	5	21MAY09	28MAY09
15-506	Rec. Award-Fire Protection	5	21MAY09	28MAY09
15A-506	Rec. Award-Plumbing	7	21MAY09	01JUN09
05B-510	Award Contract-05B-Misc Metals	3	26MAY09	28MAY09
E1710	Rev/App Award-Elevators	4	26MAY09	29MAY09
14A-516	Fab/Delv.-Elevator #2-Machine Room Equipment	50	26MAY09	04AUG09
09A-508	Rev/App Award 09A Drywall	3	27MAY09	29MAY09
07D-509C	Fab/Delv-Mtls-07D- Spray Fireproofing-C	5	28MAY09	03JUN09
16A-508	Rev/App Award-Electrical	3	29MAY09	02JUN09
15C-508	Rev/App Award-HVAC	3	29MAY09	02JUN09
15-508	Rev/App Award-Fire Protection	3	29MAY09	02JUN09
05B-512A	Prep/Sub SD+Data - 05B-Misc Metals Bldg A	10	29MAY09	11JUN09
05B-512C	Prep/Sub SD+Data - 05B-Misc Metals Bldg C	10	29MAY09	11JUN09
05B-512B	Prep/Sub SD+Data - 05B-Misc Metals Bldg B	10	29MAY09	11JUN09
09A-510	Award Contract Pkg 09A Drywall	3	01JUN09	03JUN09
14A-510	Award Contract-Elevators	5	01JUN09	05JUN09
07C-512B	Prep/Sub SD- Waterproofing+Joint Sealants Bldg B	7	01JUN09	09JUN09
07C-514A	Rev/App SD's-Waterproofing+Joint Sealants Bldg A	10	01JUN09	12JUN09
08D-504	Bid Period -08D-Special Doors	44	01JUN09*	31JUL09
09B-504	Bid Period - Ceramic Tile	44	01JUN09*	31JUL09
09C-504	Bid Period -Pkg 09A ACT Ceilings	44	01JUN09	31JUL09
09D-504	Bid Period -Carpeting	44	01JUN09*	31JUL09
09E-504	Bid Period - Resilient Flooring	44	01JUN09*	31JUL09
09G-504	Bid Period - Epoxy Flooring	44	01JUN09*	31JUL09
10A-504	Bid Period - Specialties	44	01JUN09*	31JUL09
10B-504	Bid Period - Signage	44	01JUN09*	31JUL09
12A-504	Bid Period -Pkg 12A Theater Seating	44	01JUN09*	31JUL09
09H-504	Bid Period - Paint + Wallcoverings	44	01JUN09*	31JUL09
06A-504	Bid Period -06A-Millwork	44	01JUN09	31JUL09
02B-503	Bid Period - Pkg 02B Landscaping	44	01JUN09*	31JUL09
09F-504	Bid Period -Pkg 09F Wood Athletic Flooring	44	01JUN09*	31JUL09



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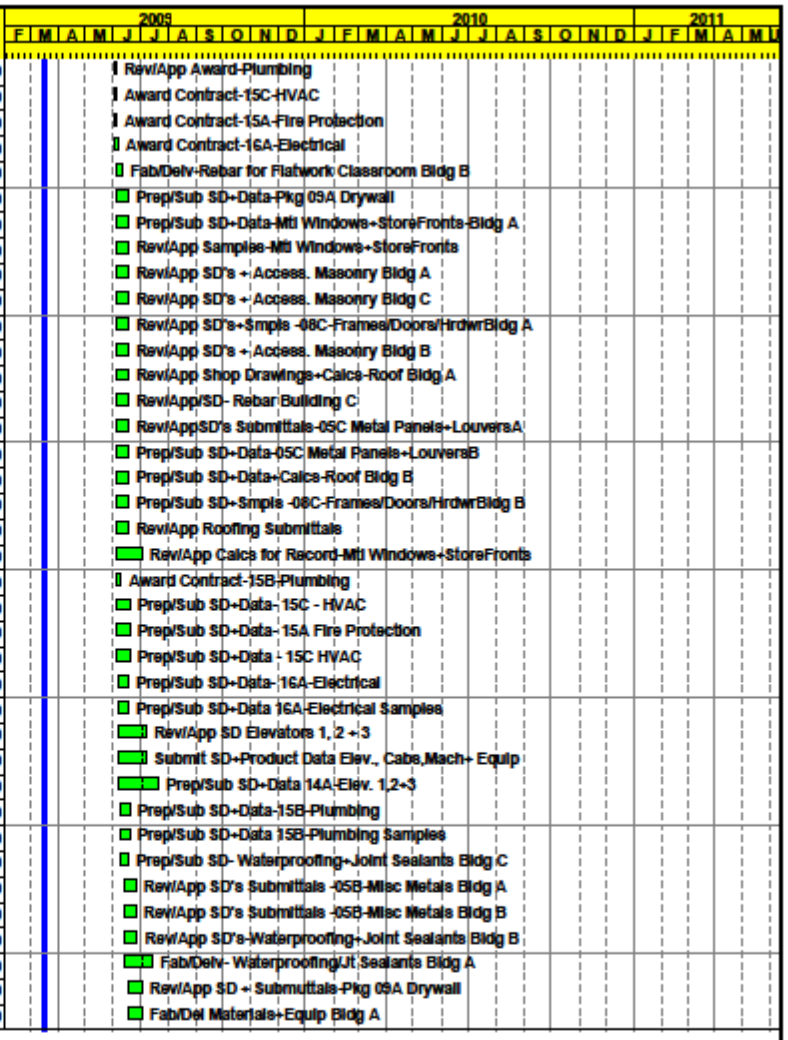
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
15A-508	Rev/App Award-Plumbing	3	02JUN09	04JUN09
15C-510	Award Contract-15C-HVAC	2	03JUN09	04JUN09
15A-510	Award Contract-15A-Fire Protection	2	03JUN09	04JUN09
16A-510	Award Contract-16A-Electrical	3	03JUN09	05JUN09
03AF516B	Fab/Delv-Rebar for Flatwork Classroom Bldg B	5	04JUN09	10JUN09
09A-512	Prep/Sub SD+Data-Pkg 09A Drywall	10	04JUN09	17JUN09
08A-512A	Prep/Sub SD+Data-Mtl Windows+StoreFronts-Bldg A	10	04JUN09	17JUN09
08A-5141	Rev/App Samples-Mtl Windows+StoreFronts	10	04JUN09	17JUN09
04A-514A	Rev/App SD's + Access. Masonry Bldg A	10	04JUN09	17JUN09
04A-514C	Rev/App SD's + Access. Masonry Bldg C	10	04JUN09	17JUN09
08C-512A1	Rev/App SD's+Smpls -08C-Frames/Doors/HrdwrBldg A	10	04JUN09	17JUN09
04A-514B	Rev/App SD's + Access. Masonry Bldg B	10	04JUN09	17JUN09
07B-514A	Rev/App Shop Drawings+Calcs-Roof Bldg A	10	04JUN09	17JUN09
03AF514C	Rev/App/SD- Rebar Building C	10	04JUN09	17JUN09
05C-514A	Rev/AppSD's Submittals-05C Metal Panels+LouversA	10	04JUN09	17JUN09
05C-512B	Prep/Sub SD+Data-05C Metal Panels+LouversB	10	04JUN09	17JUN09
07B-512B	Prep/Sub SD+Data+Calcs-Roof Bldg B	10	04JUN09	17JUN09
08C-512B	Prep/Sub SD+Smpls -08C-Frames/Doors/HrdwrBldg B	10	04JUN09	17JUN09
07B-5150	Rev/App Roofing Submittals	10	04JUN09	17JUN09
08A-5140	Rev/App Calcs for Record-Mtl Windows+StoreFronts	20	04JUN09	01JUL09
15B-510	Award Contract-15B-Plumbing	2	05JUN09	08JUN09
15C-512	Prep/Sub SD+Data- 15C - HVAC	10	05JUN09	18JUN09
15A-512	Prep/Sub SD+Data- 15A Fire Protection	10	05JUN09	18JUN09
15C-522	Prep/Sub SD+Data - 15C HVAC	10	05JUN09	18JUN09
16A-512	Prep/Sub SD+Data- 16A-Electrical	8	08JUN09	17JUN09
16A-522	Prep/Sub SD+Data 16A-Electrical Samples	8	08JUN09	17JUN09
E1770	Rev/App SD Elevators 1, 2 + 3	20	08JUN09	06JUL09
14A-512	Submit SD+Product Data Elev., Cabs,Mach+ Equip	20	08JUN09	06JUL09
14A-513	Prep/Sub SD+Data 14A-Elev. 1,2+3	30	08JUN09	20JUL09
15B-512	Prep/Sub SD+Data-15B-Plumbing	8	09JUN09	18JUN09
15B-522	Prep/Sub SD+Data 15B-Plumbing Samples	8	09JUN09	18JUN09
07C-512C	Prep/Sub SD- Waterproofing+Joint Sealants Bldg C	6	10JUN09	17JUN09
05B-514A	Rev/App SD's Submittals -05B-Misc Metals Bldg A	10	12JUN09	25JUN09
05B-514B	Rev/App SD's Submittals -05B-Misc Metals Bldg B	10	12JUN09	25JUN09
07C-514B	Rev/App SD's-Waterproofing+Joint Sealants Bldg B	10	15JUN09	26JUN09
07C-516A	Fab/Delv- Waterproofing/Jt Sealants Bldg A	20	15JUN09	13JUL09
09A-514	Rev/App SD + Submuttals-Pkg 09A Drywall	10	18JUN09	01JUL09
08C-516A	Fab/Del Materials+Equip Bldg A	10	18JUN09	01JUL09



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Date	Revision	Checked	Approved
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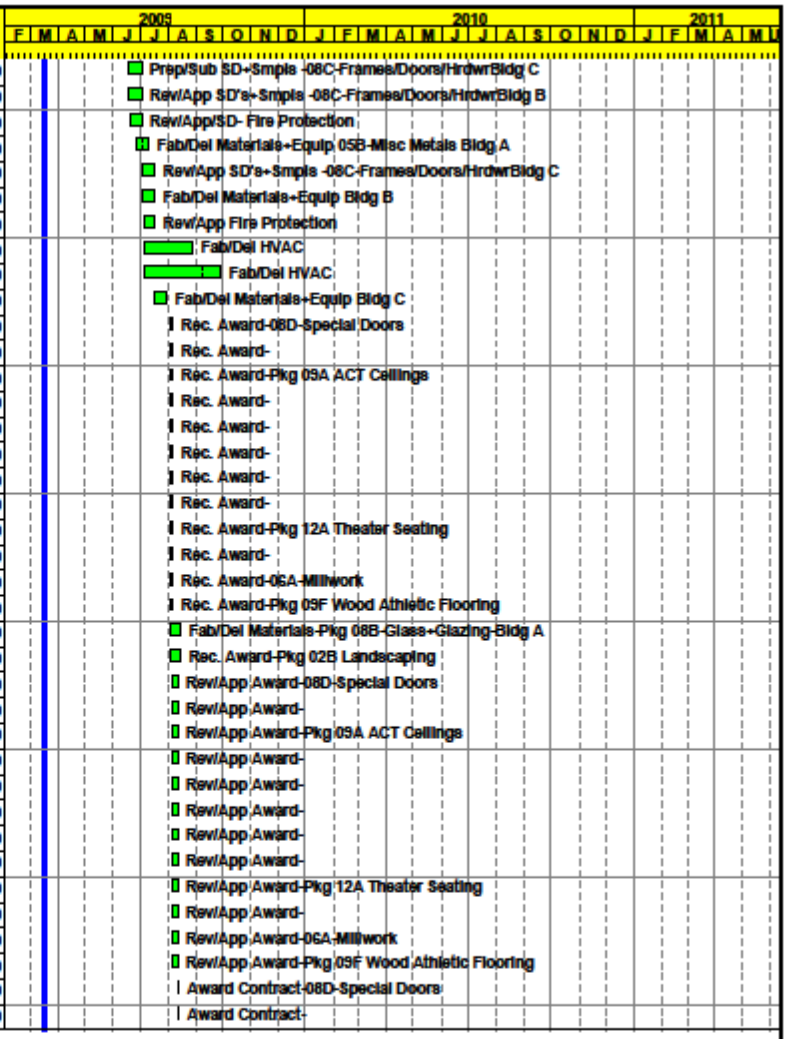
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
08C-512C	Prep/Sub SD+Smpls -08C-Frames/Doors/HrdwrBldg C	10	18JUN09	01JUL09
08C-512B1	Rev/App SD's+Smpls -08C-Frames/Doors/HrdwrBldg B	10	18JUN09	01JUL09
15-514	Rev/App/SD- Fire Protection	10	19JUN09	02JUL09
05B-516A	Fab/Del Materials+Equip 05B-Misc Metals Bldg A	10	26JUN09	10JUL09
08C-512C1	Rev/App SD's+Smpls -08C-Frames/Doors/HrdwrBldg C	10	02JUL09	16JUL09
08C-516B	Fab/Del Materials+Equip Bldg B	10	02JUL09	16JUL09
15-524	Rev/App Fire Protection	10	06JUL09	17JUL09
15C-520	Fab/Del HVAC	40	06JUL09	28AUG09
15C-526	Fab/Del HVAC	60	06JUL09	28SEP09
08C-516C	Fab/Del Materials+Equip Bldg C	10	17JUL09	30JUL09
08D-506	Rec. Award-08D-Special Doors	3	03AUG09	05AUG09
09B-506	Rec. Award-	3	03AUG09	05AUG09
09C-506	Rec. Award-Pkg 09A ACT Ceilings	3	03AUG09	05AUG09
09D-506	Rec. Award-	3	03AUG09	05AUG09
09E-506	Rec. Award-	3	03AUG09	05AUG09
09G-506	Rec. Award-	3	03AUG09	05AUG09
10A-506	Rec. Award-	3	03AUG09	05AUG09
10B-506	Rec. Award-	3	03AUG09	05AUG09
12A-506	Rec. Award-Pkg 12A Theater Seating	3	03AUG09	05AUG09
09H-506	Rec. Award-	3	03AUG09	05AUG09
06A-506	Rec. Award-06A-Millwork	3	03AUG09	05AUG09
09F-506	Rec. Award-Pkg 09F Wood Athletic Flooring	3	03AUG09	05AUG09
08B-516A	Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg A	10	03AUG09	14AUG09
02B-504	Rec. Award-Pkg 02B Landscaping	10	03AUG09	14AUG09
08D-508	Rev/App Award-08D-Special Doors	3	06AUG09	10AUG09
09B-508	Rev/App Award-	3	06AUG09	10AUG09
09C-508	Rev/App Award-Pkg 09A ACT Ceilings	3	06AUG09	10AUG09
09D-508	Rev/App Award-	3	06AUG09	10AUG09
09E-508	Rev/App Award-	3	06AUG09	10AUG09
09G-508	Rev/App Award-	3	06AUG09	10AUG09
10A-508	Rev/App Award-	3	06AUG09	10AUG09
10B-508	Rev/App Award-	3	06AUG09	10AUG09
12A-508	Rev/App Award-Pkg 12A Theater Seating	3	06AUG09	10AUG09
09H-508	Rev/App Award-	3	06AUG09	10AUG09
06A-508	Rev/App Award-06A-Millwork	3	06AUG09	10AUG09
09F-508	Rev/App Award-Pkg 09F Wood Athletic Flooring	3	06AUG09	10AUG09
08D-510	Award Contract-08D-Special Doors	3	11AUG09	13AUG09
09B-510	Award Contract-	3	11AUG09	13AUG09



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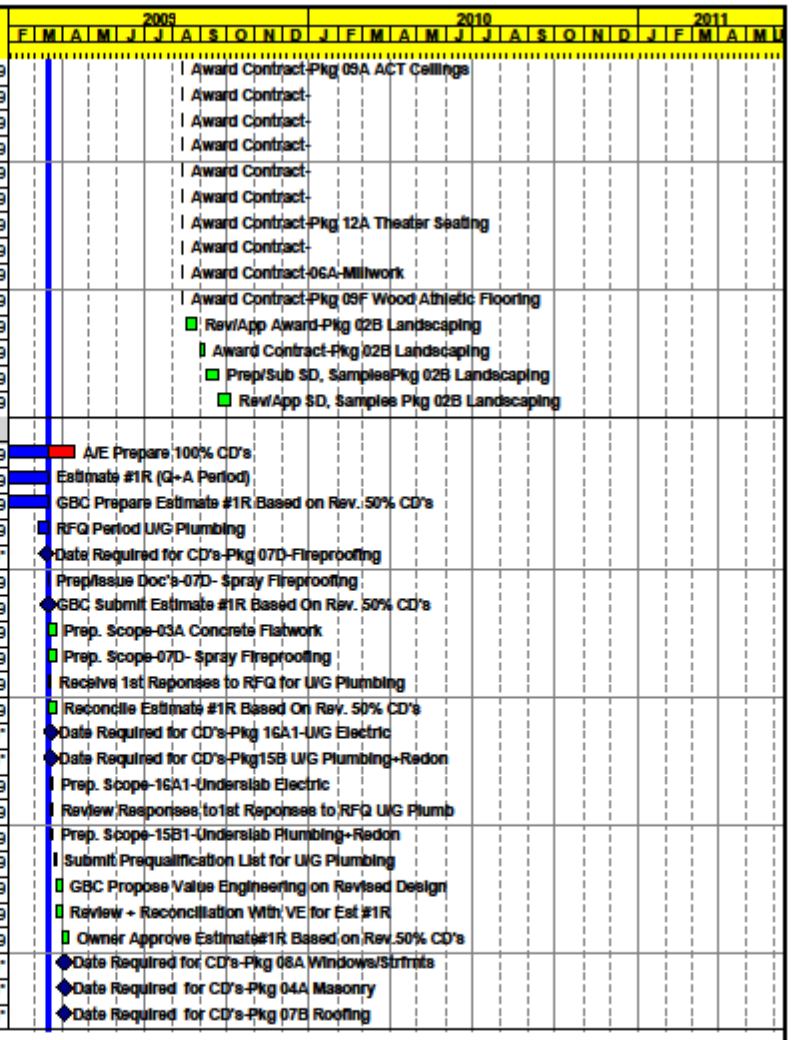
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
09C-510	Award Contract-Pkg 09A ACT Ceilings	3	11AUG09	13AUG09
09D-510	Award Contract-	3	11AUG09	13AUG09
09E-510	Award Contract-	3	11AUG09	13AUG09
09G-510	Award Contract-	3	11AUG09	13AUG09
10A-510	Award Contract-	3	11AUG09	13AUG09
10B-510	Award Contract-	3	11AUG09	13AUG09
12A-510	Award Contract-Pkg 12A Theater Seating	3	11AUG09	13AUG09
09H-510	Award Contract-	3	11AUG09	13AUG09
06A-510	Award Contract-06A-Millwork	3	11AUG09	13AUG09
09F-510	Award Contract-Pkg 09F Wood Athletic Flooring	3	11AUG09	13AUG09
02B-505	Rev/App Award-Pkg 02B Landscaping	10	17AUG09	28AUG09
02B-506	Award Contract-Pkg 02B Landscaping	5	31AUG09	04SEP09
02B-507	Prep/Sub SD, SamplesPkg 02B Landscaping	10	08SEP09	21SEP09
02B-508	Rev/App SD, Samples Pkg 02B Landscaping	10	22SEP09	05OCT09
PRECONSTRUCTION				
141	A/E Prepare 100% CD's	23*	16JUL08A	15APR09
R-191	Estimate #1R (Q+A Period)	1	27JAN09A	16MAR09
R-51	GBC Prepare Estimate #1R Based on Rev. 50% CD's	1	27JAN09A	16MAR09
336.2A	RFQ Period U/G Plumbing	1*	04MAR09A	16MAR09
07D-500	Date Required for CD's-Pkg 07D-Fireproofing	0		13MAR09*
07D-501	Prep/Issue Doc's-07D- Spray Fireproofing	0*	16MAR09	13MAR09
R-181	GBC Submit Estimate #1R Based On Rev. 50% CD's	0		16MAR09
03AF-502	Prep. Scope-03A Concrete Flatwork	7*	16MAR09	24MAR09
07D-502	Prep. Scope-07D- Spray Fireproofing	7*	16MAR09	24MAR09
336.3A	Receive 1st Reponses to RFQ for U/G Plumbing	2	17MAR09	18MAR09
R-61	Reconcile Estimate #1R Based On Rev. 50% CD's	5	17MAR09	23MAR09
16AU-500	Date Required for CD's-Pkg 16A1-U/G Electric	0		18MAR09*
15BU-500	Date Required for CD's-Pkg15B U/G Plumbing+Redon	0		18MAR09*
16AU-502	Prep. Scope-16A1-Underslab Electric	2	19MAR09	20MAR09
336.4A	Review Responses to1st Reponses to RFQ U/G Plumb	2	19MAR09	20MAR09
15BU-502	Prep. Scope-15B1-Underslab Plumbing+Redon	2*	19MAR09	20MAR09
336.5A	Submit Prequalification List for U/G Plumbing	1	23MAR09	23MAR09
R-71	GBC Propose Value Engineering on Revised Design	5	24MAR09	30MAR09
R-201	Review + Reconciliation With VE for Est #1R	5	25MAR09	31MAR09
R-451	Owner Approve Estimate#1R Based on Rev.50% CD's	5	01APR09	07APR09
08A-500	Date Required for CD's-Pkg 08A Windows/Strfrnts	0		02APR09*
04A-500	Date Required for CD's-Pkg 04A Masonry	0		02APR09*
07B-500	Date Required for CD's-Pkg 07B Roofing	0		02APR09*



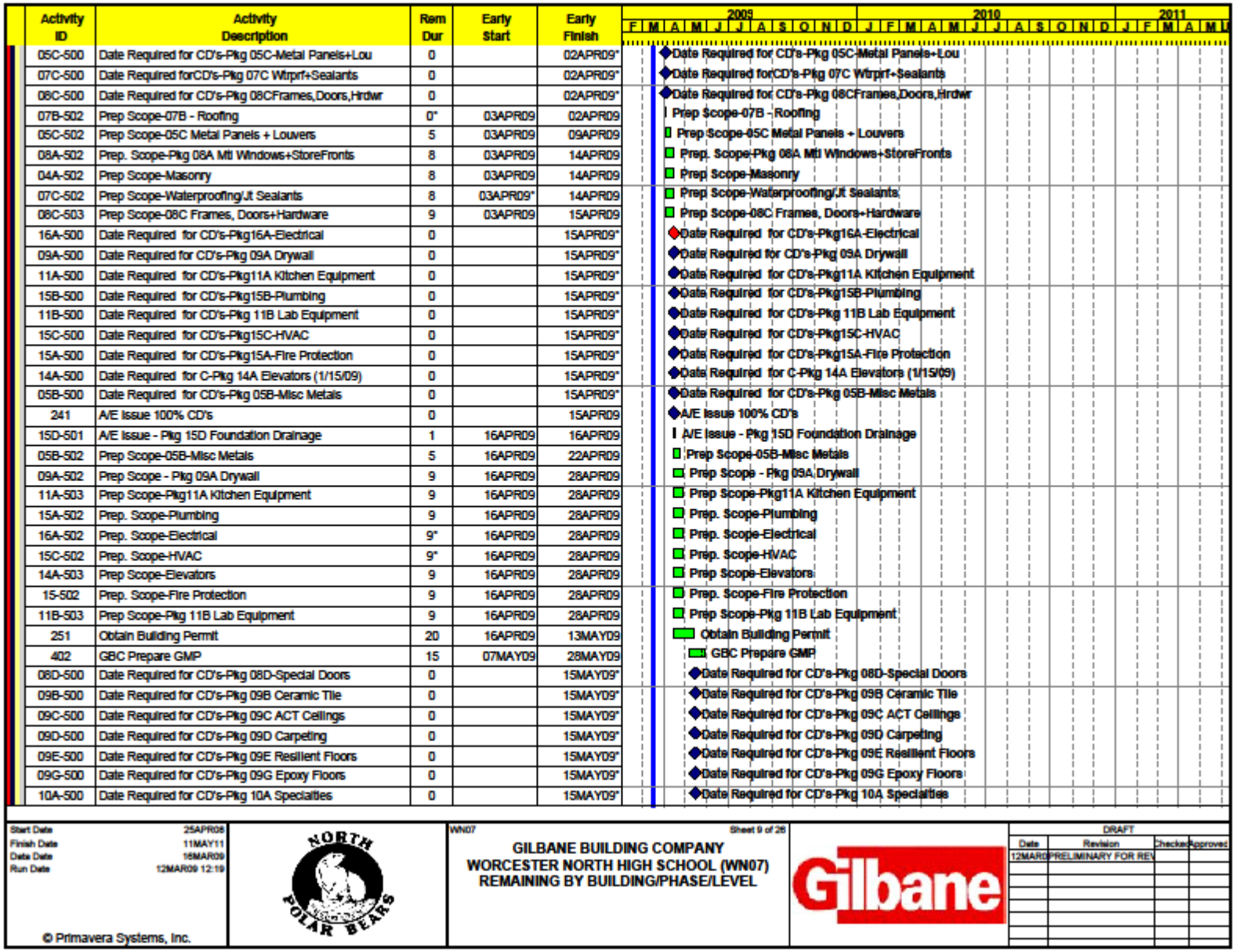
Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
Run Date 12MAR09 12:19

WN07 Sheet 8 of 28

GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		



Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
05C-500	Date Required for CD's-Pkg 05C-Metal Panels+Lou	0		02APR09*
07C-500	Date Required forCD's-Pkg 07C Wtrprf+Sealants	0		02APR09*
08C-500	Date Required for CD's-Pkg 08CFrames,Doors,Hrdwr	0		02APR09*
07B-502	Prep Scope-07B - Roofing	0*	03APR09	02APR09
05C-502	Prep Scope-05C Metal Panels + Louvers	5	03APR09	09APR09
08A-502	Prep. Scope-Pkg 08A Mtl Windows+StoreFronts	8	03APR09	14APR09
04A-502	Prep Scope-Masonry	8	03APR09	14APR09
07C-502	Prep Scope-Waterproofing/Jt Sealants	8	03APR09*	14APR09
08C-503	Prep Scope-08C Frames, Doors+Hardware	9	03APR09	15APR09
16A-500	Date Required for CD's-Pkg16A-Electrical	0		15APR09*
09A-500	Date Required for CD's-Pkg 09A Drywall	0		15APR09*
11A-500	Date Required for CD's-Pkg11A Kitchen Equipment	0		15APR09*
15B-500	Date Required for CD's-Pkg15B-Plumbing	0		15APR09*
11B-500	Date Required for CD's-Pkg 11B Lab Equipment	0		15APR09*
15C-500	Date Required for CD's-Pkg15C-HVAC	0		15APR09*
15A-500	Date Required for CD's-Pkg15A-Fire Protection	0		15APR09*
14A-500	Date Required for C-Pkg 14A Elevators (1/15/09)	0		15APR09*
05B-500	Date Required for CD's-Pkg 05B-Misc Metals	0		15APR09*
241	A/E Issue 100% CD's	0		15APR09
15D-501	A/E Issue - Pkg 15D Foundation Drainage	1	16APR09	16APR09
05B-502	Prep Scope-05B-Misc Metals	5	16APR09	22APR09
09A-502	Prep Scope - Pkg 09A Drywall	9	16APR09	28APR09
11A-503	Prep Scope-Pkg11A Kitchen Equipment	9	16APR09	28APR09
15A-502	Prep. Scope-Plumbing	9	16APR09	28APR09
16A-502	Prep. Scope-Electrical	9*	16APR09	28APR09
15C-502	Prep. Scope-HVAC	9*	16APR09	28APR09
14A-503	Prep Scope-Elevators	9	16APR09	28APR09
15-502	Prep. Scope-Fire Protection	9	16APR09	28APR09
11B-503	Prep Scope-Pkg 11B Lab Equipment	9	16APR09	28APR09
251	Obtain Building Permit	20	16APR09	13MAY09
402	GBC Prepare GMP	15	07MAY09	28MAY09
08D-500	Date Required for CD's-Pkg 08D-Special Doors	0		15MAY09*
09B-500	Date Required for CD's-Pkg 09B Ceramic Tile	0		15MAY09*
09C-500	Date Required for CD's-Pkg 09C ACT Ceilings	0		15MAY09*
09D-500	Date Required for CD's-Pkg 09D Carpeting	0		15MAY09*
09E-500	Date Required for CD's-Pkg 09E Resilient Floors	0		15MAY09*
09G-500	Date Required for CD's-Pkg 09G Epoxy Floors	0		15MAY09*
10A-500	Date Required for CD's-Pkg 10A Specialties	0		15MAY09*

Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
Run Date 12MAR09 12:19

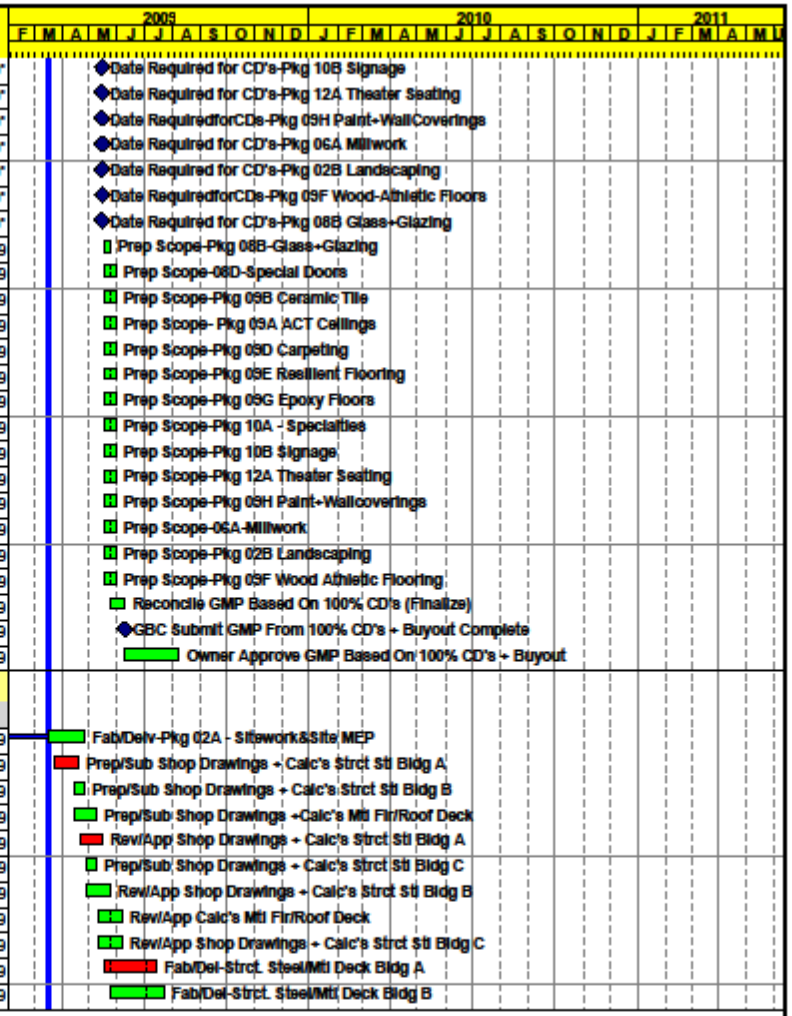
WN07 Sheet 9 of 28

GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
10B-500	Date Required for CD's-Pkg 10B Signage	0		15MAY09*
12A-500	Date Required for CD's-Pkg 12A Theater Seating	0		15MAY09*
09H-500	Date RequiredforCDs-Pkg 09H Paint+WallCoverings	0		15MAY09*
06A-500	Date Required for CD's-Pkg 06A Millwork	0		15MAY09*
02B-500	Date Required for CD's-Pkg 02B Landscaping	0		15MAY09*
09F-500	Date RequiredforCDs-Pkg 09F Wood-Athletic Floors	0		15MAY09*
08B-500	Date Required for CD's-Pkg 08B Glass+Glazing	0		15MAY09*
08B-503	Prep Scope-Pkg 08B-Glass+Glazing	5	18MAY09	22MAY09
08D-503	Prep Scope-08D-Special Doors	9	18MAY09	29MAY09
09B-503	Prep Scope-Pkg 09B Ceramic Tile	9	18MAY09	29MAY09
09C-503	Prep Scope- Pkg 09A ACT Ceilings	9	18MAY09	29MAY09
09D-503	Prep Scope-Pkg 09D Carpeting	9	18MAY09	29MAY09
09E-503	Prep Scope-Pkg 09E Resilient Flooring	9	18MAY09	29MAY09
09G-503	Prep Scope-Pkg 09G Epoxy Floors	9	18MAY09	29MAY09
10A-503	Prep Scope-Pkg 10A - Specialties	9	18MAY09	29MAY09
10B-503	Prep Scope-Pkg 10B Signage	9	18MAY09	29MAY09
12A-503	Prep Scope-Pkg 12A Theater Seating	9	18MAY09	29MAY09
09H-503	Prep Scope-Pkg 09H Paint+Wallcoverings	9	18MAY09	29MAY09
06A-502	Prep Scope-06A-Millwork	9	18MAY09	29MAY09
02B-502	Prep Scope-Pkg 02B Landscaping	9	18MAY09	29MAY09
09F-503	Prep Scope-Pkg 09F Wood Athletic Flooring	9	18MAY09	29MAY09
412	Reconcile GMP Based On 100% CD's (Finalize)	10	26MAY09	08JUN09
422	GBC Submit GMP From 100% CD's + Buyout Complete	0		08JUN09
432	Owner Approve GMP Based On 100% CD's + Buyout	60	09JUN09	07AUG09
GENERAL BUILDING				
GENERAL				
213	Fab/Delv-Pkg 02A - Sitework&Site MEP	30*	02DEC08A	24APR09
05A-512A	Prep/Sub Shop Drawings + Calc's Strct Stl Bldg A	20	23MAR09	17APR09
05A-512B	Prep/Sub Shop Drawings + Calc's Strct Stl Bldg B	10	13APR09	24APR09
05A-513C	Prep/Sub Shop Drawings +Calc's Mtl Flr/Roof Deck	20	13APR09	08MAY09
05A-514A	Rev/App Shop Drawings + Calc's Strct Stl Bldg A	20	20APR09	15MAY09
05A-512C	Prep/Sub Shop Drawings + Calc's Strct Stl Bldg C	10	27APR09	08MAY09
05A-514B	Rev/App Shop Drawings + Calc's Strct Stl Bldg B	20	27APR09	22MAY09
05A-515C	Rev/App Calc's Mtl Flr/Roof Deck	19	11MAY09	05JUN09
05A-514C	Rev/App Shop Drawings + Calc's Strct Stl Bldg C	19	11MAY09	05JUN09
05A-516A	Fab/Del-Strct. Steel/Mtl Deck Bldg A	40	18MAY09	14JUL09
05A-516B	Fab/Del-Strct. Steel/Mtl Deck Bldg B	40	26MAY09	21JUL09



Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
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WN07 Sheet 10 of 28

GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
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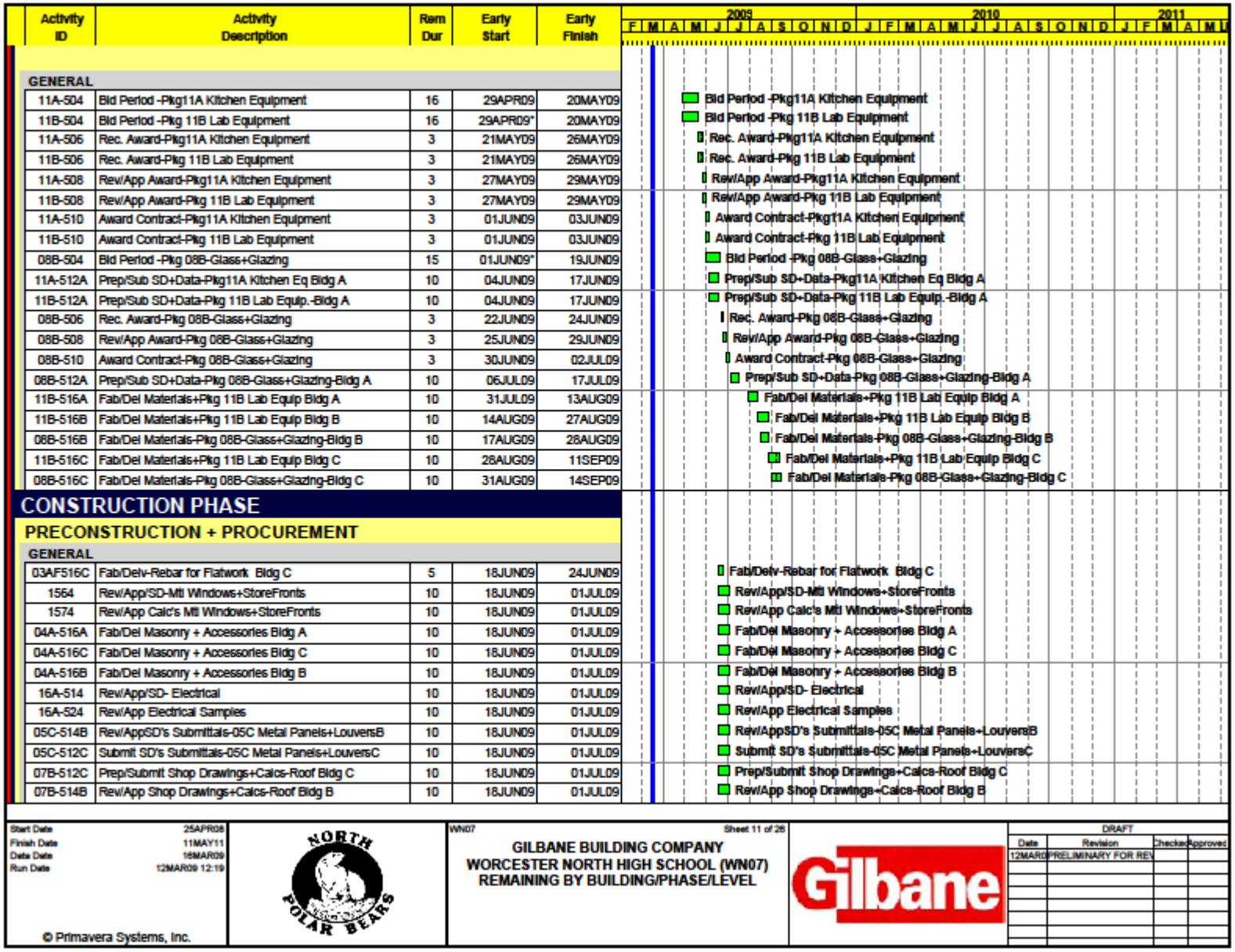
2009
2010
2011
F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
GENERAL
11A-504 Bid Period -Pkg11A Kitchen Equipment 16 29APR09 20MAY09
11B-504 Bid Period -Pkg 11B Lab Equipment 16 29APR09* 20MAY09
11A-506 Rec. Award-Pkg11A Kitchen Equipment 3 21MAY09 26MAY09
11B-506 Rec. Award-Pkg 11B Lab Equipment 3 21MAY09 26MAY09
11A-508 Rev/App Award-Pkg11A Kitchen Equipment 3 27MAY09 29MAY09
11B-508 Rev/App Award-Pkg 11B Lab Equipment 3 27MAY09 29MAY09
11A-510 Award Contract-Pkg11A Kitchen Equipment 3 01JUN09 03JUN09
11B-510 Award Contract-Pkg 11B Lab Equipment 3 01JUN09 03JUN09
08B-504 Bid Period -Pkg 08B-Glass+Glazing 15 01JUN09* 19JUN09
11A-512A Prep/Sub SD+Data-Pkg11A Kitchen Eq Bldg A 10 04JUN09 17JUN09
11B-512A Prep/Sub SD+Data-Pkg 11B Lab Equip.-Bldg A 10 04JUN09 17JUN09
08B-506 Rec. Award-Pkg 08B-Glass+Glazing 3 22JUN09 24JUN09
08B-508 Rev/App Award-Pkg 08B-Glass+Glazing 3 25JUN09 29JUN09
08B-510 Award Contract-Pkg 08B-Glass+Glazing 3 30JUN09 02JUL09
08B-512A Prep/Sub SD+Data-Pkg 08B-Glass+Glazing-Bldg A 10 06JUL09 17JUL09
11B-516A Fab/Del Materials+Pkg 11B Lab Equip Bldg A 10 31JUL09 13AUG09
11B-516B Fab/Del Materials+Pkg 11B Lab Equip Bldg B 10 14AUG09 27AUG09
08B-516B Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg B 10 17AUG09 28AUG09
11B-516C Fab/Del Materials+Pkg 11B Lab Equip Bldg C 10 28AUG09 11SEP09
08B-516C Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg C 10 31AUG09 14SEP09
CONSTRUCTION PHASE
PRECONSTRUCTION + PROCUREMENT
GENERAL
03AF516C Fab/Delv-Rebar for Flatwork Bldg C 5 18JUN09 24JUN09
1564 Rev/App/SD-Mtl Windows+StoreFronts 10 18JUN09 01JUL09
1574 Rev/App Calc's Mtl Windows+StoreFronts 10 18JUN09 01JUL09
04A-516A Fab/Del Masonry + Accessories Bldg A 10 18JUN09 01JUL09
04A-516C Fab/Del Masonry + Accessories Bldg C 10 18JUN09 01JUL09
04A-516B Fab/Del Masonry + Accessories Bldg B 10 18JUN09 01JUL09
16A-514 Rev/App/SD- Electrical 10 18JUN09 01JUL09
16A-524 Rev/App Electrical Samples 10 18JUN09 01JUL09
05C-514B Rev/AppSD's Submittals-05C Metal Panels+LouversB 10 18JUN09 01JUL09
05C-512C Submit SD's Submittals-05C Metal Panels+LouversC 10 18JUN09 01JUL09
07B-512C Prep/Submit Shop Drawings+Calcs-Roof Bldg C 10 18JUN09 01JUL09
07B-514B Rev/App Shop Drawings+Calcs-Roof Bldg B 10 18JUN09 01JUL09
Bid Period -Pkg11A Kitchen Equipment
Bid Period -Pkg 11B Lab Equipment
Rec. Award-Pkg11A Kitchen Equipment
Rec. Award-Pkg 11B Lab Equipment
Rev/App Award-Pkg11A Kitchen Equipment
Rev/App Award-Pkg 11B Lab Equipment
Award Contract-Pkg11A Kitchen Equipment
Award Contract-Pkg 11B Lab Equipment
Bid Period -Pkg 08B-Glass+Glazing
Prep/Sub SD+Data-Pkg11A Kitchen Eq Bldg A
Prep/Sub SD+Data-Pkg 11B Lab Equip.-Bldg A
Rec. Award-Pkg 08B-Glass+Glazing
Rev/App Award-Pkg 08B-Glass+Glazing
Award Contract-Pkg 08B-Glass+Glazing
Prep/Sub SD+Data-Pkg 08B-Glass+Glazing-Bldg A
Fab/Del Materials+Pkg 11B Lab Equip Bldg A
Fab/Del Materials+Pkg 11B Lab Equip Bldg B
Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg B
Fab/Del Materials+Pkg 11B Lab Equip Bldg C
Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg C
Fab/Delv-Rebar for Flatwork Bldg C
Rev/App/SD-Mtl Windows+StoreFronts
Rev/App Calc's Mtl Windows+StoreFronts
Fab/Del Masonry + Accessories Bldg A
Fab/Del Masonry + Accessories Bldg C
Fab/Del Masonry + Accessories Bldg B
Rev/App/SD- Electrical
Rev/App Electrical Samples
Rev/AppSD's Submittals-05C Metal Panels+LouversB
Submit SD's Submittals-05C Metal Panels+LouversC
Prep/Submit Shop Drawings+Calcs-Roof Bldg C
Rev/App Shop Drawings+Calcs-Roof Bldg B
Start Date 25APR08
Finish Date 11MAY11
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NORTH POLAR BEARS
WN07
Sheet 11 of 28
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL
Gilbane
DRAFT
Date Revision Checked Approved
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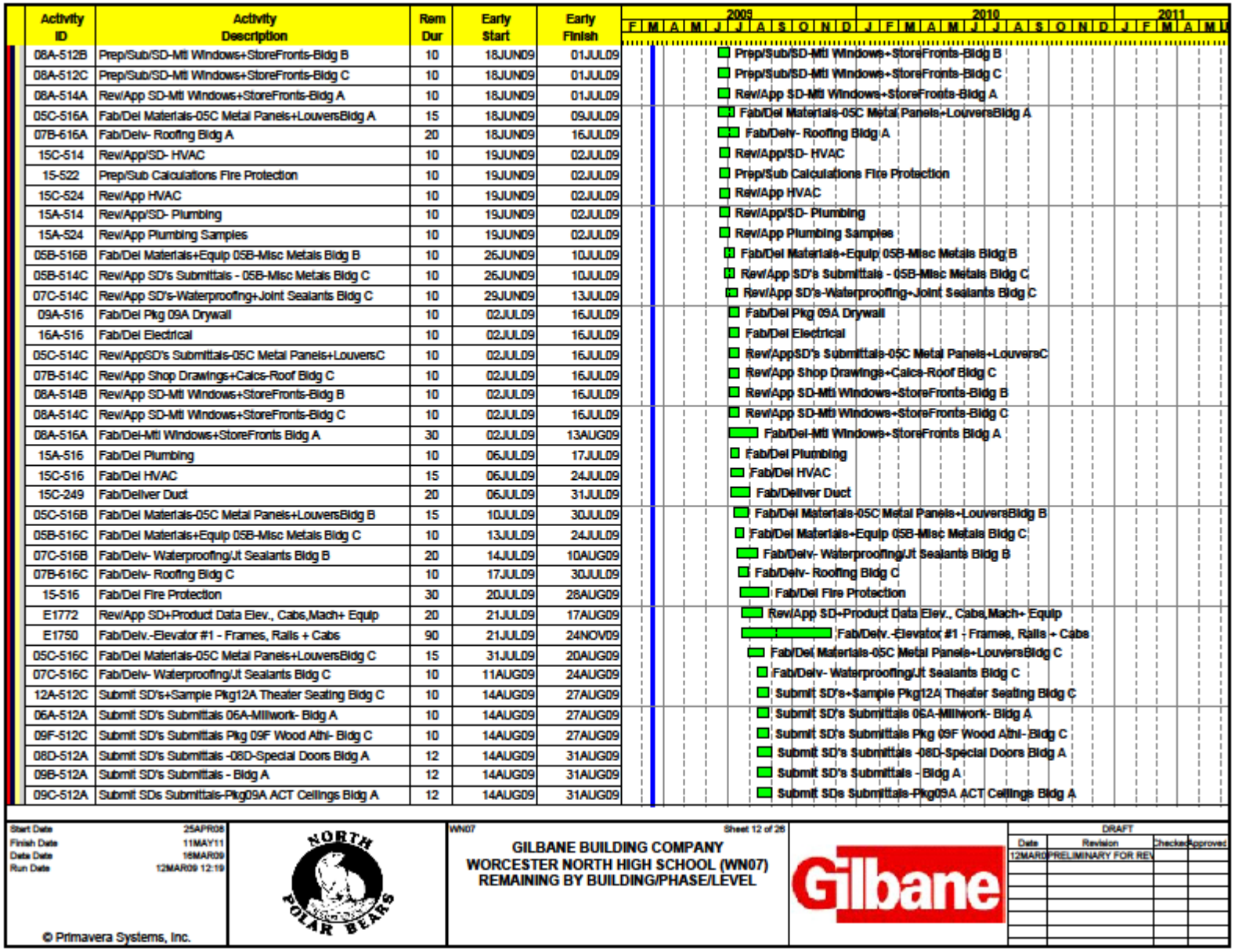
Activity ID
Activity Description
Rem Dur
Early Start
Early Finish
2009
2010
2011
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08A-512B Prep/Sub/SD-Mtl Windows+StoreFronts-Bldg B 10 18JUN09 01JUL09 Prep/Sub/SD-Mtl Windows+StoreFronts-Bldg B
08A-512C Prep/Sub/SD-Mtl Windows+StoreFronts-Bldg C 10 18JUN09 01JUL09 Prep/Sub/SD-Mtl Windows+StoreFronts-Bldg C
08A-514A Rev/App SD-Mtl Windows+StoreFronts-Bldg A 10 18JUN09 01JUL09 Rev/App SD-Mtl Windows+StoreFronts-Bldg A
05C-516A Fab/Del Materials-05C Metal Panels+LouversBldg A 15 18JUN09 09JUL09 Fab/Del Materials-05C Metal Panels+LouversBldg A
07B-516A Fab/Delv- Roofing Bldg A 20 18JUN09 16JUL09 Fab/Delv- Roofing Bldg A
15C-514 Rev/App/SD- HVAC 10 19JUN09 02JUL09 Rev/App/SD- HVAC
15-522 Prep/Sub Calculations Fire Protection 10 19JUN09 02JUL09 Prep/Sub Calculations Fire Protection
15C-524 Rev/App HVAC 10 19JUN09 02JUL09 Rev/App HVAC
15A-514 Rev/App/SD- Plumbing 10 19JUN09 02JUL09 Rev/App/SD- Plumbing
15A-524 Rev/App Plumbing Samples 10 19JUN09 02JUL09 Rev/App Plumbing Samples
05B-516B Fab/Del Materials+Equip 05B-Misc Metals Bldg B 10 26JUN09 10JUL09 Fab/Del Materials+Equip 05B-Misc Metals Bldg B
05B-514C Rev/App SD's Submittals - 05B-Misc Metals Bldg C 10 26JUN09 10JUL09 Rev/App SD's Submittals - 05B-Misc Metals Bldg C
07C-514C Rev/App SD's-Waterproofing+Joint Sealants Bldg C 10 29JUN09 13JUL09 Rev/App SD's-Waterproofing+Joint Sealants Bldg C
09A-516 Fab/Del Pkg 09A Drywall 10 02JUL09 16JUL09 Fab/Del Pkg 09A Drywall
16A-516 Fab/Del Electrical 10 02JUL09 16JUL09 Fab/Del Electrical
05C-514C Rev/AppSD's Submittals-05C Metal Panels+LouversC 10 02JUL09 16JUL09 Rev/AppSD's Submittals-05C Metal Panels+LouversC
07B-514C Rev/App Shop Drawings+Calcs-Roof Bldg C 10 02JUL09 16JUL09 Rev/App Shop Drawings+Calcs-Roof Bldg C
08A-514B Rev/App SD-Mtl Windows+StoreFronts-Bldg B 10 02JUL09 16JUL09 Rev/App SD-Mtl Windows+StoreFronts-Bldg B
08A-514C Rev/App SD-Mtl Windows+StoreFronts-Bldg C 10 02JUL09 16JUL09 Rev/App SD-Mtl Windows+StoreFronts-Bldg C
08A-516A Fab/Del-Mtl Windows+StoreFronts Bldg A 30 02JUL09 13AUG09 Fab/Del-Mtl Windows+StoreFronts Bldg A
15A-516 Fab/Del Plumbing 10 06JUL09 17JUL09 Fab/Del Plumbing
15C-516 Fab/Del HVAC 15 06JUL09 24JUL09 Fab/Del HVAC
15C-249 Fab/Deliver Duct 20 06JUL09 31JUL09 Fab/Deliver Duct
05C-516B Fab/Del Materials-05C Metal Panels+LouversBldg B 15 10JUL09 30JUL09 Fab/Del Materials-05C Metal Panels+LouversBldg B
05B-516C Fab/Del Materials+Equip 05B-Misc Metals Bldg C 10 13JUL09 24JUL09 Fab/Del Materials+Equip 05B-Misc Metals Bldg C
07C-516B Fab/Delv- Waterproofing/Jt Sealants Bldg B 20 14JUL09 10AUG09 Fab/Delv- Waterproofing/Jt Sealants Bldg B
07B-516C Fab/Delv- Roofing Bldg C 10 17JUL09 30JUL09 Fab/Delv- Roofing Bldg C
15-516 Fab/Del Fire Protection 30 20JUL09 26AUG09 Fab/Del Fire Protection
E1772 Rev/App SD+Product Data Elev., Cabs,Mach+ Equip 20 21JUL09 17AUG09 Rev/App SD+Product Data Elev., Cabs,Mach+ Equip
E1750 Fab/Delv.-Elevator #1 - Frames, Rails + Cabs 90 21JUL09 24NOV09 Fab/Delv.-Elevator #1 - Frames, Rails + Cabs
05C-516C Fab/Del Materials-05C Metal Panels+LouversBldg C 15 31JUL09 20AUG09 Fab/Del Materials-05C Metal Panels+LouversBldg C
07C-516C Fab/Delv- Waterproofing/Jt Sealants Bldg C 10 11AUG09 24AUG09 Fab/Delv- Waterproofing/Jt Sealants Bldg C
12A-512C Submit SD's+Sample Pkg12A Theater Seating Bldg C 10 14AUG09 27AUG09 Submit SD's+Sample Pkg12A Theater Seating Bldg C
06A-512A Submit SD's Submittals 06A-Millwork- Bldg A 10 14AUG09 27AUG09 Submit SD's Submittals 06A-Millwork- Bldg A
09F-512C Submit SD's Submittals Pkg 09F Wood Athl- Bldg C 10 14AUG09 27AUG09 Submit SD's Submittals Pkg 09F Wood Athl- Bldg C
08D-512A Submit SD's Submittals -08D-Special Doors Bldg A 12 14AUG09 31AUG09 Submit SD's Submittals -08D-Special Doors Bldg A
09B-512A Submit SD's Submittals - Bldg A 12 14AUG09 31AUG09 Submit SD's Submittals - Bldg A
09C-512A Submit SDs Submittals-Pkg09A ACT Ceilings Bldg A 12 14AUG09 31AUG09 Submit SDs Submittals-Pkg09A ACT Ceilings Bldg A
Start Date 25APR08
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NORTH POLAR BEARS
WN07
Sheet 12 of 28
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL
Gilbane
DRAFT
Date
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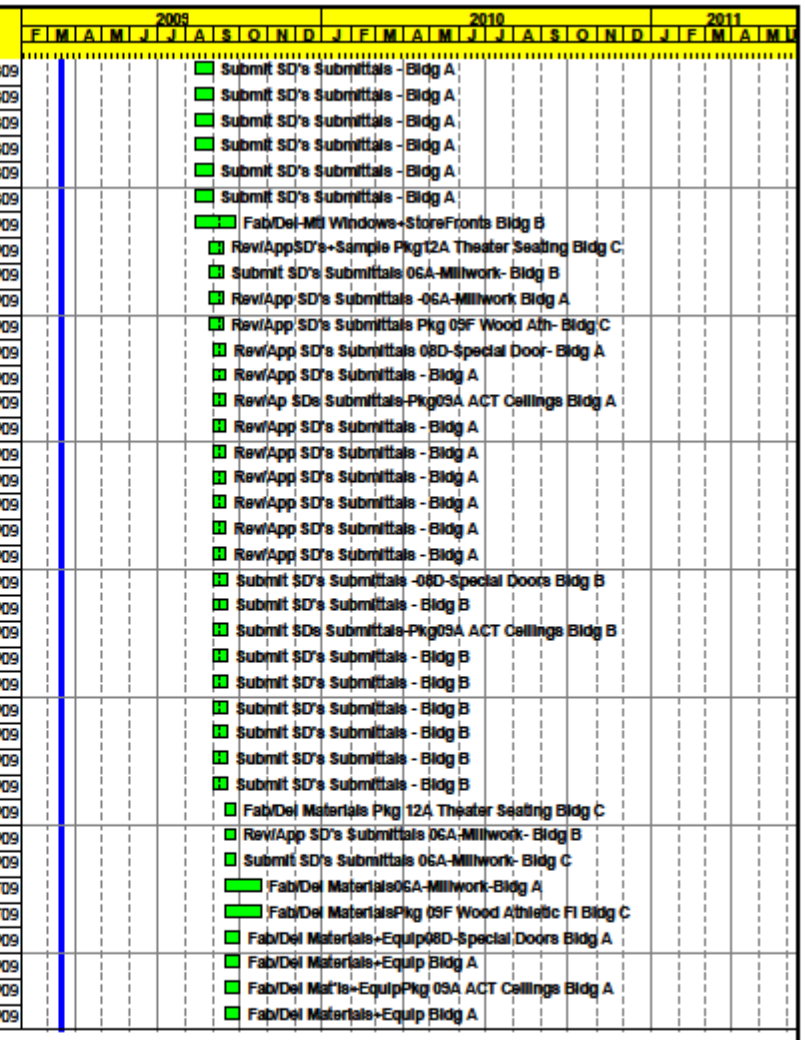
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
09D-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
09E-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
09G-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
10A-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
10B-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
09H-512A	Submit SD's Submittals - Bldg A	12	14AUG09	31AUG09
08A-516B	Fab/Del-Mtl Windows+StoreFronts Bldg B	30	14AUG09	25SEP09
12A-514C	Rev/AppSD's+Sample Pkg12A Theater Seating Bldg C	10	28AUG09	11SEP09
06A-512B	Submit SD's Submittals 06A-Millwork- Bldg B	10	28AUG09	11SEP09
06A-514A	Rev/App SD's Submittals -06A-Millwork Bldg A	10	28AUG09	11SEP09
09F-514C	Rev/App SD's Submittals Pkg 09F Wood Ath- Bldg C	10	28AUG09	11SEP09
08D-514A	Rev/App SD's Submittals 08D-Special Door- Bldg A	10	01SEP09	15SEP09
09B-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
09C-514A	Rev/Ap SDs Submittals-Pkg09A ACT Ceilings Bldg A	10	01SEP09	15SEP09
09D-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
09E-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
09G-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
10A-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
10B-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
09H-514A	Rev/App SD's Submittals - Bldg A	10	01SEP09	15SEP09
08D-512B	Submit SD's Submittals -08D-Special Doors Bldg B	12	01SEP09	17SEP09
09B-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
09C-512B	Submit SDs Submittals-Pkg09A ACT Ceilings Bldg B	12	01SEP09	17SEP09
09D-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
09E-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
09G-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
09H-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
10A-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
10B-512B	Submit SD's Submittals - Bldg B	12	01SEP09	17SEP09
12A-516C	Fab/Del Materials Pkg 12A Theater Seating Bldg C	10	14SEP09	25SEP09
06A-514B	Rev/App SD's Submittals 06A-Millwork- Bldg B	10	14SEP09	25SEP09
06A-512C	Submit SD's Submittals 06A-Millwork- Bldg C	10	14SEP09	25SEP09
06A-516A	Fab/Del Materials06A-Millwork-Bldg A	30	14SEP09	23OCT09
09F-516C	Fab/Del MaterialsPkg 09F Wood Athletic Fl Bldg C	30	14SEP09	23OCT09
08D-516A	Fab/Del Materials+Equip08D-Special Doors Bldg A	10	16SEP09	29SEP09
09B-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
09C-516A	Fab/Del Mat'ls+EquipPkg 09A ACT Ceilings Bldg A	10	16SEP09	29SEP09
09D-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09



Start Date 25APR08
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GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

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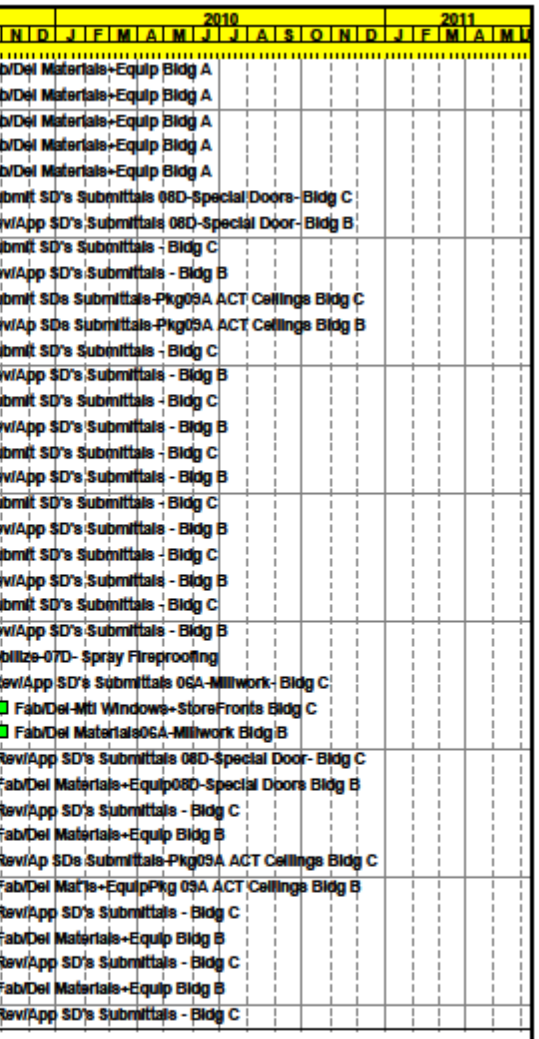
Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
09E-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
09G-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
10A-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
10B-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
09H-516A	Fab/Del Materials+Equip Bldg A	10	16SEP09	29SEP09
08D-512C	Submit SD's Submittals 08D-Special Doors- Bldg C	10	18SEP09	01OCT09
08D-514B	Rev/App SD's Submittals 08D-Special Door- Bldg B	10	18SEP09	01OCT09
09B-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
09B-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
09C-512C	Submit SDs Submittals-Pkg09A ACT Ceilings Bldg C	10	18SEP09	01OCT09
09C-514B	Rev/Ap SDs Submittals-Pkg09A ACT Ceilings Bldg B	10	18SEP09	01OCT09
09D-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
09D-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
09E-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
09E-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
09G-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
09G-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
09H-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
09H-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
10A-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
10A-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
10B-512C	Submit SD's Submittals - Bldg C	10	18SEP09	01OCT09
10B-514B	Rev/App SD's Submittals - Bldg B	10	18SEP09	01OCT09
07D-510	Mobilize-07D- Spray Fireproofing	0	28SEP09	
06A-514C	Rev/App SD's Submittals 06A-Millwork- Bldg C	10	28SEP09	09OCT09
08A-516C	Fab/Del-Mtl Windows+StoreFronts Bldg C	30	28SEP09	06NOV09
06A-516B	Fab/Del Materials06A-Millwork Bldg B	30	28SEP09	06NOV09
08D-514C	Rev/App SD's Submittals 08D-Special Door- Bldg C	10	02OCT09	15OCT09
08D-516B	Fab/Del Materials+Equip08D-Special Doors Bldg B	10	02OCT09	15OCT09
09B-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
09B-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
09C-514C	Rev/Ap SDs Submittals-Pkg09A ACT Ceilings Bldg C	10	02OCT09	15OCT09
09C-516B	Fab/Del Mat'ls+EquipPkg 09A ACT Ceilings Bldg B	10	02OCT09	15OCT09
09D-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
09D-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
09E-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
09E-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
09G-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09



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GILBANE BUILDING COMPANY
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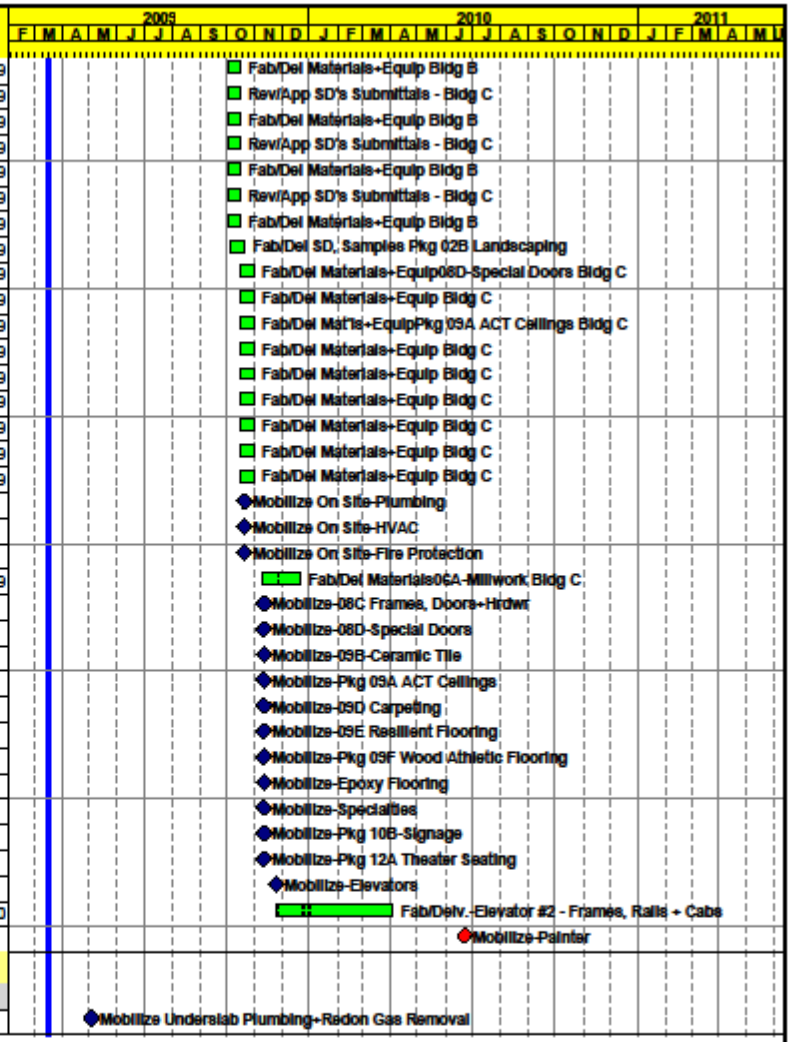
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
09G-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
09H-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
09H-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
10A-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
10A-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
10B-514C	Rev/App SD's Submittals - Bldg C	10	02OCT09	15OCT09
10B-516B	Fab/Del Materials+Equip Bldg B	10	02OCT09	15OCT09
02B-509	Fab/Del SD, Samples Pkg 02B Landscaping	10	06OCT09	19OCT09
08D-516C	Fab/Del Materials+Equip08D-Special Doors Bldg C	10	16OCT09	29OCT09
09B-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
09C-516C	Fab/Del Mat'ls+EquipPkg 09A ACT Ceilings Bldg C	10	16OCT09	29OCT09
09D-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
09E-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
09G-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
09H-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
10A-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
10B-516C	Fab/Del Materials+Equip Bldg C	10	16OCT09	29OCT09
15A-518	Mobilize On Site-Plumbing	0	20OCT09	
15C-518	Mobilize On Site-HVAC	0	20OCT09	
15-518	Mobilize On Site-Fire Protection	0	20OCT09	
06A-516C	Fab/Del Materials06A-Millwork Bldg C	30	09NOV09	21DEC09
08C-518	Mobilize-08C Frames, Doors+Hrdwr	0	11NOV09	
08D-518	Mobilize-08D-Special Doors	0	11NOV09	
09B-518	Mobilize-09B-Ceramic Tile	0	11NOV09	
09C-518	Mobilize-Pkg 09A ACT Ceilings	0	11NOV09	
09D-518	Mobilize-09D Carpeting	0	11NOV09	
09E-518	Mobilize-09E Resilient Flooring	0	11NOV09	
09F-518	Mobilize-Pkg 09F Wood Athletic Flooring	0	11NOV09	
09G-518	Mobilize-Epoxy Flooring	0	11NOV09	
10A-518	Mobilize-Specialties	0	11NOV09	
10B-518	Mobilize-Pkg 10B-Signage	0	11NOV09	
12A-518	Mobilize-Pkg 12A Theater Seating	0	11NOV09	
E1760	Mobilize-Elevators	0	25NOV09	
E1756	Fab/Delv.-Elevator #2 - Frames, Rails + Cabs	90	25NOV09	02APR10
09H-518	Mobilize-Painter	0	23JUN10	
GENERAL BUILDING				
GENERAL				
15BU-510	Mobilize Underslab Plumbing+Redon Gas Removal	0	04MAY09	



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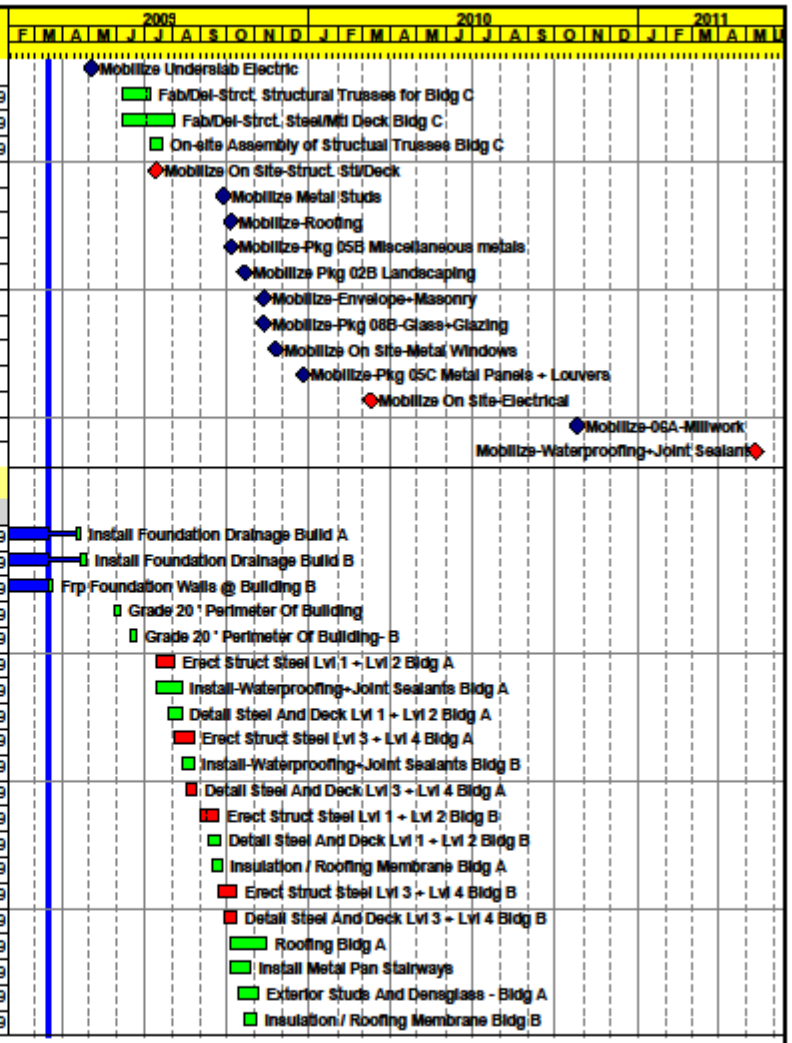
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
16AU-510	Mobilize Underslab Electric	0	04MAY09	
05A-517C	Fab/Del-Strct. Structural Trusses for Bldg C	20	08JUN09	06JUL09
05A-516C	Fab/Del-Strct. Steel/Mtl Deck Bldg C	40	08JUN09	03AUG09
05A-517C2	On-site Assembly of Structual Trusses Bldg C	10	07JUL09	20JUL09
05A-518	Mobilize On Site-Struct. Stl/Deck	0	14JUL09	
09A-518	Mobilize Metal Studs	0	28SEP09	
07B-618	Mobilize-Roofing	0	05OCT09	
05B-518	Mobilize-Pkg 05B Miscellaneous metals	0	06OCT09	
02B-510	Mobilize Pkg 02B Landscaping	0	20OCT09	
04A-518	Mobilize-Envelope+Masonry	0	11NOV09	
08B-518	Mobilize-Pkg 08B-Glass+Glazing	0	11NOV09	
08A-518	Mobilize On Site-Metal Windows	0	25NOV09	
05C-518	Mobilize-Pkg 05C Metal Panels + Louvers	0	24DEC09	
16A-518	Mobilize On Site-Electrical	0	09MAR10	
06A-518	Mobilize-06A-Millwork	0	26OCT10	
07C-518	Mobilize-Waterproofing+Joint Sealants	0	12MAY11	
CLASSROOM STRUCTURE				
GENERAL				
C-3001A	Install Foundation Drainage Build A	3	22JAN09A	21APR09
C-3001B	Install Foundation Drainage Build B	4	26JAN09A	27APR09
C-4140B	Frp Foundation Walls @ Building B	5	26JAN09A	20MAR09
C-4107A	Grade 20 ' Perimeter Of Building	5	29MAY09	04JUN09
C-4107B	Grade 20 ' Perimeter Of Building- B	5	16JUN09	22JUN09
C-4170A	Erect Struct Steel Lvl 1 + Lvl 2 Bldg A	15	14JUL09	03AUG09
C-4092A	Install-Waterproofing+Joint Sealants Bldg A	20	14JUL09	10AUG09
C-4195A	Detail Steel And Deck Lvl 1 + Lvl 2 Bldg A	10	28JUL09	10AUG09
C-4230A	Erect Struct Steel Lvl 3 + Lvl 4 Bldg A	15	04AUG09	24AUG09
C-4092B	Install-Waterproofing+Joint Sealants Bldg B	10	11AUG09	24AUG09
C-4175A	Detail Steel And Deck Lvl 3 + Lvl 4 Bldg A	10*	17AUG09	28AUG09
C-4170B	Erect Struct Steel Lvl 1 + Lvl 2 Bldg B	15	31AUG09	21SEP09
C-4195B	Detail Steel And Deck Lvl 1 + Lvl 2 Bldg B	10	10SEP09	23SEP09
C-4205A	Insulation / Roofing Membrane Bldg A	10	14SEP09	25SEP09
C-4230B	Erect Struct Steel Lvl 3 + Lvl 4 Bldg B	15	22SEP09	12OCT09
C-4175B	Detail Steel And Deck Lvl 3 + Lvl 4 Bldg B	10	29SEP09	12OCT09
C-4215A	Roofing Bldg A	30	05OCT09	13NOV09
C-4280A	Install Metal Pan Stairways	15	06OCT09	26OCT09
C-4240	Exterior Studs And Densglass - Bldg A	15	14OCT09	03NOV09
C-4205B	Insulation / Roofing Membrane Bldg B	10	20OCT09	02NOV09



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GILBANE BUILDING COMPANY
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REMAINING BY BUILDING/PHASE/LEVEL

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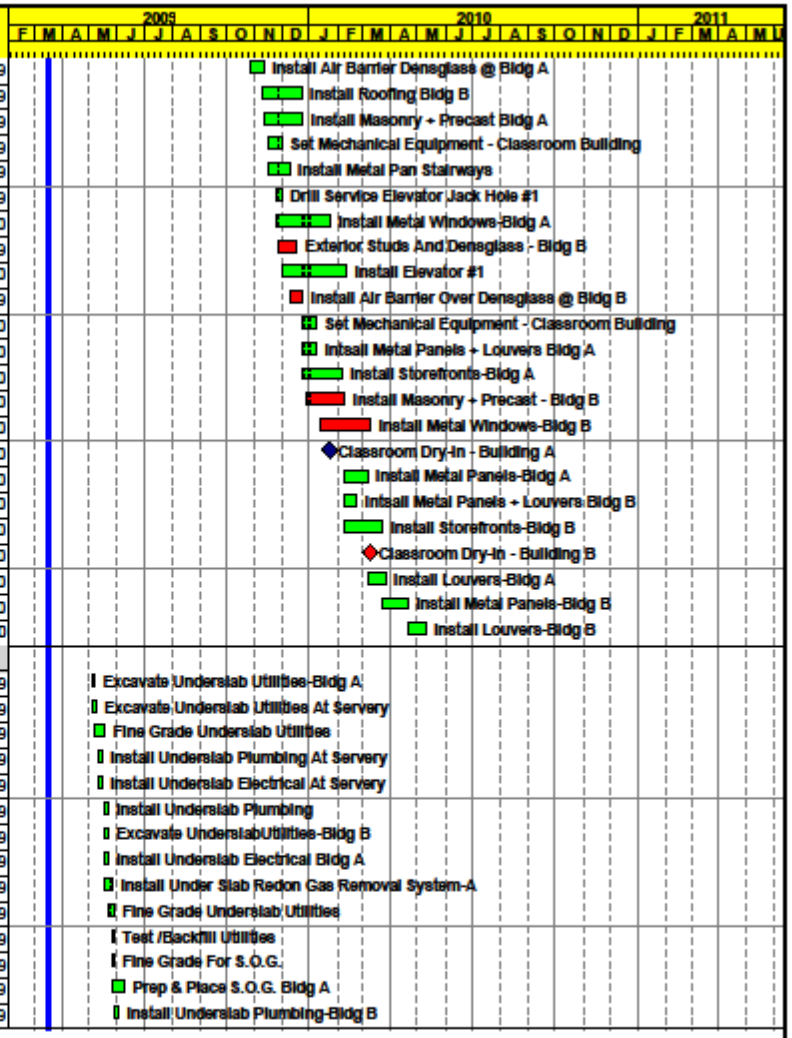
Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
C-4245	Install Air Barrier Densglass @ Bldg A	10	28OCT09	10NOV09
C-4215B	Install Roofing Bldg B	30	10NOV09	22DEC09
C-4290A	Install Masonry + Precast Bldg A	30	11NOV09	23DEC09
C-4301	Set Mechanical Equipment - Classroom Building	10	16NOV09	30NOV09
C-4280B	Install Metal Pan Stairways	15	17NOV09	08DEC09
C-4055A	Drill Service Elevator Jack Hole #1	3	25NOV09	30NOV09
C-4275	Install Metal Windows-Bldg A	40	25NOV09	22JAN10
C-4240B	Exterior Studs And Densglass - Bldg B	15	27NOV09	17DEC09
C-6075A	Install Elevator #1	50	01DEC09	10FEB10
C-4245B	Install Air Barrier Over Densglass @ Bldg B	10	11DEC09	24DEC09
C-4301B	Set Mechanical Equipment - Classroom Building	10	23DEC09	07JAN10
C-4291A	Intsall Metal Panels + Louvers Bldg A	10	24DEC09	06JAN10
C-4250	Install Storefronts-Bldg A	30	24DEC09	05FEB10
C-4290B	Install Masonry + Precast - Bldg B	30	28DEC09	08FEB10
C-4275B	Install Metal Windows-Bldg B	40	12JAN10	08MAR10
C-4270	Classroom Dry-In - Building A	0		22JAN10
C-4255	Install Metal Panels-Bldg A	20	08FEB10	05MAR10
C-4291B	Intsall Metal Panels + Louvers Bldg B	10	09FEB10	22FEB10
C-4250B	Install Storefronts-Bldg B	30	09FEB10	22MAR10
C-4270B	Classroom Dry-In - Building B	0		08MAR10
C-4260	Install Louvers-Bldg A	15	08MAR10	26MAR10
C-4255B	Install Metal Panels-Bldg B	20	23MAR10	19APR10
C-4260B	Install Louvers-Bldg B	15	20APR10	10MAY10
1ST FLOOR				
C-4155A	Excavate Underslab Utilities-Bldg A	3	04MAY09*	06MAY09
C-4115A	Excavate Underslab Utilities At Servery	5	04MAY09	08MAY09
C-4150A	Fine Grade Underslab Utilities	8	07MAY09	18MAY09
C-4145K	Install Underslab Plumbing At Servery	5	11MAY09	15MAY09
C-4147K	Install Underslab Electrical At Servery	5	11MAY09	15MAY09
C-4165A	Install Underslab Plumbing	3	19MAY09	21MAY09
C-4155B	Excavate UnderslabUtilities-Bldg B	3	19MAY09	21MAY09
C-4167A	Install Underslab Electrical Bldg A	3	19MAY09	21MAY09
C-4090A	Install Under Slab Redon Gas Removal System-A	5	19MAY09	26MAY09
C-4150B	Fine Grade Underslab Utilities	3	22MAY09	27MAY09
C-4125A	Test /Backfill Utilities	1	27MAY09	27MAY09
C-4105A	Fine Grade For S.O.G.	2	27MAY09	28MAY09
C-4110A	Prep & Place S.O.G. Bldg A	9	27MAY09	08JUN09
C-4165B	Install Underslab Plumbing-Bldg B	4	28MAY09	02JUN09



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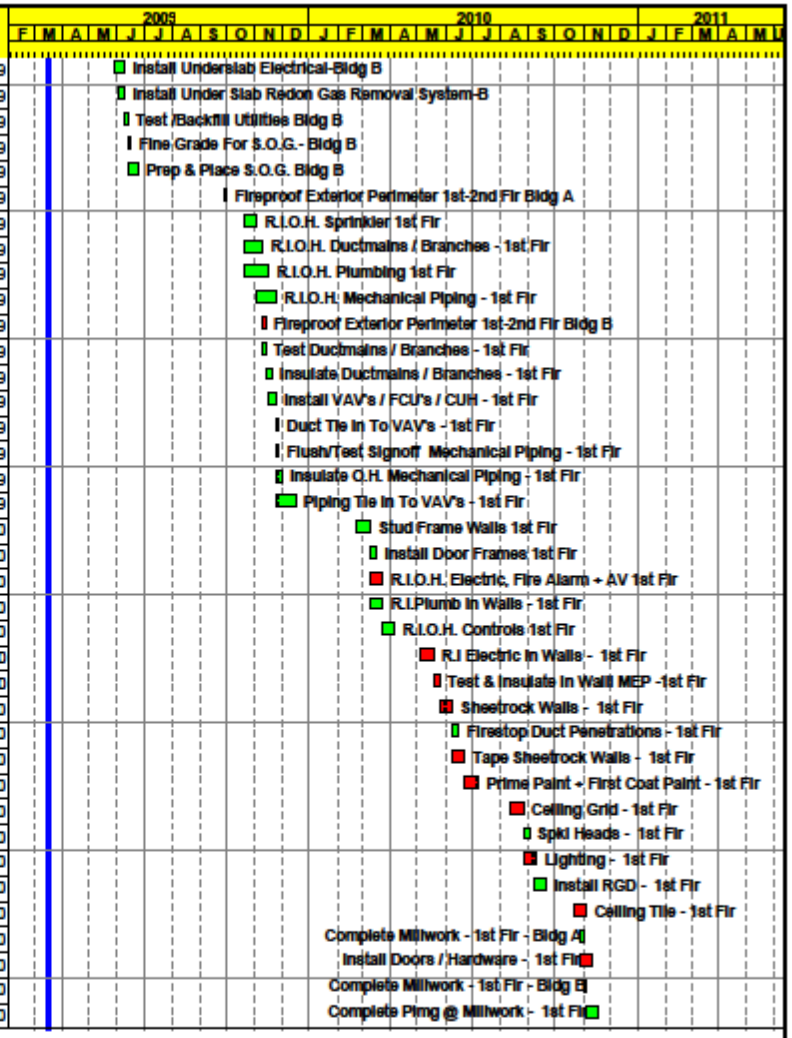
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
C-4167B	Install Underslab Electrical-Bldg B	8	28MAY09	08JUN09
C-4090B	Install Under Slab Redon Gas Removal System-B	5	03JUN09	09JUN09
C-4125B	Test /Backfill Utilities Bldg B	2	10JUN09	11JUN09
C-4105B	Fine Grade For S.O.G.- Bldg B	2	12JUN09	15JUN09
C-4110B	Prep & Place S.O.G. Bldg B	9	12JUN09	24JUN09
C-4001A	Fireproof Exterior Perimeter 1st-2nd Flr Bldg A	3	28SEP09	30SEP09
1-5315	R.I.O.H. Sprinkler 1st Flr	10	20OCT09	02NOV09
1-9305	R.I.O.H. Ductmains / Branches - 1st Flr	15	20OCT09	09NOV09
1-5325	R.I.O.H. Plumbing 1st Flr	20	20OCT09	16NOV09
1-9320	R.I.O.H. Mechanical Piping - 1st Flr	15	03NOV09	23NOV09
C-4001B	Fireproof Exterior Perimeter 1st-2nd Flr Bldg B	3	10NOV09	12NOV09
1-9304	Test Ductmains / Branches - 1st Flr	3	10NOV09	12NOV09
1-9309	Insulate Ductmains / Branches - 1st Flr	5	13NOV09	19NOV09
1-9306	Install VAV's / FCU's / CUH - 1st Flr	5	17NOV09	23NOV09
1-9308	Duct Tie In To VAV's - 1st Flr	3	24NOV09	27NOV09
1-9321	Flush/Test Signoff Mechanical Piping - 1st Flr	3	24NOV09	27NOV09
1-9322	Insulate O.H. Mechanical Piping - 1st Flr	5	24NOV09	01DEC09
1-9307	Piping Tie In To VAV's - 1st Flr	15	24NOV09	15DEC09
1-5330	Stud Frame Walls 1st Flr	10	23FEB10	08MAR10
1-5332	Install Door Frames 1st Flr	5	09MAR10	15MAR10
1-5310	R.I.O.H. Electric, Fire Alarm + AV 1st Flr	10	09MAR10	22MAR10
1-5335	R.I.Plumb In Walls - 1st Flr	10	09MAR10	22MAR10
1-5320	R.I.O.H. Controls 1st Flr	10	23MAR10	05APR10
1-5340	R.I Electric In Walls - 1st Flr	10	04MAY10	17MAY10
1-5350	Test & Insulate In Wall MEP -1st Flr	5	18MAY10	24MAY10
1-5355	Sheetrock Walls - 1st Flr	10	25MAY10	08JUN10
1-9415	Firestop Duct Penetrations - 1st Flr	5	09JUN10	15JUN10
1-5360	Tape Sheetrock Walls - 1st Flr	10	09JUN10	22JUN10
1-5365	Prime Paint + First Coat Paint - 1st Flr	10	23JUN10	07JUL10
1-5385	Ceiling Grid - 1st Flr	10	12AUG10	25AUG10
1-5395	Spkl Heads - 1st Flr	5	26AUG10	01SEP10
1-5390	Lighting - 1st Flr	10	26AUG10	09SEP10
1-5400	Install RGD - 1st Flr	10	07SEP10	20SEP10
1-5402	Ceiling Tile - 1st Flr	9	22OCT10	03NOV10
1-5410A	Complete Millwork - 1st Flr - Bldg A	3	29OCT10	02NOV10
1-5405	Install Doors / Hardware - 1st Flr	10	29OCT10	11NOV10
1-5410B	Complete Millwork - 1st Flr - Bldg B	1	03NOV10	03NOV10
1-5415	Complete Plmg @ Millwork - 1st Flr	10	04NOV10	17NOV10



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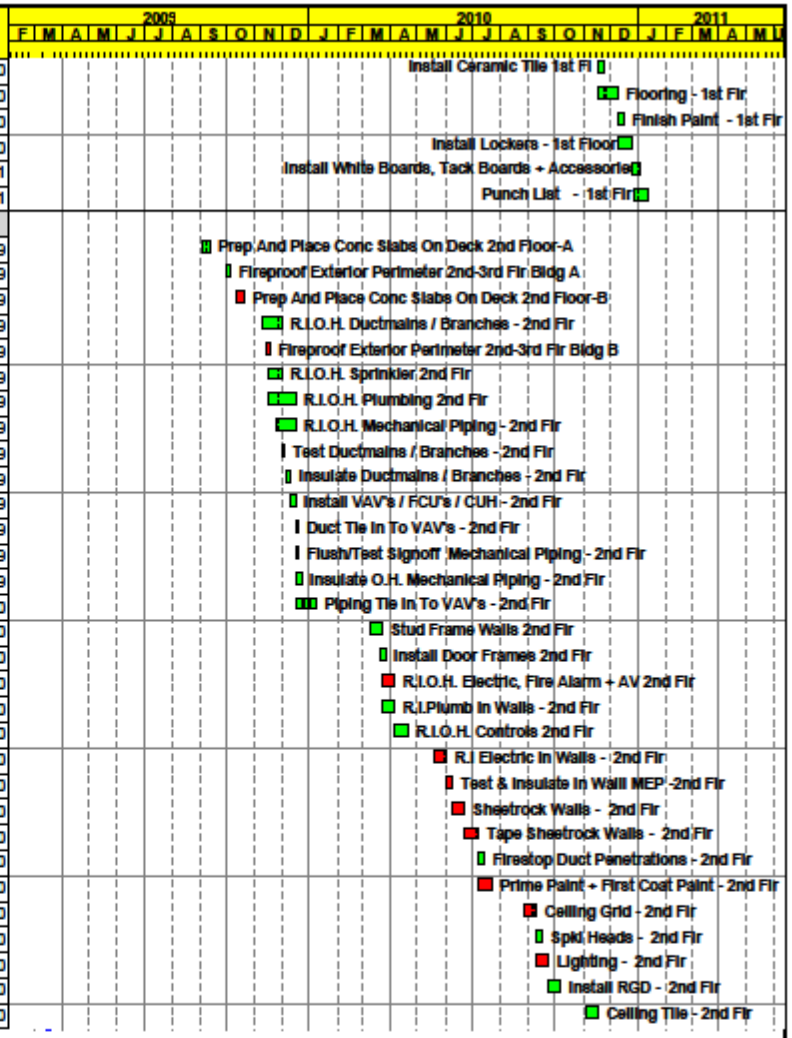
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
1-5490	Install Ceramic Tile 1st Flr	5	18NOV10	24NOV10
1-5420	Flooring - 1st Flr	15	18NOV10	09DEC10
1-5425	Finish Paint - 1st Flr	5	10DEC10	16DEC10
1-5440	Install Lockers - 1st Floor	10	10DEC10	23DEC10
1-5450	Install White Boards, Tack Boards + Accessories	5	27DEC10	03JAN11
1-5430	Punch List - 1st Flr	10	28DEC10	11JAN11
2ND FLOOR				
C-4202A	Prep And Place Conc Slabs On Deck 2nd Floor-A	5	04SEP09	11SEP09
C-4002A	Fireproof Exterior Perimeter 2nd-3rd Flr Bldg A	3	01OCT09	05OCT09
C-4202B	Prep And Place Conc Slabs On Deck 2nd Floor-B	5	13OCT09	19OCT09
2-9305	R.I.O.H. Ductmains / Branches - 2nd Flr	15	10NOV09	01DEC09
C-4002B	Fireproof Exterior Perimeter 2nd-3rd Flr Bldg B	3	13NOV09	17NOV09
2-5315	R.I.O.H. Sprinkler 2nd Flr	10	17NOV09	01DEC09
2-5325	R.I.O.H. Plumbing 2nd Flr	20	17NOV09	15DEC09
2-9320	R.I.O.H. Mechanical Piping - 2nd Flr	15	24NOV09	15DEC09
2-9304	Test Ductmains / Branches - 2nd Flr	3	02DEC09	04DEC09
2-9309	Insulate Ductmains / Branches - 2nd Flr	5	07DEC09	11DEC09
2-9306	Install VAV's / FCU's / CUH - 2nd Flr	5	09DEC09	15DEC09
2-9308	Duct Tie In To VAV's - 2nd Flr	3	16DEC09	18DEC09
2-9321	Flush/Test Signoff Mechanical Piping - 2nd Flr	3	16DEC09	18DEC09
2-9322	Insulate O.H. Mechanical Piping - 2nd Flr	5	16DEC09	22DEC09
2-9307	Piping Tie In To VAV's - 2nd Flr	15	16DEC09	07JAN10
2-5330	Stud Frame Walls 2nd Flr	10	09MAR10	22MAR10
2-5332	Install Door Frames 2nd Flr	5	22MAR10	26MAR10
2-5310	R.I.O.H. Electric, Fire Alarm + AV 2nd Flr	10	23MAR10	05APR10
2-5335	R.I.Plumb In Walls - 2nd Flr	10	23MAR10	05APR10
2-5320	R.I.O.H. Controls 2nd Flr	10	06APR10	19APR10
2-5340	R.I Electric In Walls - 2nd Flr	10	18MAY10	01JUN10
2-5350	Test & Insulate In Walll MEP -2nd Flr	5	02JUN10	08JUN10
2-5355	Sheetrock Walls - 2nd Flr	10	09JUN10	22JUN10
2-5360	Tape Sheetrock Walls - 2nd Flr	10	23JUN10	07JUL10
2-9415	Firestop Duct Penetrations - 2nd Flr	5	08JUL10	14JUL10
2-5365	Prime Paint + First Coat Paint - 2nd Flr	10	08JUL10	21JUL10
2-5385	Ceiling Grid - 2nd Flr	10	26AUG10	09SEP10
2-5395	Spkl Heads - 2nd Flr	5	10SEP10	16SEP10
2-5390	Lighting - 2nd Flr	10	10SEP10	23SEP10
2-5400	Install RGD - 2nd Flr	10	24SEP10	07OCT10
2-5402	Ceiling Tile - 2nd Flr	10	04NOV10	17NOV10



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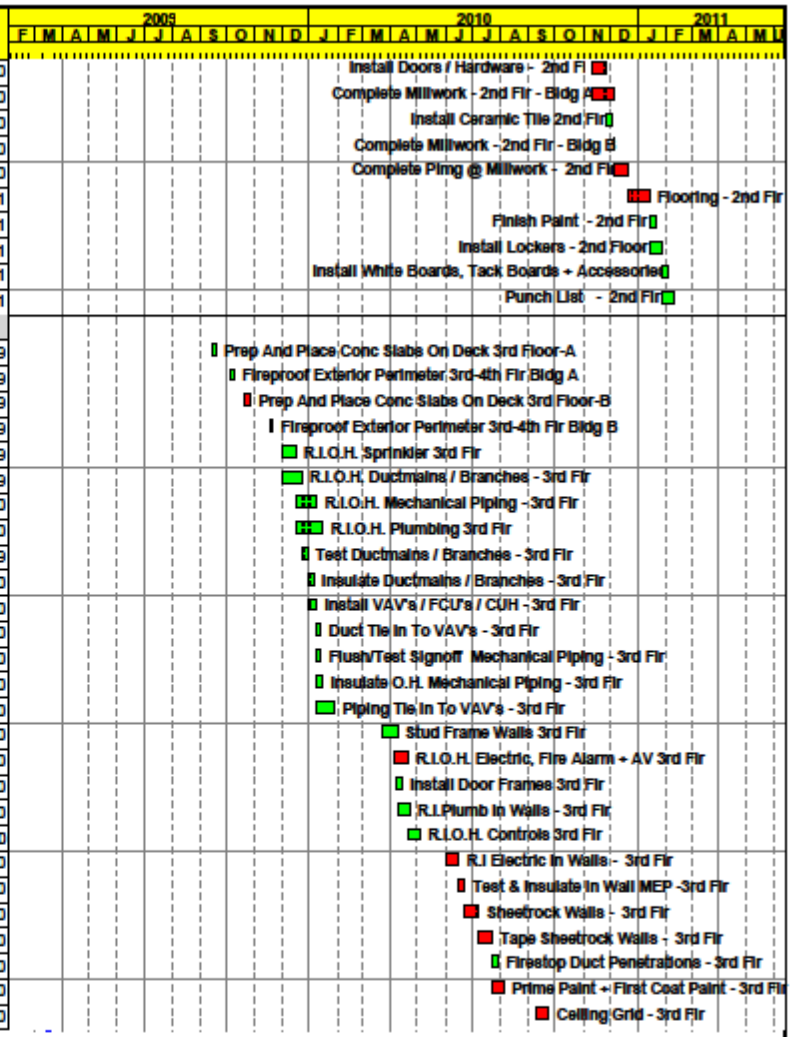
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
2-5405	Install Doors / Hardware - 2nd Flr	10	12NOV10	26NOV10
2-5410A	Complete Millwork - 2nd Flr - Bldg A	15	12NOV10	03DEC10
2-5520	Install Ceramic Tile 2nd Flr	5	26NOV10	02DEC10
2-5410B	Complete Millwork - 2nd Flr - Bldg B	1	06DEC10	06DEC10
2-5415	Complete Plmg @ Millwork - 2nd Flr	10	07DEC10	20DEC10
2-5420	Flooring - 2nd Flr	15	21DEC10	12JAN11
2-5425	Finish Paint - 2nd Flr	5	13JAN11	19JAN11
2-5440	Install Lockers - 2nd Floor	10	13JAN11	26JAN11
2-5450	Install White Boards, Tack Boards + Accessories	5	27JAN11	02FEB11
2-5430	Punch List - 2nd Flr	10	28JAN11	10FEB11
3RD FLOOR				
C-4203A	Prep And Place Conc Slabs On Deck 3rd Floor-A	5	14SEP09	18SEP09
C-4003A	Fireproof Exterior Perimeter 3rd-4th Flr Bldg A	3	06OCT09	08OCT09
C-4203B	Prep And Place Conc Slabs On Deck 3rd Floor-B	5	20OCT09	26OCT09
C-4003B	Fireproof Exterior Perimeter 3rd-4th Flr Bldg B	3	18NOV09	20NOV09
3-5315	R.I.O.H. Sprinkler 3rd Flr	10	02DEC09	15DEC09
3-9305	R.I.O.H. Ductmains / Branches - 3rd Flr	15	02DEC09	22DEC09
3-9320	R.I.O.H. Mechanical Piping - 3rd Flr	15	16DEC09	07JAN10
3-5325	R.I.O.H. Plumbing 3rd Flr	20	16DEC09	14JAN10
3-9304	Test Ductmains / Branches - 3rd Flr	3	23DEC09	28DEC09
3-9309	Insulate Ductmains / Branches - 3rd Flr	5	29DEC09	05JAN10
3-9306	Install VAV's / FCU's / CUH - 3rd Flr	5	31DEC09	07JAN10
3-9308	Duct Tie In To VAV's - 3rd Flr	3	06JAN10	12JAN10
3-9321	Flush/Test Signoff Mechanical Piping - 3rd Flr	3	06JAN10	12JAN10
3-9322	Insulate O.H. Mechanical Piping - 3rd Flr	5	08JAN10	14JAN10
3-9307	Piping Tie In To VAV's - 3rd Flr	15	08JAN10	26JAN10
3-5330	Stud Frame Walls 3rd Flr	12	23MAR10	07APR10
3-5310	R.I.O.H. Electric, Fire Alarm + AV 3rd Flr	10	06APR10	19APR10
3-5332	Install Door Frames 3rd Flr	5	07APR10	13APR10
3-5335	R.I.Plumb In Walls - 3rd Flr	10	08APR10	21APR10
3-5320	R.I.O.H. Controls 3rd Flr	10	20APR10	03MAY10
3-5340	R.I Electric In Walls - 3rd Flr	10	02JUN10	15JUN10
3-5350	Test & Insulate In Wall MEP -3rd Flr	5	16JUN10	22JUN10
3-5355	Sheetrock Walls - 3rd Flr	10	23JUN10	07JUL10
3-5360	Tape Sheetrock Walls - 3rd Flr	10	08JUL10	21JUL10
3-9415	Firestop Duct Penetrations - 3rd Flr	5	22JUL10	28JUL10
3-5365	Prime Paint + First Coat Paint - 3rd Flr	10	22JUL10	04AUG10
3-5385	Ceiling Grid - 3rd Flr	10	10SEP10	23SEP10



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GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

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Date	Revision	Checked	Approved
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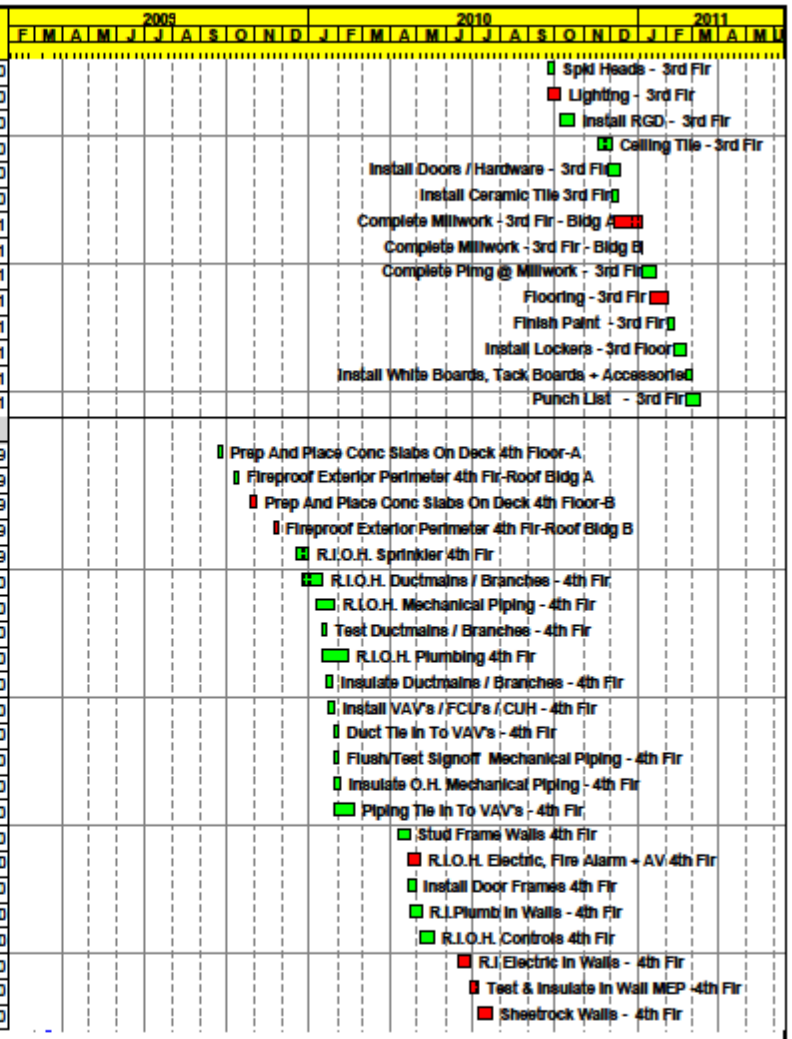
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
3-5395	Spkl Heads - 3rd Flr	5	24SEP10	30SEP10
3-5390	Lighting - 3rd Flr	10	24SEP10	07OCT10
3-5400	Install RGD - 3rd Flr	10	08OCT10	21OCT10
3-5402	Ceiling Tile - 3rd Flr	10	18NOV10	02DEC10
3-5405	Install Doors / Hardware - 3rd Flr	10	29NOV10	10DEC10
3-5530	Install Ceramic Tile 3rd Flr	5	03DEC10	09DEC10
3-5410A	Complete Millwork - 3rd Flr - Bldg A	20	06DEC10	04JAN11
3-5410B	Complete Millwork - 3rd Flr - Bldg B	1	05JAN11	05JAN11
3-5415	Complete Plmg @ Millwork - 3rd Flr	10	06JAN11	19JAN11
3-5420	Flooring - 3rd Flr	15	13JAN11	02FEB11
3-5425	Finish Paint - 3rd Flr	5	03FEB11	09FEB11
3-5440	Install Lockers - 3rd Floor	10	10FEB11	23FEB11
3-5450	Install White Boards, Tack Boards + Accessories	5	24FEB11	02MAR11
3-5430	Punch List - 3rd Flr	10	25FEB11	10MAR11
4TH FLOOR				
C-4204A	Prep And Place Conc Slabs On Deck 4th Floor-A	5	21SEP09	25SEP09
C-4004A	Fireproof Exterior Perimeter 4th Flr-Roof Bldg A	3	09OCT09	13OCT09
C-4204B	Prep And Place Conc Slabs On Deck 4th Floor-B	5	27OCT09	02NOV09
C-4004B	Fireproof Exterior Perimeter 4th Flr-Roof Bldg B	3	23NOV09	25NOV09
4-5315	R.I.O.H. Sprinkler 4th Flr	10	16DEC09	30DEC09
4-9305	R.I.O.H. Ductmains / Branches - 4th Flr	15	23DEC09	14JAN10
4-9320	R.I.O.H. Mechanical Piping - 4th Flr	15	08JAN10	28JAN10
4-9304	Test Ductmains / Branches - 4th Flr	3	15JAN10	19JAN10
4-5325	R.I.O.H. Plumbing 4th Flr	20	15JAN10	11FEB10
4-9309	Insulate Ductmains / Branches - 4th Flr	5	20JAN10	26JAN10
4-9306	Install VAV's / FCU's / CUH - 4th Flr	5	22JAN10	26JAN10
4-9308	Duct Tie In To VAV's - 4th Flr	3	29JAN10	02FEB10
4-9321	Flush/Test Signoff Mechanical Piping - 4th Flr	3	29JAN10	02FEB10
4-9322	Insulate O.H. Mechanical Piping - 4th Flr	5	29JAN10	04FEB10
4-9307	Piping Tie In To VAV's - 4th Flr	15	29JAN10	18FEB10
4-5330	Stud Frame Walls 4th Flr	10	08APR10	21APR10
4-5310	R.I.O.H. Electric, Fire Alarm + AV 4th Flr	10	20APR10	03MAY10
4-5332	Install Door Frames 4th Flr	5	21APR10	27APR10
4-5335	R.I.Plumb In Walls - 4th Flr	10	22APR10	05MAY10
4-5320	R.I.O.H. Controls 4th Flr	10	04MAY10	17MAY10
4-5340	R.I Electric In Walls - 4th Flr	10	16JUN10	29JUN10
4-5350	Test & Insulate In Wall MEP -4th Flr	5	30JUN10	07JUL10
4-5355	Sheetrock Walls - 4th Flr	10	08JUL10	21JUL10



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GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

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Date	Revision	Checked	Approved
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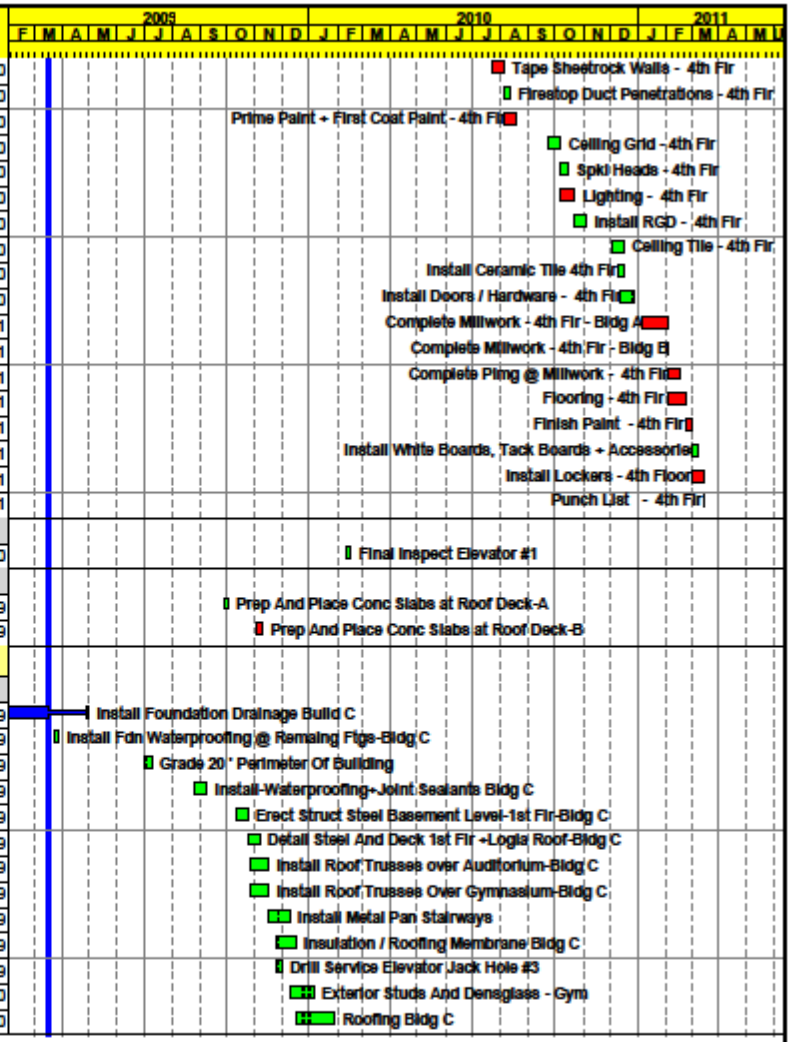
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
4-5360	Tape Sheetrock Walls - 4th Flr	10	22JUL10	04AUG10
4-9415	Firestop Duct Penetrations - 4th Flr	5	05AUG10	11AUG10
4-5365	Prime Paint + First Coat Paint - 4th Flr	10	05AUG10	18AUG10
4-5385	Ceiling Grid - 4th Flr	10	24SEP10	07OCT10
4-5395	Spkl Heads - 4th Flr	5	08OCT10	14OCT10
4-5390	Lighting - 4th Flr	10	08OCT10	21OCT10
4-5400	Install RGD - 4th Flr	10	22OCT10	04NOV10
4-5402	Ceiling Tile - 4th Flr	10	03DEC10	16DEC10
4-5540	Install Ceramic Tile 4th Flr	5	10DEC10	16DEC10
4-5405	Install Doors / Hardware - 4th Flr	10	13DEC10	27DEC10
4-5410A	Complete Millwork - 4th Flr - Bldg A	20	05JAN11	01FEB11
4-5410B	Complete Millwork - 4th Flr - Bldg B	1	02FEB11	02FEB11
4-5415	Complete Plmg @ Millwork - 4th Flr	10	03FEB11	16FEB11
4-5420	Flooring - 4th Flr	15	03FEB11	23FEB11
4-5425	Finish Paint - 4th Flr	5	24FEB11	02MAR11
4-5450	Install White Boards, Tack Boards + Accessories	5	03MAR11	09MAR11
4-5440	Install Lockers - 4th Floor	10	03MAR11	16MAR11
4-5430	Punch List - 4th Flr	0*	17MAR11	16MAR11
LIFE SAFETY				
C-4056A	Final Inspect Elevator #1	3	11FEB10	15FEB10
ROOF LEVEL				
C-420RA	Prep And Place Conc Slabs at Roof Deck-A	5	28SEP09	02OCT09
C-420RB	Prep And Place Conc Slabs at Roof Deck-B	5	03NOV09	09NOV09
GYMNASIUM STRUCTURE				
GENERAL				
G-3001C	Install Foundation Drainage Build C	2	19JAN09A	29APR09
G-5523	Install Fdn Waterproofing @ Remaing Flgs-Bldg C	5	23MAR09	27MAR09
G-4107	Grade 20 ' Perimeter Of Building	5	01JUL09	08JUL09
G-4092C	Install-Waterproofing+Joint Sealants Bldg C	10	25AUG09	08SEP09
G-4170C	Erect Struct Steel Basement Level-1st Flr-Bldg C	10	12OCT09	23OCT09
G-4195C	Detail Steel And Deck 1st Flr +Logia Roof-Bldg C	10	26OCT09	06NOV09
G-4174C	Install Roof Trusses over Auditorium-Bldg C	15	27OCT09	16NOV09
G-4174C1	Install Roof Trusses Over Gymnasium-Bldg C	15	27OCT09	16NOV09
G-4280C	Install Metal Pan Stairways	15	17NOV09	08DEC09
G-4205	Insulation / Roofing Membrane Bldg C	15	24NOV09	15DEC09
G-4055C	Drill Service Elevator Jack Hole #3	3	25NOV09	30NOV09
G-4240	Exterior Studs And Densglass - Gym	15	11DEC09	04JAN10
G-4215	Roofing Bldg C	30	16DEC09	28JAN10



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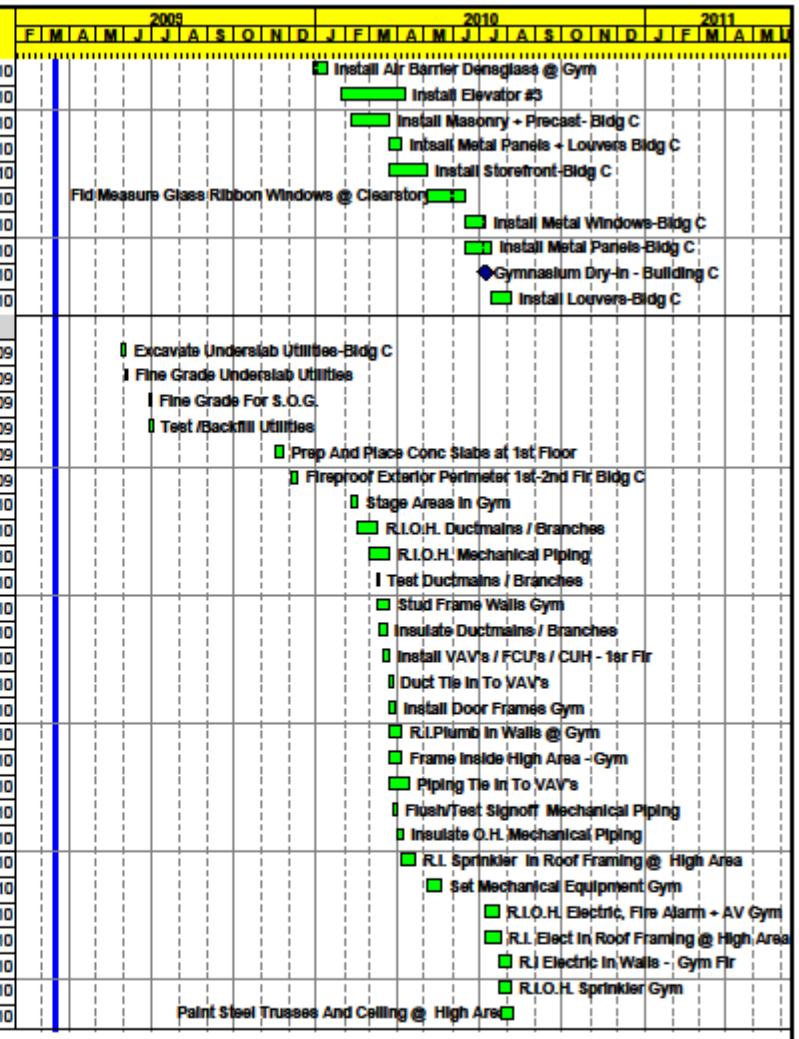
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
G-4245	Install Air Barrier Densglass @ Gym	10	28DEC09	11JAN10
G-6075C	Install Elevator #3	50	29JAN10	08APR10
G-4290C	Install Masonry + Precast- Bldg C	30	09FEB10	22MAR10
G-4291C	Intsall Metal Panels + Louvers Bldg C	10	23MAR10	05APR10
G-4275	Install Storefront-Bldg C	30	23MAR10	03MAY10
G-5505	Fld Measure Glass Ribbon Windows @ Clearstory	30	04MAY10	15JUN10
G-4250	Install Metal Windows-Bldg C	15	16JUN10	07JUL10
G-4255	Install Metal Panels-Bldg C	20	16JUN10	14JUL10
G-5520	Gymnasium Dry-In - Building C	0		07JUL10
G-4260	Install Louvers-Bldg C	15	15JUL10	04AUG10
1ST FLOOR				
G-4155	Excavate Underslab Utilities-Bldg C	3	28MAY09	01JUN09
G-4150	Fine Grade Underslab Utilities	3	02JUN09	04JUN09
G-4105	Fine Grade For S.O.G.	2	29JUN09	30JUN09
G-4125	Test /Backfill Utilities	3"	29JUN09	01JUL09
G-4201C	Prep And Place Conc Slabs at 1st Floor	5	17NOV09	23NOV09
G-4200RC	Fireproof Exterior Perimeter 1st-2nd Flr Bldg C	5	04DEC09	10DEC09
G-5460	Stage Areas In Gym	5	09FEB10	15FEB10
G1-9305	R.I.O.H. Ductmains / Branches	15	16FEB10	08MAR10
G1-9320	R.I.O.H. Mechanical Piping	15	02MAR10	22MAR10
G1-9304	Test Ductmains / Branches	3	09MAR10	11MAR10
G-5330	Stud Frame Walls Gym	10	09MAR10	22MAR10
G1-9309	Insulate Ductmains / Branches	5	12MAR10	18MAR10
G1-9306	Install VAV's / FCU's / CUH - 1sr Flr	5	16MAR10	22MAR10
G1-9308	Duct Tie In To VAV's	3	23MAR10	25MAR10
G-5332	Install Door Frames Gym	5	23MAR10	29MAR10
G-5335	R.I.Plumb In Walls @ Gym	10	23MAR10	05APR10
G-5465	Frame Inside High Area - Gym	10	23MAR10	05APR10
G1-9307	Piping Tie In To VAV's	15	23MAR10	12APR10
G1-9321	Flush/Test Signoff Mechanical Piping	3	26MAR10	30MAR10
G1-9322	Insulate O.H. Mechanical Piping	5	31MAR10	06APR10
G-5475	R.I. Sprinkler In Roof Framing @ High Area	10	06APR10	19APR10
G-4301	Set Mechanical Equipment Gym	13	04MAY10	20MAY10
G-5310	R.I.O.H. Electric, Fire Alarm + AV Gym	10	08JUL10	21JUL10
G-5470	R.I. Elect In Roof Framing @ High Area	12	08JUL10	23JUL10
G-5340	R.I Electric In Walls - Gym Flr	10	22JUL10	04AUG10
G-5315	R.I.O.H. Sprinkler Gym	10	22JUL10	04AUG10
G-5480	Paint Steel Trusses And Ceiling @ High Area	10	26JUL10	06AUG10



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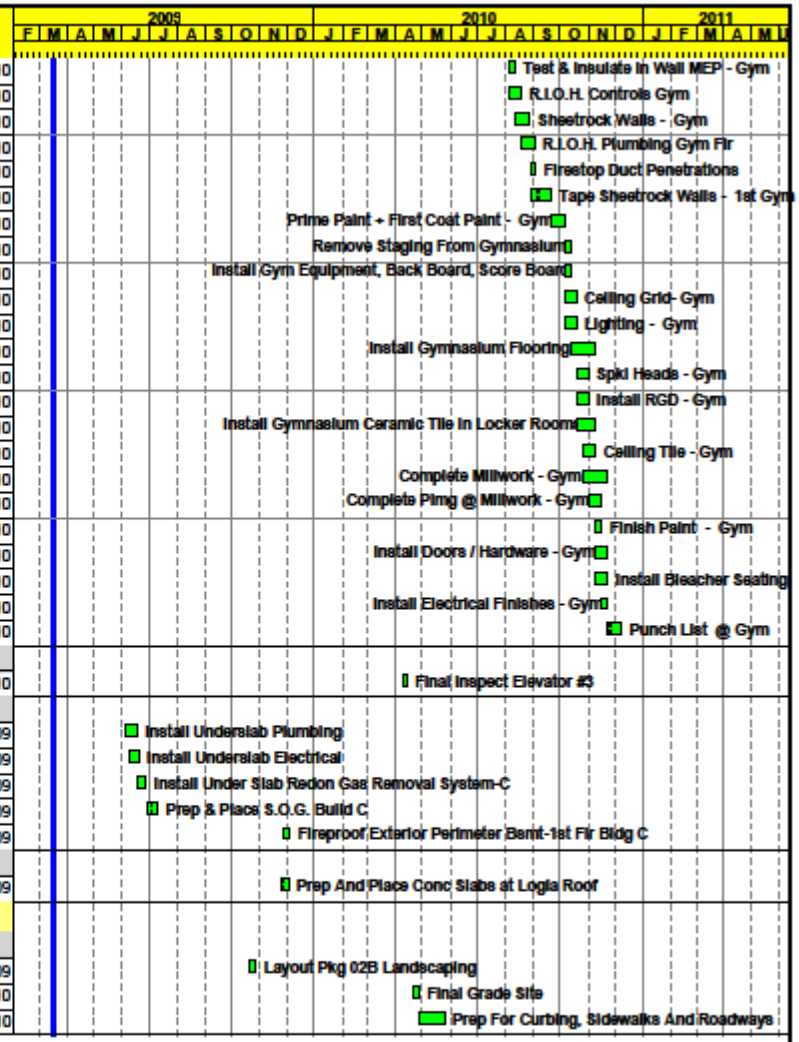
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
G-5350	Test & Insulate In Wall MEP - Gym	5	05AUG10	11AUG10
G-5320	R.I.O.H. Controls Gym	10	05AUG10	18AUG10
G-5355	Sheetrock Walls - Gym	12	12AUG10	27AUG10
G-5325	R.I.O.H. Plumbing Gym Flr	10	19AUG10	01SEP10
G1-9415	Firestop Duct Penetrations	5	30AUG10	03SEP10
G-5360	Tape Sheetrock Walls - 1st Gym	15	30AUG10	20SEP10
G-5365	Prime Paint + First Coat Paint - Gym	10	21SEP10	04OCT10
G-5500	Remove Staging From Gymnasium	5	05OCT10	11OCT10
G-5375	Install Gym Equipment, Back Board, Score Board	5	05OCT10	11OCT10
G-5385	Ceiling Grid- Gym	10	05OCT10	18OCT10
G-5390	Lighting - Gym	10	05OCT10	18OCT10
G-5440	Install Gymnasium Flooring	20	12OCT10	08NOV10
G-5395	Spkl Heads - Gym	10	19OCT10	01NOV10
G-5400	Install RGD - Gym	10	19OCT10	01NOV10
G-5420	Install Gymnasium Ceramic Tile In Locker Rooms	15	19OCT10	08NOV10
G-5402	Ceiling Tile - Gym	10	26OCT10	08NOV10
G-5410	Complete Millwork - Gym	20	26OCT10	22NOV10
G-5415	Complete Plmg @ Millwork - Gym	10	02NOV10	15NOV10
G-5425	Finish Paint - Gym	5	09NOV10	15NOV10
G-5405	Install Doors / Hardware - Gym	10	09NOV10	22NOV10
G-5450	Install Bleacher Seating	10	09NOV10	22NOV10
G-5490	Install Electrical Finishes - Gym	5	16NOV10	22NOV10
G-5430	Punch List @ Gym	10	23NOV10	07DEC10
LIFE SAFETY				
G-4056C	Final Inspect Elevator #3	3	09APR10	13APR10
BASEMENT FLOOR				
G-4165	Install Underslab Plumbing	8	05JUN09	16JUN09
G-4167C	Install Underslab Electrical	8	09JUN09	18JUN09
G-4090C	Install Under Slab Redon Gas Removal System-C	8	17JUN09	26JUN09
G-4110C	Prep & Place S.O.G. Build C	9*	29JUN09	10JUL09
G-400BC	Fireproof Exterior Perimeter Bsmt-1st Flr Bldg C	5	27NOV09	03DEC09
LOW ROOF				
G-4202C	Prep And Place Conc Slabs at Logia Roof	6	24NOV09	02DEC09
FINAL SITEWORK + LANDSCAPING				
GENERAL				
02B-512	Layout Pkg 02B Landscaping	5	20OCT09	26OCT09
S-4117	Final Grade Site	5	20APR10	26APR10
S-4127	Prep For Curbing, Sidewalks And Roadways	20	27APR10*	24MAY10



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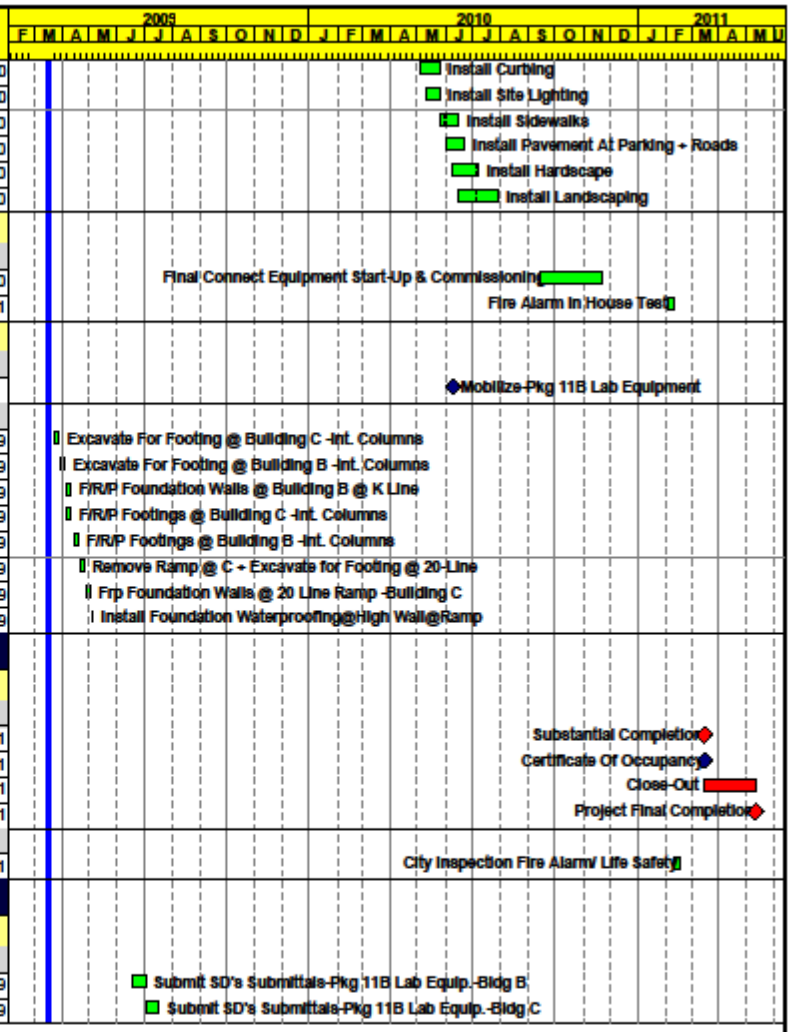
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
S-4157	Install Curbing	15	04MAY10	24MAY10
S-4167	Install Site Lighting	10	11MAY10	24MAY10
S-4177	Install Sidewalks	15	25MAY10	15JUN10
S-4187	Install Pavement At Parking + Roads	15	02JUN10	22JUN10
S-4147	Install Hardscape	20	09JUN10	07JUL10
S-4137	Install Landscaping	30	16JUN10	28JUL10
PROJECT COMPLETION				
LIFE SAFETY				
6436	Final Connect Equipment Start-Up & Commissioning	50	14SEP10	22NOV10
6435	Fire Alarm In House Test	5	04FEB11	10FEB11
GENERAL				
11B-518	Mobilize-Pkg 11B Lab Equipment	0	09JUN10	
G-4160C	Excavate For Footing @ Building C -Int. Columns	5	23MAR09	27MAR09
C-4160B	Excavate For Footing @ Building B -Int. Columns	5	30MAR09	03APR09
C-4140B1	F/R/P Foundation Walls @ Building B @ K Line	5	06APR09	10APR09
G-4161C	F/R/P Footings @ Building C -Int. Columns	5	06APR09*	10APR09
C-4161B	F/R/P Footings @ Building B -Int. Columns	5	13APR09	17APR09
G-4160C1	Remove Ramp @ C + Excavate for Footing @ 20-Line	5	20APR09	24APR09
G-4160C2	Frp Foundation Walls @ 20 Line Ramp -Building C	5	27APR09	01MAY09
G-5525	Install Foundation Waterproofing@High Wall@Ramp	2	04MAY09	05MAY09
COMPLETION PHASE				
PROJECT COMPLETION				
COMPLETION				
MS-100	Substantial Completion	0		16MAR11
MS-105	Certificate Of Occupancy	0		16MAR11
MS-110	Close-Out	40	17MAR11	11MAY11
MS-115	Project Final Completion	0		11MAY11
LIFE SAFETY				
6440	City Inspection Fire Alarm/ Life Safety	5	11FEB11	17FEB11
GENERAL				
11B-512B	Submit SD's Submittals-Pkg 11B Lab Equip.-Bldg B	10	18JUN09	01JUL09
11B-512C	Submit SD's Submittals-Pkg 11B Lab Equip.-Bldg C	10	02JUL09	16JUL09



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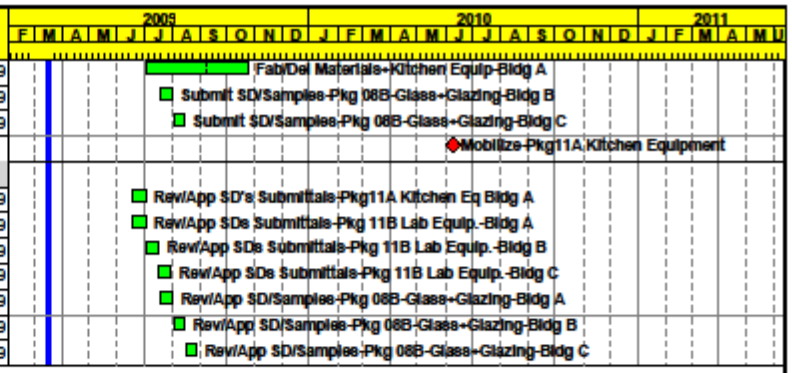
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Activity ID	Activity Description	Rem Dur	Early Start	Early Finish
11A-516A	Fab/Del Materials+Kitchen Equip-Bldg A	80	02JUL09	23OCT09
08B-512B	Submit SD/Samples-Pkg 08B-Glass+Glazing-Bldg B	10	20JUL09	31JUL09
08B-512C	Submit SD/Samples-Pkg 08B-Glass+Glazing-Bldg C	10	03AUG09	14AUG09
11A-518	Mobilize-Pkg11A Kitchen Equipment	0	09JUN10	
11A-512A1	Rev/App SD's Submittals-Pkg11A Kitchen Eq Bldg A	10	18JUN09	01JUL09
11B-514A	Rev/App SDs Submittals-Pkg 11B Lab Equip.-Bldg A	10	18JUN09	01JUL09
11B-514B	Rev/App SDs Submittals-Pkg 11B Lab Equip.-Bldg B	10	02JUL09	16JUL09
11B-514C	Rev/App SDs Submittals-Pkg 11B Lab Equip.-Bldg C	10	17JUL09	30JUL09
08B-512A1	Rev/App SD/Samples-Pkg 08B-Glass+Glazing-Bldg A	10	20JUL09	31JUL09
08B-512B1	Rev/App SD/Samples-Pkg 08B-Glass+Glazing-Bldg B	10	03AUG09	14AUG09
08B-512C1	Rev/App SD/Samples-Pkg 08B-Glass+Glazing-Bldg C	10	17AUG09	28AUG09



Start Date 25APR08
Finish Date 11MAY11
Data Date 16MAR09
Run Date 12MAR09 12:20

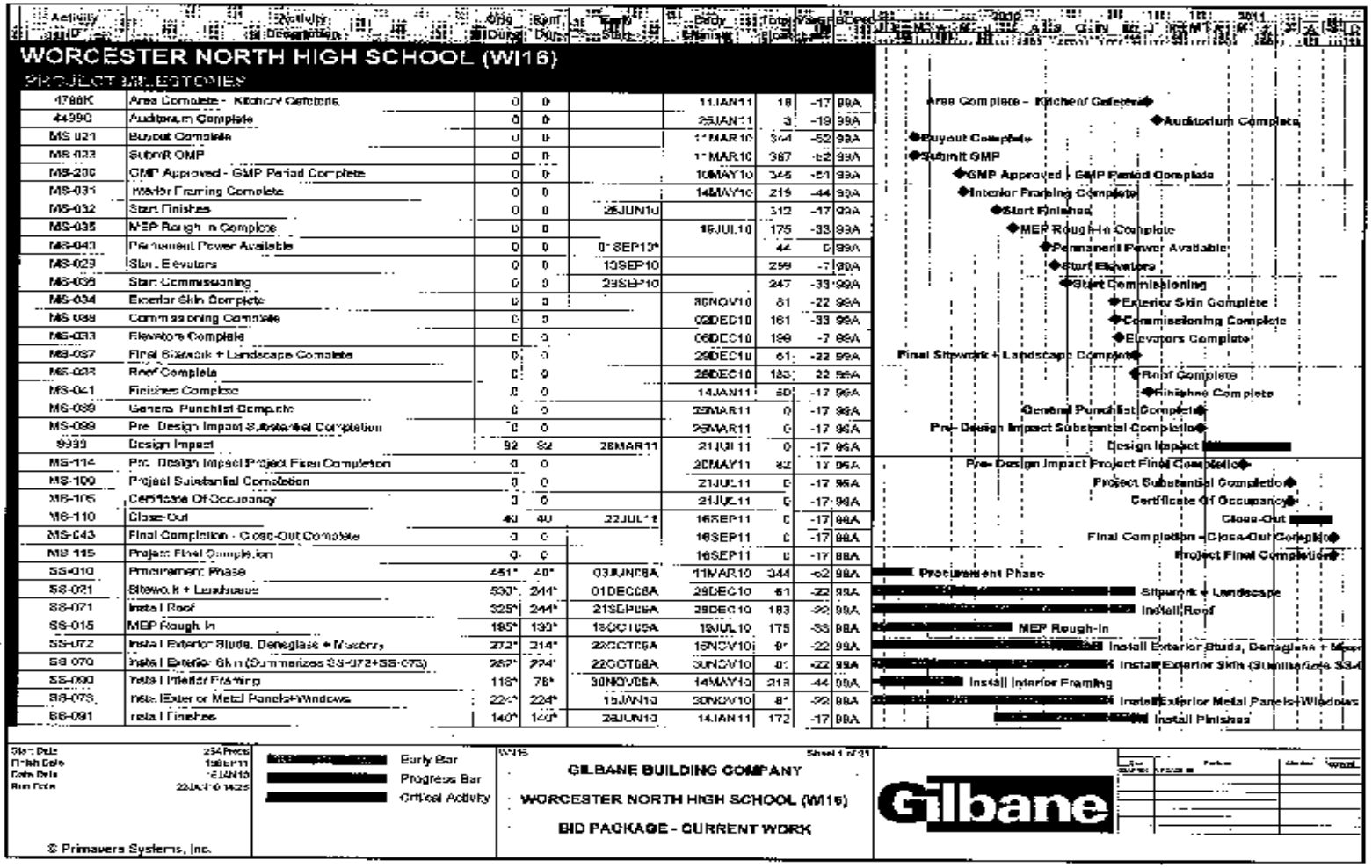
WN07 Sheet 26 of 28

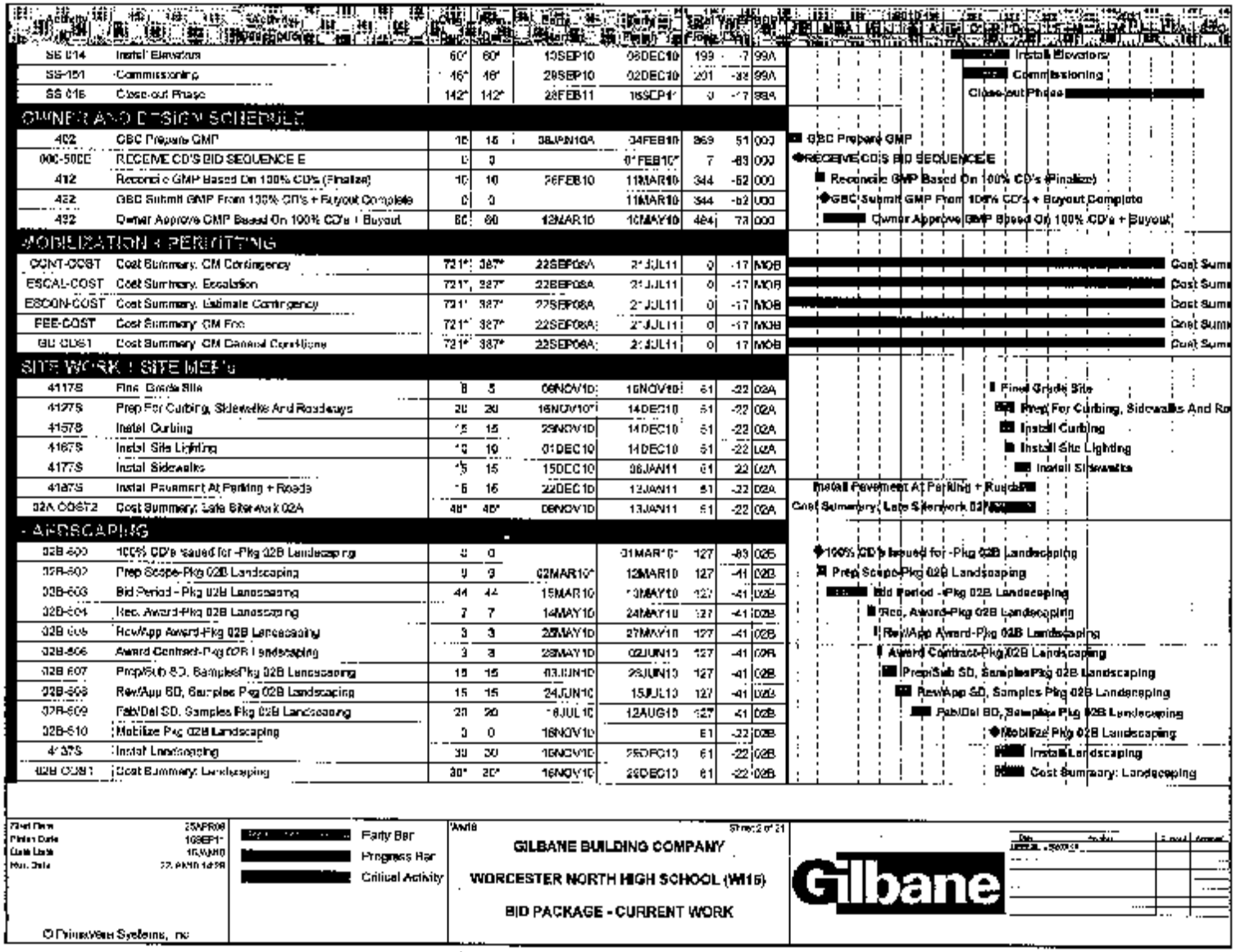
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN07)
REMAINING BY BUILDING/PHASE/LEVEL

DRAFT

Date	Revision	Checked	Approved
12MAR09	PRELIMINARY FOR REV		

Appendix B: Schedule January 2010


WORCESTER NORTH HIGH SCHOOL (WI16)
PROJECT MILESTONES
Activity ID
Activity Description
Orig Dur
Rem Dur
Early
Early
Total Float
Activity Code
1788K Area Complete - Kitchen/ Cafeteria 0 0 11JAN11 18 -17 99A
44990 Auditorium Complete 0 0 25JAN11 3 -19 99A
MS-021 Buyout Complete 0 0 11MAR10 344 -52 99A
MS-023 Submit GMP 0 0 11MAR10 387 -82 99A
MS-030 GMP Approved - GMP Period Complete 0 0 10MAY10 345 -51 99A
MS-031 Interior Framing Complete 0 0 14MAY10 219 -44 99A
MS-032 Start Finishes 0 0 25JUN10 312 -17 99A
MS-035 MEP Rough-In Complete 0 0 16JUL10 175 -33 99A
MS-041 Permanent Power Available 0 0 01SEP10* 44 0 99A
MS-029 Start Elevators 0 0 10SEP10 259 -7 99A
MS-036 Start Commissioning 0 0 29SEP10 247 -33 99A
MS-034 Exterior Skin Complete 0 0 80NOV10 81 -22 99A
MS-088 Commissioning Complete 0 0 02DEC10 161 -33 99A
MS-033 Elevators Complete 0 0 06DEC10 199 -7 99A
MS-087 Final Sitework + Landscape Complete 0 0 29DEC10 61 -22 99A
MS-038 Roof Complete 0 0 29DEC10 183 22 99A
MS-041 Finishes Complete 0 0 14JAN11 80 -17 99A
MS-089 General Punchlist Complete 0 0 28MAR11 0 -17 99A
MS-099 Pre- Design Impact Substantial Completion 0 0 28MAR11 0 -17 99A
9999 Design Impact 92 92 28MAR11 21JUL11 0 -17 99A
MS-114 Pre- Design Impact Project Final Completion 0 0 20MAY11 62 17 99A
MS-100 Project Substantial Completion 0 0 21JUL11 0 -17 99A
MS-105 Certificate Of Occupancy 0 0 21JUL11 0 -17 99A
MS-110 Close-Out 40 40 22JUL11 16SEP11 0 -17 99A
MS-043 Final Completion - Close-Out Complete 0 0 16SEP11 0 -17 99A
MS-115 Project Final Completion 0 0 16SEP11 0 -17 99A
SS-010 Procurement Phase 451* 40* 03JUN08A 11MAR10 344 -52 99A
SS-021 Sitework + Landscape 530* 244* 01DEC08A 29DEC10 61 -22 99A
SS-071 Install Roof 325* 244* 21SEP09A 29DEC10 183 -22 99A
SS-015 MEP Rough-In 195* 130* 15OCT09A 16JUL10 175 -33 99A
SS-072 Install Exterior Studs, Deneglass + Masonry 272* 214* 22OCT09A 15NOV10 81 -22 99A
SS-070 Install Exterior Skin (Summarizes SS-072+SS-073) 282* 224* 22OCT09A 30NOV10 81 -22 99A
SS-090 Install Interior Framing 116* 78* 30NOV09A 14MAY10 219 -44 99A
SS-073 Install Exterior Metal Panels+Windows 224* 224* 15JUN10 30NOV10 81 -22 99A
SS-091 Install Finishes 140* 140* 28JUN10 14JAN11 172 -17 99A
Area Complete - Kitchen/ Cafeteria
Auditorium Complete
Buyout Complete
Submit GMP
GMP Approved - GMP Period Complete
Interior Framing Complete
Start Finishes
MEP Rough-In Complete
Permanent Power Available
Start Elevators
Start Commissioning
Exterior Skin Complete
Commissioning Complete
Elevators Complete
Final Sitework + Landscape Complete
Roof Complete
Finishes Complete
General Punchlist Complete
Pre- Design Impact Substantial Completion
Design Impact
Pre- Design Impact Project Final Completion
Project Substantial Completion
Certificate Of Occupancy
Close-Out
Final Completion - Close-Out Complete
Project Final Completion
Procurement Phase
Sitework + Landscape
Install Roof
MEP Rough-In
Install Exterior Studs, Deneglass + Masonry
Install Exterior Skin (Summarizes SS-0
Install Interior Framing
Install Exterior Metal Panels+Windows
Install Finishes
Start Date 25APR08
Finish Date 16SEP11
Data Date 21JAN10
Run Date 22JAN10 14:25
© Primavera Systems, Inc.
Early Bar
Progress Bar
Critical Activity
WI16
Sheet 1 of 31
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WI16)
BID PACKAGE - CURRENT WORK
Gilbane


SS 014 Install Elevators 60 60 10SEP10 08DEC10 199 -7 99A
SS-151 Commissioning 46 46 29SEP10 02DEC10 201 -38 99A
SS 015 Close-out Phase 142 142 28FEB11 16SEP11 0 -17 99A
OWNER AND DESIGN SCHEDULE
402 GBC Prepare GMP 15 15 08JAN10A 04FEB10 369 51 000
000-500E RECEIVE CD'S BID SEQUENCE E 0 0 0 FEB10* 7 -69 000
412 Reconcile GMP Based On 100% CD's (Finalize) 10 10 26FEB10 11MAR10 344 -52 000
422 GBC Submit GMP From 100% CD's + Buyout Complete 0 0 11MAR10 344 -52 000
432 Owner Approve GMP Based On 100% CD's + Buyout 60 60 12MAR10 10MAY10 484 73 000
MOBILIZATION + PERMITTING
CONT-COST Cost Summary: CM Contingency 721* 387* 22SEP08A 21JUL11 0 -17 MOB
ESCAL-COST Cost Summary: Escalation 721* 387* 22SEP08A 21JUL11 0 -17 MOB
ESCON-COST Cost Summary: Estimate Contingency 721* 387* 22SEP08A 21JUL11 0 -17 MOB
FEE-COST Cost Summary: CM Fee 721* 387* 22SEP08A 21JUL11 0 -17 MOB
GC-COST Cost Summary: CM General Conditions 721* 387* 22SEP08A 21JUL11 0 17 MOB
SITE WORK / SITE MEP's
4117S Fine Grade Site 8 5 08NOV10 16NOV10 61 -22 02A
4127S Prep For Curbing, Sidewalks And Roadways 20 20 16NOV10* 14DEC10 61 -22 02A
4157S Install Curbing 15 15 29NOV10 14DEC10 61 -22 02A
4167S Install Site Lighting 19 19 01DEC10 14DEC10 61 -22 02A
4177S Install Sidewalks 15 15 15DEC10 06JAN11 61 22 02A
4187S Install Pavement At Parking + Roads 16 16 22DEC10 13JAN11 61 -22 02A
02A COST2 Cost Summary: Late Sitework 02A 45* 45* 08NOV10 13JAN11 61 -22 02A
LANDSCAPING
02B-600 100% CD's Issued for -Pkg 02B Landscaping 0 0 31MAR10* 127 -69 025
02B-602 Prep Scope-Pkg 02B Landscaping 9 9 02MAR10* 12MAR10 127 -41 02B
02B-603 Bid Period - Pkg 02B Landscaping 44 44 15MAR10 13MAY10 127 -41 02B
02B-604 Rec. Award-Pkg 02B Landscaping 7 7 14MAY10 24MAY10 127 -41 02B
02B-605 Rev/App Award-Pkg 02B Landscaping 3 3 25MAY10 27MAY10 127 -41 02B
02B-606 Award Contract-Pkg 02B Landscaping 3 3 28MAY10 02JUN10 127 -41 02B
02B-607 Prep/Sub SD, Samples Pkg 02B Landscaping 15 15 03JUN10 23JUN10 127 -41 02B
02B-608 Rev/App SD, Samples Pkg 02B Landscaping 15 15 24JUN10 15JUL10 127 -41 02B
02B-609 Fab/Del SD, Samples Pkg 02B Landscaping 20 20 16JUL10 12AUG10 127 41 02B
02B-610 Mobilize Pkg 02B Landscaping 0 0 16NOV10 61 -22 02B
4137S Install Landscaping 30 30 16NOV10 29DEC10 61 -22 02B
02B COST Cost Summary: Landscaping 30* 30* 16NOV10 29DEC10 61 -22 02B
Start Date 25APR08
Finish Date 16SEP11
Data Date 15JUN10
Run Date 22 JUN 10 16:58
Early Bar
Progress Bar
Critical Activity
Sheet 2 of 21
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (W15)
BID PACKAGE - CURRENT WORK
Gilbane
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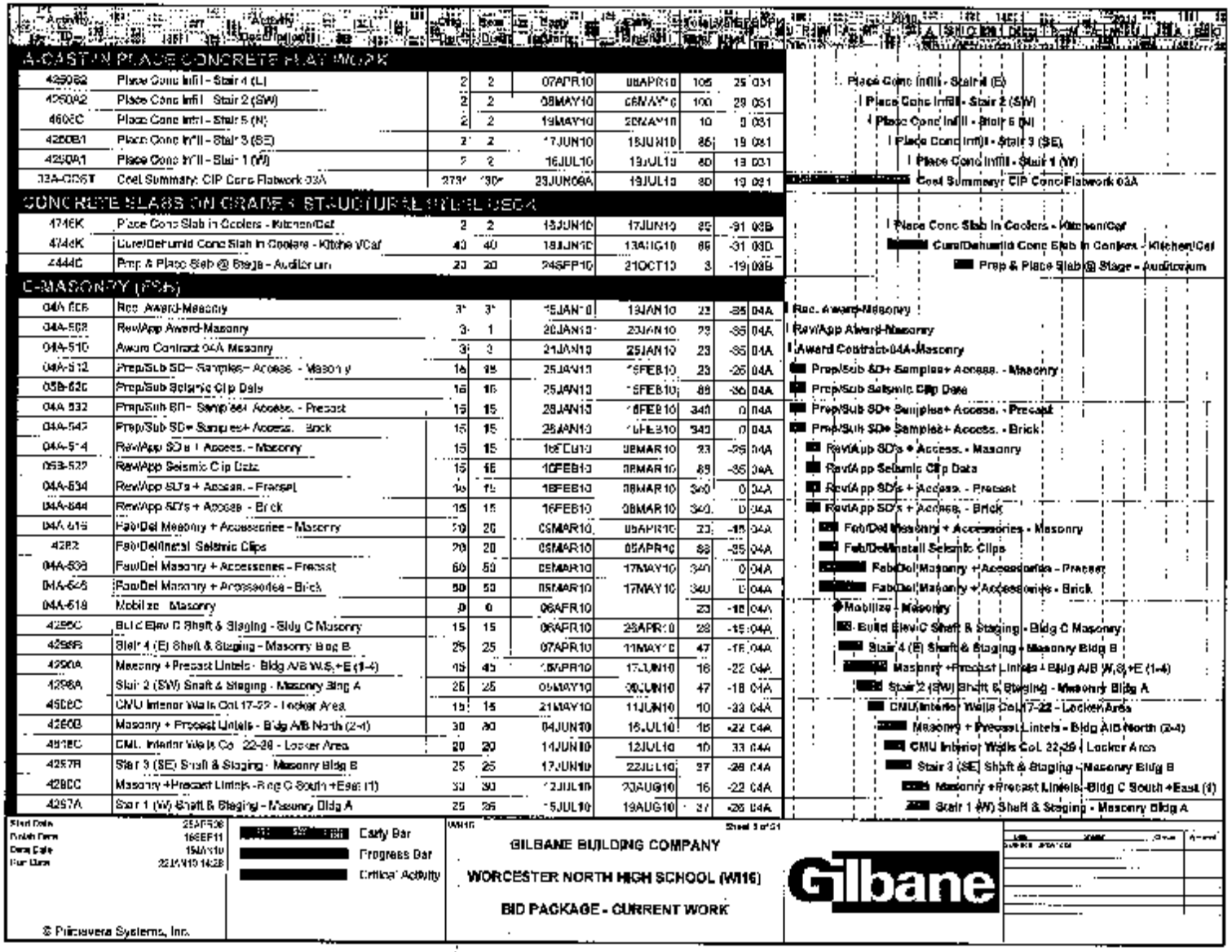
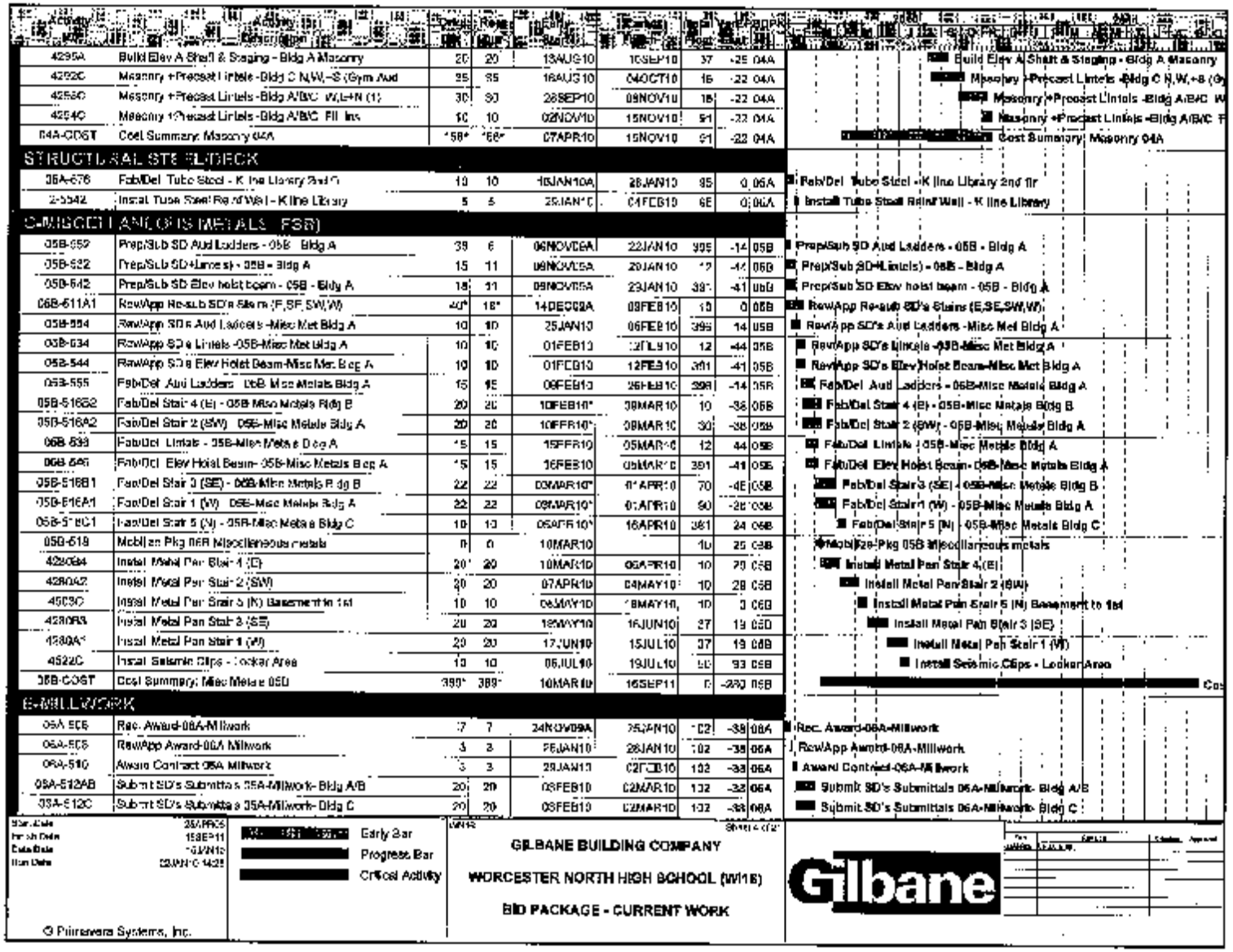

A-CAST IN PLACE CONCRETE FLAT WORK
429082 Place Conc Infil - Stair 4 (E) 2 2 07APR10 08APR10 105 25 031
429082 Place Conc Infil - Stair 2 (SW) 2 2 06MAY10 06MAY10 100 29 031
4608C Place Conc Infil - Stair 5 (N) 2 2 19MAY10 20MAY10 10 0 031
4286B1 Place Conc Infil - Stair 3 (SE) 2 2 17JUN10 18JUN10 86 19 031
4250A1 Place Conc Infil - Stair 1 (W) 2 2 16JUL10 19JUL10 80 19 031
03A-COST Cost Summary: CIP Conc Flatwork 03A 2734 '30* 23JUN09A 19JUL10 80 19 031
CONCRETE SLABS ON GRADE + STRUCTURAL SUPERSTRUCT
4746K Place Conc Slab in Coolers - Kitchen/Caf 2 2 15JUN10 17JUN10 25 -91 03B
474dK Cure/Dehumid Conc Slab in Coolers - Kitche VCaf 40 40 18JUN10 13AUG10 66 -31 03D
4444C Prep & Place Slab @ Stage - Auditorium 20 20 24SEP10 21OCT10 3 -19 03B
C-MASONRY (PHs)
04A 605 Rec Award-Masonry 3* 3* 15JAN10 19JAN10 23 -85 04A
04A-502 RevApp Award-Masonry 3* 1 20JAN10 20JAN10 23 -85 04A
04A-510 Award Contract 04A Masonry 3* 3 21JAN10 25JAN10 23 -85 04A
04A-512 Prep/Sub SD- Samples- Access. - Masonry 15 15 25JAN10 15FEB10 23 -25 04A
05B-520 Prep/Sub Seismic Clip Data 15 15 25JAN10 15FEB10 88 -35 04A
04A 532 Prep/Sub SD- Samples+ Access. - Precast 15 15 25JAN10 16FEB10 340 0 04A
04A-542 Prep/Sub SD+ Samples+ Access. Brick 15 15 25JAN10 16FEB10 340 0 04A
04A-514 RevApp SDs + Access. - Masonry 15 15 16FEB10 08MAR10 23 -25 04A
05B-522 RevApp Seismic Clip Data 15 15 16FEB10 08MAR10 88 -35 04A
04A-534 RevApp SDs + Access. - Precast 15 15 16FEB10 08MAR10 340 0 04A
04A-544 RevApp SDs + Access - Brick 15 15 16FEB10 08MAR10 340 0 04A
04A-515 Fab/Del Masonry + Accessories - Masonry 20 20 09MAR10 05APR10 23 -15 04A
4282 Fab/Del/Install Seismic Clips 20 20 09MAR10 05APR10 88 -35 04A
04A-536 Fab/Del Masonry + Accessories - Precast 50 50 09MAR10 17MAY10 340 0 04A
04A-546 Fab/Del Masonry + Accessories - Brick 50 50 09MAR10 17MAY10 340 0 04A
04A-519 Mobilize - Masonry 0 0 06APR10 23 -15 04A
4256C Build Elev C Shaft & Staging - Bldg C Masonry 15 15 06APR10 28APR10 28 -15 04A
4258B Stair 4 (E) Shaft & Staging - Masonry Bldg B 25 25 07APR10 11MAY10 47 -16 04A
4290A Masonry + Precast Lintels - Bldg A/B W,S,+E (1-4) 45 45 15APR10 17JUN10 16 -22 04A
4296A Stair 2 (SW) Shaft & Staging - Masonry Bldg A 25 25 05MAY10 09JUN10 47 -18 04A
4608C CMU Interior Walls Col 17-22 - Locker Area 15 15 21MAY10 11JUN10 10 -33 04A
4260B Masonry + Precast Lintels - Bldg A/B North (2-4) 30 30 04JUN10 16JUL10 16 -22 04A
4618C CMU Interior Walls Co 22-29 - Locker Area 20 20 14JUN10 12JUL10 10 33 04A
4287B Stair 3 (SE) Shaft & Staging - Masonry Bldg B 25 25 17JUN10 22JUL10 27 -28 04A
4280C Masonry +Precast Lintels - Bldg C South +East (1) 30 30 12JUL10 03AUG10 16 -22 04A
4287A Stair 1 (W) Shaft & Staging - Masonry Bldg A 25 25 15JUL10 19AUG10 27 -26 04A
Place Conc Infill - Stair 4 (E)
Place Conc Infill - Stair 2 (SW)
Place Conc Infill - Stair 5 (N)
Place Conc Infill - Stair 3 (SE)
Place Conc Infill - Stair 1 (W)
Cost Summary: CIP Conc Flatwork 03A
Place Conc Slab in Coolers - Kitchen/Caf
Cure/Dehumid Conc Slab in Coolers - Kitchen/Caf
Prep & Place Slab @ Stage - Auditorium
Rec. Award-Masonry
RevApp Award-Masonry
Award Contract-04A-Masonry
Prep/Sub SD+ Samples+ Access. - Masonry
Prep/Sub Seismic Clip Data
Prep/Sub SD+ Samples+ Access. - Precast
Prep/Sub SD+ Samples+ Access. - Brick
RevApp SDs + Access. - Masonry
RevApp Seismic Clip Data
RevApp SDs + Access. - Precast
RevApp SDs + Access. - Brick
Fab/Del Masonry + Accessories - Masonry
Fab/Del/Install Seismic Clips
Fab/Del Masonry + Accessories - Precast
Fab/Del Masonry + Accessories - Brick
Mobilize - Masonry
Build Elev C Shaft & Staging - Bldg C Masonry
Stair 4 (E) Shaft & Staging - Masonry Bldg B
Masonry +Precast Lintels - Bldg A/B W,S,+E (1-4)
Stair 2 (SW) Shaft & Staging - Masonry Bldg A
CMU Interior Walls Col 17-22 - Locker Area
Masonry + Precast Lintels - Bldg A/B North (2-4)
CMU Interior Walls Co 22-29 - Locker Area
Stair 3 (SE) Shaft & Staging - Masonry Bldg B
Masonry +Precast Lintels - Bldg C South +East (1)
Stair 1 (W) Shaft & Staging - Masonry Bldg A
Start Date 25APR08
Finish Date 16SEP11
Data Date 15MAY10
Run Date 22MAY10 14:28
Early Bar
Progress Bar
Critical Activity
© Primavera Systems, Inc.
WM16
Sheet 1 of 31
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WI16)
BID PACKAGE - CURRENT WORK
Gilbane



4295A	Build Elev A Shaft & Staging - Bldg A Masonry	20	20	13AUG10	10SEP10	37	-25	04A
4292C	Masonry +Precast Lintels -Bldg C N,W,+S (Gym Aud	25	35	16AUG10	04OCT10	16	-22	04A
4253C	Masonry +Precast Lintels -Bldg A/B/C W,E+N (1)	30	30	23SEP10	09NOV10	18	-22	04A
4254C	Masonry +Precast Lintels -Bldg A/B/C Fill Ins	10	10	02NOV10	15NOV10	91	-22	04A
04A-COST	Cost Summary: Masonry 04A	*58*	*68*	07APR10	15NOV10	91	-22	04A
STRUCTURAL STEEL/DECK								
05A-676	Fab/Del Tube Steel - K line Library 2nd Fl	10	10	16JAN10A	28JAN10	95	0	05A
2-5542	Install Tube Steel Reinf Wall - K line Library	5	5	29JAN10	04FEB10	95	0	05A
C-MISCELLANEOUS METALS (FSR)								
05B-552	Prep/Sub SD Aud Ladders - 05B - Bldg A	39	6	06NOV09A	22JAN10	395	-14	05B
05B-522	Prep/Sub SD+Lintels) - 05B - Bldg A	15	11	09NOV09A	20JAN10	12	-44	05B
05B-542	Prep/Sub SD Elev hoist beam - 05B - Bldg A	15	11	09NOV09A	23JAN10	391	-41	05B
05B-511A1	RevApp Re-sub SD's Stairs (E,SE,SW,W)	40*	18*	14DEC09A	08FEB10	10	0	05B
05B-554	RevApp SD's Aud Ladders -Misc Met Bldg A	10	10	25JAN10	05FEB10	395	14	05B
05B-534	RevApp SD's Lintels -05B-Misc Met Bldg A	10	10	01FEB10	12FEB10	12	-44	05B
05B-544	RevApp SD's Elev Hoist Beam-Misc Met Bldg A	10	10	01FEB10	12FEB10	391	-41	05B
05B-555	Fab/Del Aud Ladders - 05B Misc Metals Bldg A	15	15	09FEB10	26FEB10	398	-14	05B
05B-516S2	Fab/Del Stair 4 (E) - 05B Misc Metals Bldg B	20	20	10FEB10*	09MAR10	10	-38	05B
05B-516A2	Fab/Del Stair 2 (SW) - 05B-Misc Metals Bldg A	20	20	10FEB10*	09MAR10	30	-38	05B
05B-533	Fab/Del Lintels - 05B-Misc Metals Bldg A	15	15	15FEB10	05MAR10	12	44	05B
05B-545	Fab/Del Elev Hoist Beam- 05B-Misc Metals Bldg A	15	15	16FEB10	05MAR10	391	-41	05B
05B-516B1	Fab/Del Stair 3 (SE) - 05B-Misc Metals Bldg B	22	22	02MAR10*	01APR10	70	-6E	05B
05B-516A1	Fab/Del Stair 1 (W) - 05B-Misc Metals Bldg A	22	22	02MAR10*	01APR10	90	-28	05B
05B-516C1	Fab/Del Stair 5 (N) - 05B-Misc Metals Bldg C	10	10	05MAR10*	16APR10	361	24	05B
05B-519	Mobilize Pkg 05B Miscellaneous metals	0	0	10MAR10		10	25	05B
4250B4	Install Metal Pan Stair 4 (E)	20	20	10MAR10	06APR10	10	29	05B
4250A2	Install Metal Pan Stair 2 (SW)	20	20	07APR10	04MAY10	10	28	05B
4503C	Install Metal Pan Stair 5 (N) Basement to 1st	10	10	05MAY10	18MAY10	10	0	05D
4250B3	Install Metal Pan Stair 3 (SE)	20	20	19MAY10	16JUN10	27	19	05B
4250A1	Install Metal Pan Stair 1 (W)	20	20	17JUN10	15JUL10	37	19	05B
4522C	Install Seismic Clips - Locker Area	10	10	06JUL10	19JUL10	50	93	05B
05B-COST	Cost Summary: Misc Metals 05B	389*	389*	10MAR10	16SEP11	0	-330	05B
E-MILLWORK								
05A-505	Rec. Award-05A-Millwork	7	7	24NOV09A	25JAN10	102	-38	05A
05A-503	RevApp Award-05A Millwork	3	3	25JAN10	28JAN10	102	-38	05A
05A-510	Award Contract 05A Millwork	3	3	29JAN10	02FEB10	102	-38	05A
05A-512AB	Submit SD's Submittals 05A-Millwork- Bldg A/B	20	20	03FEB10	02MAR10	102	-38	05A
05A-512C	Submit SD's Submittals 05A-Millwork- Bldg C	20	20	03FEB10	02MAR10	102	-38	05A

Early Bar
Progress Bar
Critical Activity

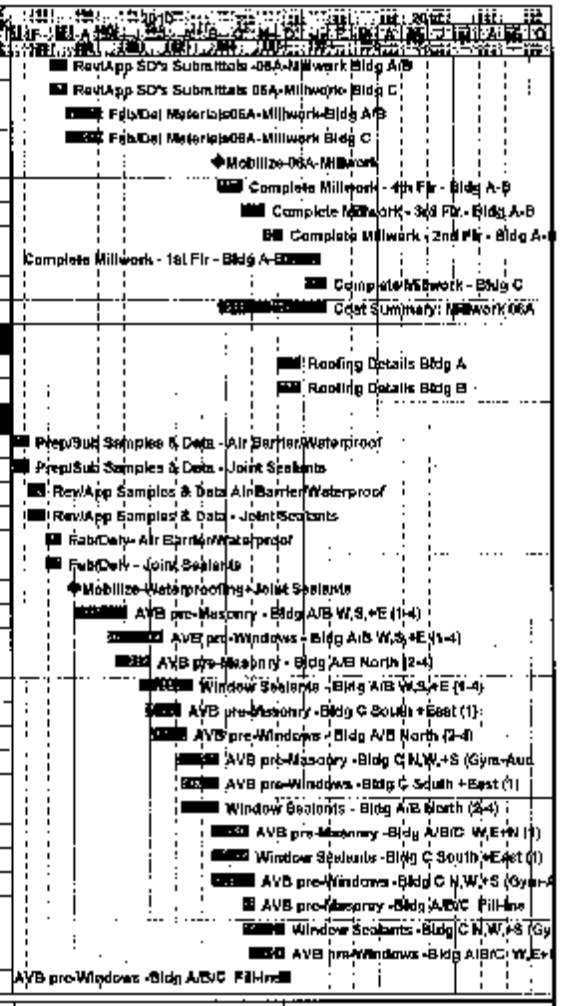
GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (W18)

BID PACKAGE - CURRENT WORK

Gilbane

Activity	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Variance	Activity
08A-514AB	Rev/App SD's Submittals -08A-Millwork Bldg A/B	15	15	03MAR10	23MAR10	102	-33	08A
08A-514C	Rev/App SD's Submittals 08A-Millwork- Bldg C	15	15	03MAR10	23MAR10	102	-33	08A
08A-516AB	Fab/Del Materials08A-Millwork-Bldg A/B	30	30	24MAR10	04MAY10	102	-33	08A
08A-516C	Fab/Del Materials08A-Millwork Bldg C	30	30	24MAR10	04MAY10	102	-33	08A
08A-518	Mobilize-08A-Millwork	0	0	22SEP10		5	-17	08A
4-541CAB	Complete Millwork - 4th Flr - Bldg A-B	20	20	22SEP10	15OCT10	5	-17	08A
3-541CAD	Complete Millwork - 3rd Flr - Bldg A-B	20	20	20OCT10	16NOV10	5	-17	08A
2-541CAB	Complete Millwork - 2nd Flr - Bldg A-B	15	15	17NOV10	06DEC10	5	-17	08A
1-541CAB	Complete Millwork - 1st Flr - Bldg A-B	30	30	09DEC10	21JAN11	5	-17	08A
541CC	Complete Millwork - Bldg C	20	20	03JAN11	28JAN11	5	-17	08A
08A-COST	Cost Summary, Millwork 08A	90*	90*	22SEP10	28JAN11	5	17	08A
C-ROOFING (FSB)								
4215A	Roofing Details Bldg A	20	20	01DEC10*	29DEC10	31	-22	07B
4215B	Roofing Details Bldg B	20	20	01DEC10	29DEC10	31	-22	07B
C-WATERPROOFING+JOINT SEALANTS (FSB)								
07C-512	Prep/Sub Samples & Data - Air Barrier/Waterproof	15	15	16JAN10	04FEB10	28	-47	07C
07C-515	Prep/Sub Samples & Data - Joint Sealants	15	15	16JAN10	04FEB10	88	-47	07C
07C-522	Rev/App Samples & Data Air Barrier/Waterproof	15	15	05FEB10	25FEB10	28	-47	07C
07C-525	Rev/App Samples & Data - Joint Sealants	15	15	05FEB10	25FEB10	88	-47	07C
07C-532	Fab/Deliv- Air Barrier/Waterproof	12*	12*	26FEB10	15MAR10	28	-44	07C
07C-535	Fab/Deliv - Joint Sealants	12*	12*	26FEB10	15MAR10	88	-44	07C
07C-518	Mobilize-Waterproofing+Joint Sealants	0	0	01APR10		10	-22	07C
4280A	AVB pre-Masonry - Bldg A/B W,S,+E (1-4)	45	45	01APR10*	03JUN10	16	-22	07C
4310A	AVB pre-Windows - Bldg A/B W,S,+E (1-4)	45	45	13MAY10	15JUL10	16	-22	07C
4280D	AVB pre-Masonry - Bldg A/B North (2-4)	30	30	20MAY10	01JUL10	16	-23	07C
4330A	Window Sealants - Bldg A/B W,S,+E (1-4)	45	45	16JUN10	20AUG10	16	-22	07C
4280C	AVB pre-Masonry -Bldg C South +East (1)	30	30	25JUN10	05AUG10	16	-23	07C
4310B	AVB pre-Windows - Bldg A/B North (2-4)	30	30	02JUL10	13AUG10	16	-22	07C
4262C	AVB pre-Masonry -Bldg C N,W,+S (Gym-Aud	35	35	02AUG10	20SEP10	16	-22	07C
4310C	AVB pre-Windows -Bldg C South +East (1)	30	30	09AUG10	20SEP10	16	-22	07C
4330B	Window Sealants - Bldg A/B North (2-4)	30	30	09AUG10	20SEP10	16	-22	07C
4280C	AVB pre-Masonry -Bldg A/B/C W,E+N (1)	30	30	14SEP10	25OCT10	16	-23	07C
4330C	Window Sealants -Bldg C South +East (1)	30	30	14SEP10	25OCT10	16	-22	07C
4262C	AVB pre-Windows -Bldg C N,W,+S (Gym-Aud	35	35	14SEP10	01NOV10	16	-22	07C
4284C	AVB pre-Masonry -Bldg A/B/C Fill-Ins	10	10	19OCT10	01NOV10	5*	-23	07C
4332C	Window Sealants -Bldg C N,W,+S (Gym-Aud	35	35	19OCT10	07DEC10	16	-22	07C
4319C	AVB pre-Windows -Bldg A/B/C W,E+N (1)	30	30	26OCT10	07DEC10	16	-22	07C
4314C	AVB pre-Windows -Bldg A/B/C Fill-ins	10	10	01DEC10	14DEC10	31	-22	07C



Start Date 25APR08
Finish Date 16SEP11
Data Date 15MAY10
Run Date 22MAY10 14:18

Early Bar
Progress Bar
Critical Activity

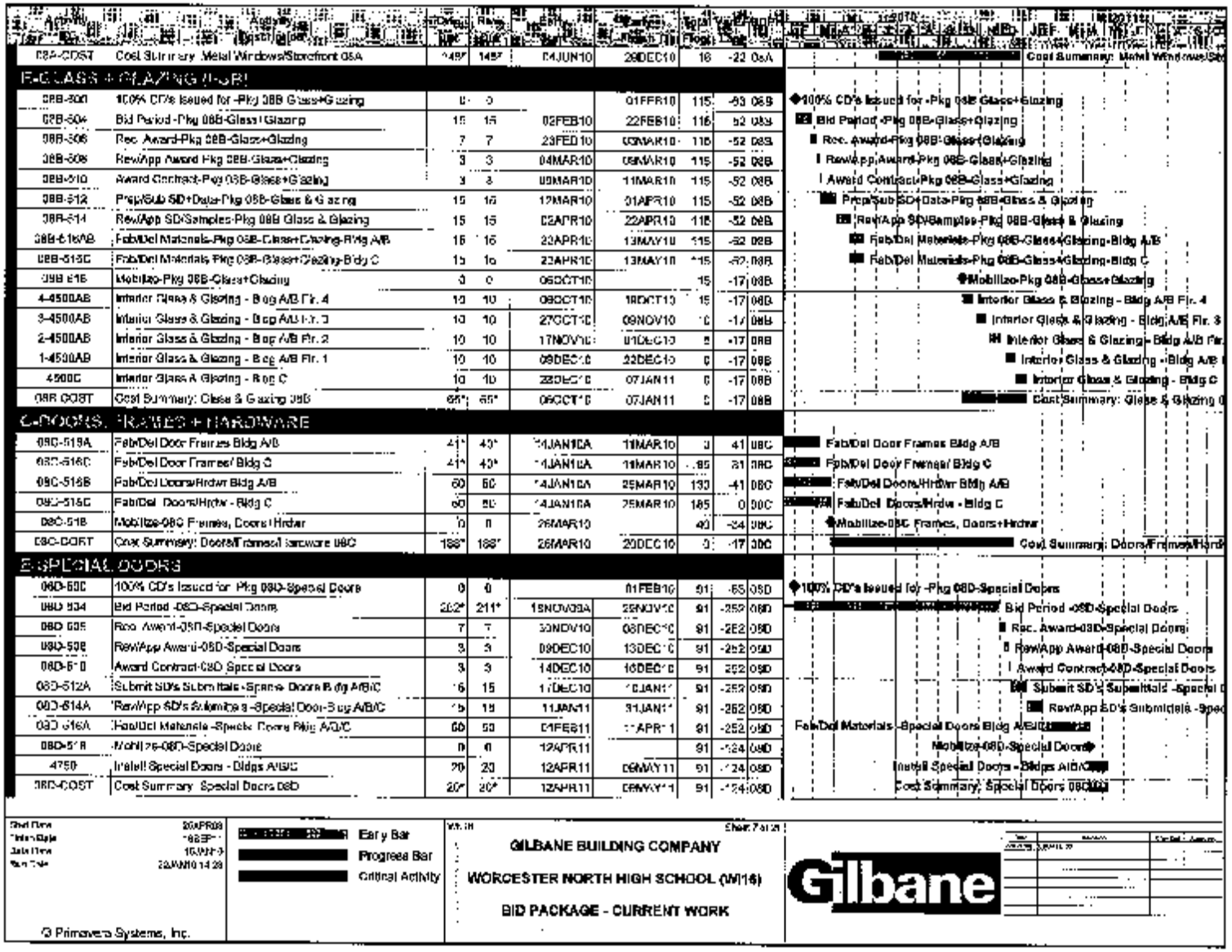
GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (W16)

BID PACKAGE - CURRENT WORK

Gilbane

4330C	Window Sealants -Bldg A/B/C W,E+N (1)	30	30	01DEC10	13JAN11*	16	-22	07C
4334C	Window Sealants -Bldg A/B/C Fl-Ins	10	10	07JAN11	20JAN11*	16	-22	07C
07C-COST	Cost Summary: Waterproofing & Sealants 07C	205*	205*	01APR10	20JAN11*	16	-22	07C
A-SPRAY-ON FIREPROOFING								
4210INC	Fireproof Interior Perimeter 1st Flr Bldg C Aud	67*	9*	31OCT09A	22JAN10	22	21	07D
4200C	Fireproof Exterior Perimeter Bldg C (Gym)	7	7	01APR10*	08APR10	24	-31	07D
4416C	Fireproof Patching @ Ceiling - Auditorium	5	5	21MAY10	27MAY10	22	0	07D
4624C	Fireproof Patching - Locker Area	3	3	20JUL10	22JUL10	52	-33	07D
07D-COST	Cost Summary: Spray Fireproofing D/D	141*	61*	22SEP09A	08APR10	24	-76	07D
C-METAL SIDING & LOUVERS								
05C-500	100% CD's Issued for -Bldg 07E-Metal Panels+Lou	0	0		06FEB10*	124	-67	07E
05C-506	Rec. Award-07E Metal Panels	7	7	15JAN10	25JAN10	127	-30	07E
05C-508	Rev/App Award-07E Metal Panels	3	3	25JAN10	28JAN10	127	-30	07E
05C 510	Award Contract-07E Metal Panels	3	3	28JAN10	02FEB10	127	-30	07E
05C-512AB	Prep/Sub SD & Data-07E Metal Panels Bldg A/B	20	20	08FEB10	05MAR10	124	-33	07E
05C-512C	Prep/Sub SD & Data-07E Metal Panels Bldg C	20	20	09FEB10	08MAR10	144	-33	07E
05C-514AB	Rev/AppSD's Submittals-07E Metal Panels Bldg A/B	15	15	09MAR10	26MAR10	124	-33	07E
05C 514C	Rev/AppSD's Submittals-07E Metal Panels Bldg C	15	15	09MAR10	26MAR10	144	-33	07E
05C-516AB	Fab/Del Materials-07E Metal Panels Bldg A/B	50	50	29MAR10	07JUN10	124	-33	07E
05C-516C	Fab/Del Materials-07E Metal Panels C	50	50	29MAR10	07JUN10	144	-33	07E
05C-518	Mobilize-Bldg 07E Metal Panels	0	0	05OCT10		41	-22	07E
4281C	Install Metal Panels Bldg C	30	30	05DEC10	19NOV10	61	-22	07E
4281AB	Install Metal Panels Bldg A/B (@ Stairs only)	30	30	19OCT10	30NOV10	91	-22	07E
05C COST	Cost Summary: Metal Panels 07C	40*	40*	05OCT10	30NOV10	91	-22	07E
C-METAL WINDOWS/STOREFRONTS (FSB)								
08A-5161	Fab/Del-Mtl Storefronts Bldg A/B	40	40	21DEC09A	11MAR10	76	-30	08A
08A-5162	Fab/Del-Mtl StoreFronts Bldg C	40	40	21DEC09A	11MAR10	205	-30	08A
08A-5151	Fab/Del Mtl Windows / Receptors Bldg A	60	60	21DEC09A	09APR10	55	-30	08A
08A-5152	Fab/Del-Mtl Windows / Receptors Bldg B	60	60	21DEC09A	09APR10	55	-30	08A
08A-5153	Fab/Del-Mtl Windows / Receptors Bldg C	60	60	21DEC09A	09APR10	116	-30	08A
08A-519	Mobilize On Site-Metal Window Receptors	0	0	04JUN10		16	22	08A
4320A	Windows - Bldg A/B W,S,+E (1-4)	45	45	04JUN10	05AUG10	16	-22	08A
4320B	Windows - Bldg A/B North (2-4)	30	30	26JUL10	06SEP10	16	-22	08A
4320C	Windows - Bldg C South +East (1)	30	30	30AUG10	11OCT10	16	-22	08A
4250C	Install Storefront-Bldg C	30	30	06OCT10	16NOV10	61	-22	08A
4322C	Windows -Bldg C N,W,+S (Gym+Aud	35	35	05OCT10	22NOV10	16	-22	08A
4250A	Install Storefronts-Bldg A/B	30	30	19OCT10	30NOV10	91	-22	08A
4320C	Windows -Bldg A/B/C W,E+N (1)	30	30	15NOV10	29DEC10	16	-22	08A


08A-COST Cost Summary: Metal Windows/Storefront 08A 148* 148* 04JUN10 29DEC10 16 -22 08A
Cost Summary: Metal Windows/Sto
E-GLASS + GLAZING (08B)
08B-300 100% CD's Issued for -Pkg 08B Glass+Glazing 0 0 01FEB10 115 -93 08B
08B-304 Bid Period -Pkg 08B-Glass+Glazing 15 15 02FEB10 22FEB10 115 -52 08B
08B-306 Rec. Award-Pkg 08B-Glass+Glazing 7 7 23FEB10 03MAR10 115 -52 08B
08B-308 RevApp Award-Pkg 08B-Glass+Glazing 3 3 04MAR10 08MAR10 115 -52 08B
08B-310 Award Contract-Pkg 08B-Glass+Glazing 3 3 09MAR10 11MAR10 115 -52 08B
08B-312 Prep/Sub SD+Data-Pkg 08B-Glass & Glazing 15 15 12MAR10 01APR10 115 -52 08B
08B-314 RevApp SD/Samples-Pkg 08B Glass & Glazing 15 15 02APR10 22APR10 115 -52 08B
08B-316AB Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg A/B 15 15 23APR10 13MAY10 115 -52 08B
08B-316C Fab/Del Materials-Pkg 08B-Glass+Glazing-Bldg C 15 15 23APR10 13MAY10 115 -52 08B
08B 318 Mobilize-Pkg 08B-Glass+Glazing 0 0 06OCT10 15 -17 08B
4-4500AB Interior Glass & Glazing - Bldg A/B Flr. 4 10 10 06OCT10 18OCT10 15 -17 08B
3-4500AB Interior Glass & Glazing - Bldg A/B Flr. 3 10 10 27OCT10 09NOV10 15 -17 08B
2-4500AB Interior Glass & Glazing - Bldg A/B Flr. 2 10 10 17NOV10 01DEC10 15 -17 08B
1-4500AB Interior Glass & Glazing - Bldg A/B Flr. 1 10 10 08DEC10 22DEC10 15 -17 08B
4500C Interior Glass & Glazing - Bldg C 10 10 23DEC10 07JAN11 15 -17 08B
08B COST Cost Summary: Glass & Glazing 08B 65* 65* 06OCT10 07JAN11 15 -17 08B
Cost Summary: Glass & Glazing 0
C-DOORS, FRAMES + HARDWARE
08C-316A Fab/Del Door Frames Bldg A/B 41* 40* 14JAN10A 11MAR10 3 41 08C
08C-316C Fab/Del Door Frames/ Bldg C 41* 40* 14JAN10A 11MAR10 185 41 08C
08C-316B Fab/Del Doors/Hrdwr Bldg A/B 60 60 14JAN10A 25MAR10 130 -41 08C
08C-316C Fab/Del Doors/Hrdwr - Bldg C 60 60 14JAN10A 25MAR10 185 0 08C
08C-318 Mobilize-08C Frames, Doors+Hrdwr 0 0 26MAR10 40 -24 08C
08C-COST Cost Summary: Doors/Frames/Hardware 08C 188* 188* 26MAR10 29DEC10 0 -17 08C
Cost Summary: Doors/Frames/Hard
E-SPECIAL DOORS
08D-300 100% CD's Issued for -Pkg 08D-Special Doors 0 0 01FEB10 91 -65 08D
08D 304 Bid Period -08D-Special Doors 282* 211* 15NOV09A 29NOV10 91 -252 08D
08D 305 Rec. Award-08D-Special Doors 7 7 30NOV10 08DEC10 91 -252 08D
08D-308 RevApp Award-08D-Special Doors 3 3 09DEC10 13DEC10 91 -252 08D
08D-310 Award Contract-08D Special Doors 3 3 14DEC10 16DEC10 91 -252 08D
08D-312A Submit SD's Submittals -Special Doors Bldg A/B/C 15 15 17DEC10 07JAN11 91 -252 08D
08D-314A RevApp SD's Submittals -Special Door Bldg A/B/C 15 15 11JAN11 31JAN11 91 -252 08D
08D-316A Fab/Del Materials -Special Doors Bldg A/B/C 60 60 01FEB11 11APR11 91 -252 08D
08D-318 Mobilize-08D-Special Doors 0 0 12APR11 91 -124 08D
4750 Install Special Doors - Bldgs A/B/C 20 20 12APR11 09MAY11 91 -124 08D
08D-COST Cost Summary: Special Doors 08D 20* 20* 12APR11 09MAY11 91 -124 08D
100% CD's Issued for -Pkg 08D-Special Doors
Bid Period -08D-Special Doors
Rec. Award-08D-Special Doors
RevApp Award-08D-Special Doors
Award Contract-08D-Special Doors
Submit SD's Submittals -Special
RevApp SD's Submittals -Spec
Fab/Del Materials -Special Doors Bldg A/B/C
Mobilize-08D-Special Doors
Install Special Doors - Bldgs A/B/C
Cost Summary: Special Doors 08D
Early Bar
Progress Bar
Critical Activity
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (W116)
BID PACKAGE - CURRENT WORK
Gilbane
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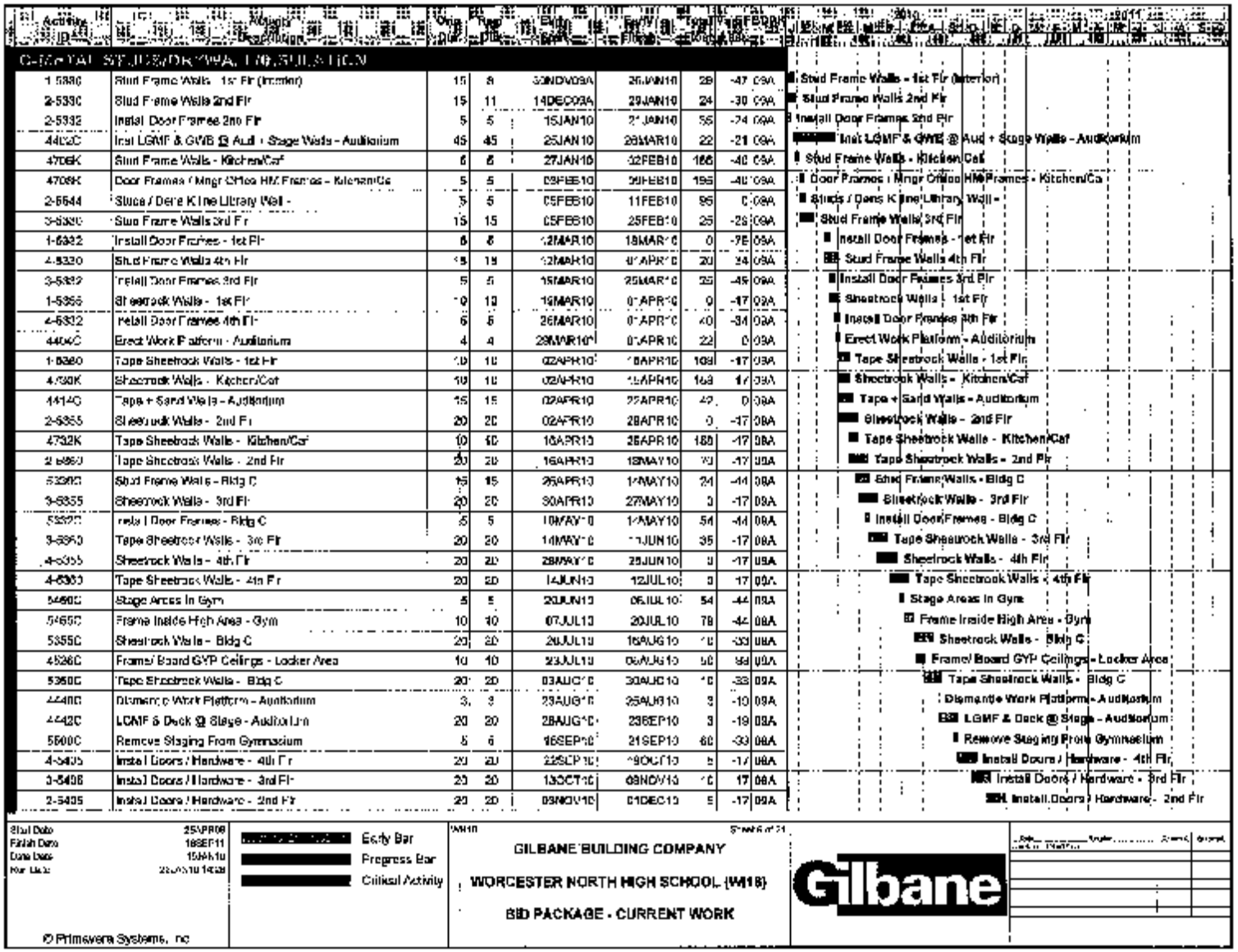
Activity ID
Activity Description
Orig Dur
Rem Dur
Early Start
Early Finish
Total Float
FEB '10
MAR '10
APR '10
MAY '10
JUN '10
JUL '10
AUG '10
SEP '10
OCT '10
NOV '10
DEC '10
JAN '11
CONSTRUCTION
1-5330 Stud Frame Walls - 1st Flr (Interior) 15 8 03NOV09A 26JAN10 28 -47 09A
2-5330 Stud Frame Walls 2nd Flr 15 11 14DEC09A 29JAN10 24 -30 09A
2-5332 Install Door Frames 2nd Flr 5 5 15JAN10 21JAN10 55 -74 09A
4402C Inst LGMF & GWB @ Aud + Stage Walls - Auditorium 45 45 25JAN10 29MAR10 22 -21 09A
4706K Stud Frame Walls - Kitchen/Caf 5 5 27JAN10 02FEB10 166 -40 09A
4709K Door Frames / Mngr Office HM Frames - Kitchen/Ca 5 5 03FEB10 09FEB10 195 -40 09A
2-5644 Studs / Deps K line Library Wall - 5 5 05FEB10 11FEB10 95 0 09A
3-5330 Stud Frame Walls 3rd Flr 15 15 05FEB10 25FEB10 25 -28 09A
1-5332 Install Door Frames - 1st Flr 5 5 12MAR10 18MAR10 0 -75 09A
4-5330 Stud Frame Walls 4th Flr 15 15 12MAR10 01APR10 20 24 09A
3-5332 Install Door Frames 3rd Flr 5 5 15MAR10 25MAR10 25 -45 09A
1-5355 Sheetrock Walls - 1st Flr 10 10 19MAR10 01APR10 0 -17 09A
4-5332 Install Door Frames 4th Flr 5 5 26MAR10 01APR10 40 -34 09A
4404C Erect Work Platform - Auditorium 4 4 29MAR10 01APR10 22 0 09A
1-5360 Tape Sheetrock Walls - 1st Flr 10 10 02APR10 15APR10 169 -17 09A
4730K Sheetrock Walls - Kitchen/Caf 10 10 02APR10 15APR10 169 -17 09A
4414C Tape + Sand Walls - Auditorium 15 15 02APR10 22APR10 42 0 09A
2-5355 Sheetrock Walls - 2nd Flr 20 20 02APR10 28APR10 0 -17 09A
4732K Tape Sheetrock Walls - Kitchen/Caf 10 10 16APR10 29APR10 169 -17 09A
2-5360 Tape Sheetrock Walls - 2nd Flr 20 20 16APR10 13MAY10 0 -17 09A
5336C Stud Frame Walls - Bldg C 15 15 26APR10 14MAY10 24 -44 09A
3-5355 Sheetrock Walls - 3rd Flr 20 20 30APR10 27MAY10 0 -17 09A
5339C Install Door Frames - Bldg C 5 5 10MAY10 14MAY10 54 -44 09A
3-5360 Tape Sheetrock Walls - 3rd Flr 20 20 14MAY10 11JUN10 35 -17 09A
4-5355 Sheetrock Walls - 4th Flr 20 20 28MAY10 25JUN10 0 -17 09A
4-5360 Tape Sheetrock Walls - 4th Flr 20 20 14JUN10 12JUL10 0 -17 09A
5460C Stage Areas In Gym 5 5 29JUN10 06JUL10 54 -44 09A
5465C Frame Inside High Area - Gym 10 10 07JUL10 20JUL10 78 -44 09A
5355C Sheetrock Walls - Bldg C 20 20 26JUL10 19AUG10 10 -33 09A
4526C Frame/ Board GYP Ceilings - Locker Area 10 10 23JUL10 06AUG10 90 56 09A
5360C Tape Sheetrock Walls - Bldg C 20 20 03AUG10 30AUG10 10 -33 09A
4440C Dismantle Work Platform - Auditorium 3 3 23AUG10 25AUG10 3 -10 09A
4442C LGMF & Deck @ Stage - Auditorium 20 20 26AUG10 23SEP10 3 -19 09A
5600C Remove Staging From Gymnasium 5 5 16SEP10 21SEP10 60 -33 09A
4-5405 Install Doors / Hardware - 4th Flr 20 20 22SEP10 19OCT10 5 -17 09A
3-5405 Install Doors / Hardware - 3rd Flr 20 20 13OCT10 09NOV10 10 17 09A
2-5405 Install Doors / Hardware - 2nd Flr 20 20 03NOV10 01DEC10 5 -17 09A
Stud Frame Walls - 1st Flr (Interior)
Stud Frame Walls 2nd Flr
Install Door Frames 2nd Flr
Inst LGMF & GWB @ Aud + Stage Walls - Auditorium
Stud Frame Walls - Kitchen/Caf
Door Frames / Mngr Office HM Frames - Kitchen/Ca
Studs / Deps K line Library Wall -
Stud Frame Walls 3rd Flr
Install Door Frames - 1st Flr
Stud Frame Walls 4th Flr
Install Door Frames 3rd Flr
Sheetrock Walls - 1st Flr
Install Door Frames 4th Flr
Erect Work Platform - Auditorium
Tape Sheetrock Walls - 1st Flr
Sheetrock Walls - Kitchen/Caf
Tape + Sand Walls - Auditorium
Sheetrock Walls - 2nd Flr
Tape Sheetrock Walls - Kitchen/Caf
Tape Sheetrock Walls - 2nd Flr
Stud Frame Walls - Bldg C
Sheetrock Walls - 3rd Flr
Install Door Frames - Bldg C
Tape Sheetrock Walls - 3rd Flr
Sheetrock Walls - 4th Flr
Tape Sheetrock Walls - 4th Flr
Stage Areas In Gym
Frame Inside High Area - Gym
Sheetrock Walls - Bldg C
Frame/ Board GYP Ceilings - Locker Area
Tape Sheetrock Walls - Bldg C
Dismantle Work Platform - Auditorium
LGMF & Deck @ Stage - Auditorium
Remove Staging From Gymnasium
Install Doors / Hardware - 4th Flr
Install Doors / Hardware - 3rd Flr
Install Doors / Hardware - 2nd Flr
Start Date 25APR08
Finish Date 16SEP11
Data Date 15MAY10
Print Date 22MAY10 14:28
Early Bar
Progress Bar
Critical Activity
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (W18)
BID PACKAGE - CURRENT WORK
Gilbane
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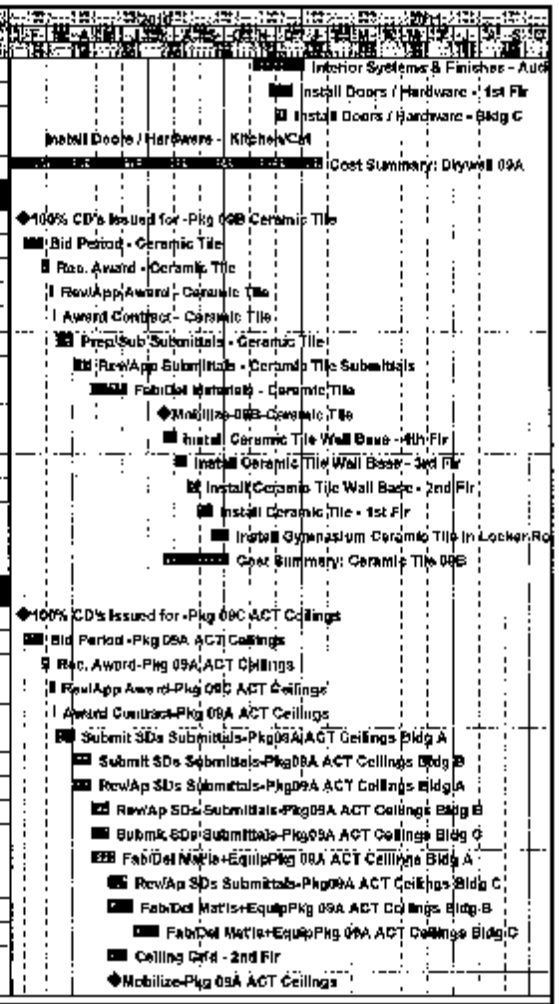
Activity ID	Activity							
4442C	Interior Systems & Finishes - Auditorium	40	40	05NOV10	04JAN11	31	-19	09A
1-5406	Install Doors / Hardware - 1st Flr	15	15	24NOV10	20DEC10	0	-12	09A
5405C	Install Doors / Hardware - Bldg C	10	10	22DEC10	05DEC10	10	-33	09A
4764K	Install Doors / Hardware - Kitchen/Cef	2	2	10JAN11	11JAN11	16	-17	09A
09A-COST	Cost Summary: Drywall 09A	308*	262*	09NOV09A	25JAN11	6	-18	09A
C-CERAMIC TILE (FSS)								
09B-500	100% CD's Issued for -Pkg 09B Ceramic Tile	0	0		01FEB10	96	-53	09B
09B-504	Bid Period - Ceramic Tile	15	15	02FEB10	22FEB10	96	-52	09B
09B-506	Rec. Award - Ceramic Tile	7	7	23FEB10	03MAR10	96	-52	09B
09B-508	RevApp Award - Ceramic Tile	3	3	04MAR10	08MAR10	95	-52	09B
09B-510	Award Contract - Ceramic Tile	3	3	09MAR10	11MAR10	95	-52	09B
09B-512	Prep/Sub Submittals - Ceramic Tile	15	15	12MAR10	01APR10	96	-52	09B
09B-514	RevApp Submittals - Ceramic Tile Submittals	15	15	02APR10	22APR10	96	-52	09B
09B-516	Fab/Del Materials - Ceramic Tile	30	30	23APR10	04JUN10	95	-52	09B
09B-518	Mobilize-09B-Ceramic Tile	0	0	20JUL10		65	-17	09B
4-5540	Install Ceramic Tile Wall Base - 4th Flr	10	10	20JUL10	02AUG10	65	-17	09B
3-5540	Install Ceramic Tile Wall Base - 3rd Flr	10	10	03AUG10	16AUG10	70	-17	09B
2-5540	Install Ceramic Tile Wall Base - 2nd Flr	10	10	17AUG10	30AUG10	75	-17	09B
1-5540	Install Ceramic Tile - 1st Flr	10	10	31AUG10	14SEP10	80	-17	09B
5840C	Install Gymnasium Ceramic Tile in Locker Rooms	15	15	15SEP10	05OCT10	50	-33	09B
09B-COST	Cost Summary: Ceramic Tile 09B	55*	55*	20JUL10	05OCT10	65	-32	09B
C-ACOUSTIC CEILINGS (FSS)								
09C-500	100% CD's Issued for -Pkg 09C ACT Ceilings	0	0		01FEB10	20	-53	09C
09C-504	Bid Period - Pkg 09A ACT Ceilings	15	15	02FEB10	22FEB10	20	-52	09C
09C-506	Rec. Award-Pkg 09A ACT Ceilings	7	7	23FEB10	03MAR10	20	-52	09C
09C-508	RevApp Award-Pkg 09C ACT Ceilings	3	3	04MAR10	08MAR10	20	-52	09C
09C-510	Award Contract-Pkg 09A ACT Ceilings	3	3	09MAR10	11MAR10	20	-52	09C
09C-512A	Submit SDs Submittals-Pkg09A ACT Ceilings Bldg A	15	15	12MAR10	01APR10	20	-52	09C
09C-512B	Submit SDs Submittals-Pkg09A ACT Ceilings Bldg B	15	15	02APR10	22APR10	20	-52	09C
09C-514A	RevAp SDs Submittals-Pkg09A ACT Ceilings Bldg A	15	15	02APR10	22APR10	20	-52	09C
09C-514B	RevAp SDs Submittals-Pkg09A ACT Ceilings Bldg B	15	15	23APR10	13MAY10	20	-52	09C
09C-512C	Submit SDs Submittals-Pkg09A ACT Ceilings Bldg C	10	10	23APR10	13MAY10	55	-52	09C
09C-516A	Fab/De Matls+EquipPkg 09A ACT Ceilings Bldg A	20	20	23APR10	20MAY10	94	-52	09C
09C-514C	RevAp SDs Submittals-Pkg09A ACT Ceilings Bldg C	15	15	14MAY10	04JUN10	55	-52	09C
09C-516B	Fab/De Matls+EquipPkg 09A ACT Ceilings Bldg B	20	20	14MAY10	11JUN10	20	-52	09C
09C-516C	Fab/De Matls+EquipPkg 09A ACT Ceilings Bldg C	20	20	14JUN10	12JUL10	50	-52	09C
2-5345	Ceiling Grid - 2nd Flr	15	15	14MAY10	04JUN10	70	-17	09C
09C-512	Mobilize-Pkg 09A ACT Ceilings	0	0	21MAY10		94	-32	09C



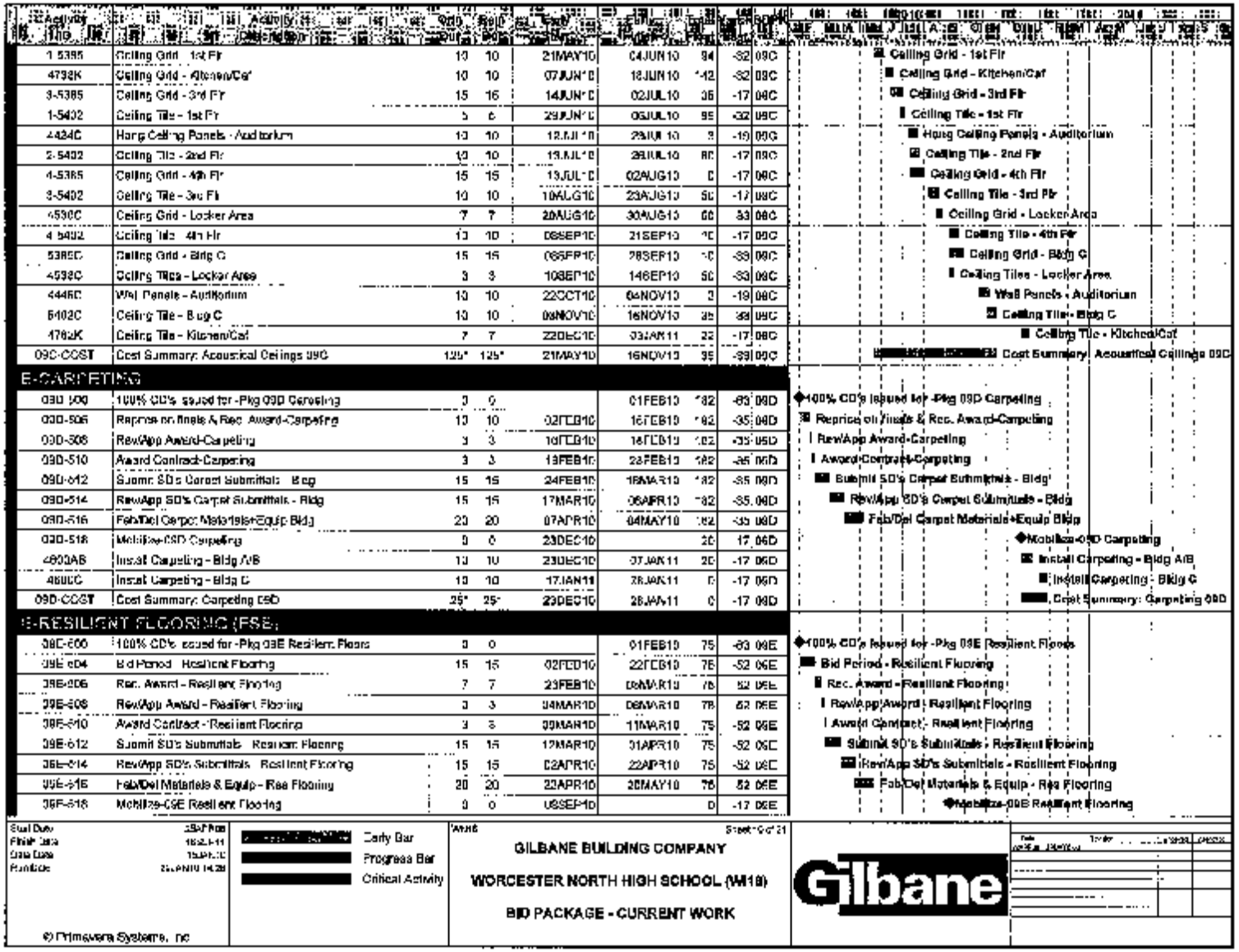
Early Bar
Progress Bar
Critical Activity

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (W116)

BID PACKAGE - CURRENT WORK

Gilbane



Activity No.	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Activity Code
1-5385	Ceiling Grid - 1st Flr	10	10	21MAY10	04JUN10	94	-82 09C
4798K	Ceiling Grid - Kitchen/Caf	10	10	07JUN10	18JUN10	112	-82 09C
3-5385	Ceiling Grid - 3rd Flr	15	15	14JUN10	02JUL10	35	-17 09C
1-5402	Ceiling Tile - 1st Flr	5	5	29JUN10	06JUL10	99	-82 09C
4434C	Hang Ceiling Panels - Auditorium	10	10	12JUL10	23JUL10	9	-19 09C
2-5402	Ceiling Tile - 2nd Flr	10	10	13JUL10	26JUL10	80	-17 09C
4-5385	Ceiling Grid - 4th Flr	15	15	13JUL10	02AUG10	0	-17 09C
3-5402	Ceiling Tile - 3rd Flr	10	10	19AUG10	23AUG10	50	-17 09C
4530C	Ceiling Grid - Locker Area	7	7	26AUG10	30AUG10	60	-33 09C
4-5402	Ceiling Tile - 4th Flr	10	10	09SEP10	21SEP10	10	-17 09C
5385C	Ceiling Grid - Bldg C	15	15	06SEP10	28SEP10	10	-33 09C
4532C	Ceiling Tiles - Locker Area	3	3	10SEP10	14SEP10	50	-33 09C
4446C	Wall Panels - Auditorium	10	10	22OCT10	04NOV10	3	-19 09C
5402C	Ceiling Tile - Bldg C	10	10	03NOV10	16NOV10	35	-33 09C
4782K	Ceiling Tile - Kitchen/Caf	7	7	22DEC10	03JAN11	22	-17 09C
09C-COST	Cost Summary: Acoustical Ceilings 09C	125*	125*	21MAY10	16NOV10	95	-93 09C
E-CARPETING							
09D-500	100% CD's issued for -Pkg 09D Carpeting	0	0		01FEB10	182	-83 09D
09D-506	Reprice on Finals & Rec. Award-Carpeting	10	10	02FEB10	16FEB10	182	-35 09D
09D-508	RevApp Award-Carpeting	3	3	16FEB10	18FEB10	182	-35 09D
09D-510	Award Contract-Carpeting	3	3	19FEB10	23FEB10	182	-35 09D
09D-512	Submit SD's Carpet Submittals - Bldg	15	15	24FEB10	16MAR10	182	-35 09D
09D-514	RevApp SD's Carpet Submittals - Bldg	15	15	17MAR10	06APR10	182	-35 09D
09D-516	Fab/Del Carpet Materials+Equip Bldg	20	20	07APR10	04MAY10	182	-35 09D
09D-518	Mobilize-09D Carpeting	0	0	23DEC10		20	-17 09D
4800AB	Install Carpeting - Bldg A/B	10	10	23DEC10	07JAN11	20	-17 09D
4800C	Install Carpeting - Bldg C	10	10	17JAN11	28JAN11	0	-17 09D
09D-COST	Cost Summary: Carpeting 09D	25*	25*	23DEC10	28JAN11	0	-17 09D
E-RESILIENT FLOORING (FSE)							
09E-500	100% CD's issued for -Pkg 09E Resilient Floors	0	0		01FEB10	75	-83 09E
09E-504	Bid Period - Resilient Flooring	15	15	02FEB10	22FEB10	75	-52 09E
09E-506	Rec. Award - Resilient Flooring	7	7	23FEB10	09MAR10	75	-52 09E
09E-508	RevApp Award - Resilient Flooring	3	3	04MAR10	08MAR10	75	-52 09E
09E-510	Award Contract - Resilient Flooring	3	3	09MAR10	11MAR10	75	-52 09E
09E-512	Submit SD's Submittals - Resilient Flooring	15	15	12MAR10	31MAR10	75	-52 09E
09E-514	RevApp SD's Submittals - Resilient Flooring	15	15	02APR10	22APR10	75	-52 09E
09E-516	Fab/Del Materials & Equip - Res Flooring	20	20	23APR10	20MAY10	75	-52 09E
09E-518	Mobilize-09E Resilient Flooring	0	0	06SEP10		0	-17 09E

Start Date 25APR08
Finish Date 16JUN11
Data Date 15APR10
Run Date 21APR10 14:28

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Early Bar
Progress Bar
Critical Activity

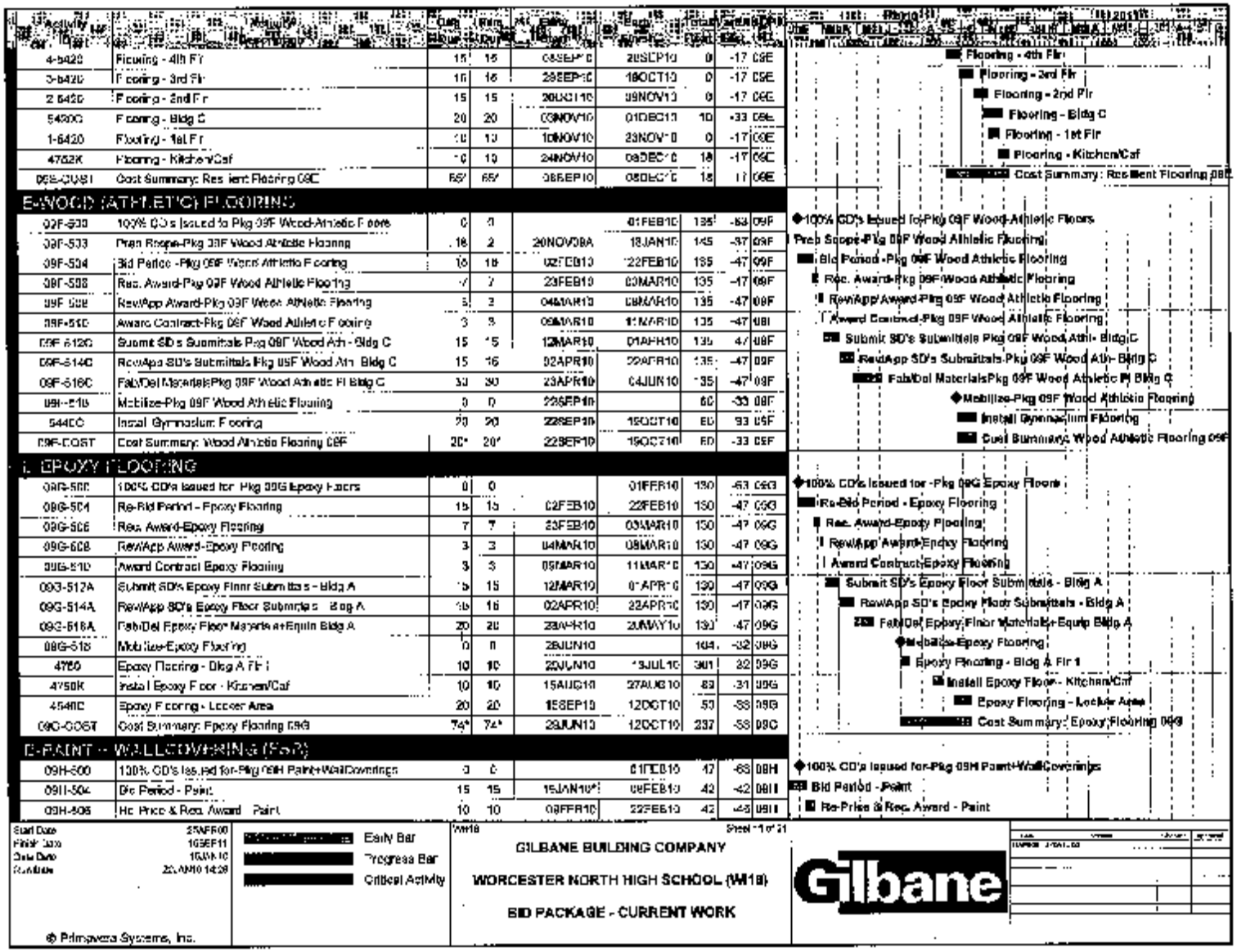
Sheet 6 of 21

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (M18)

BID PACKAGE - CURRENT WORK

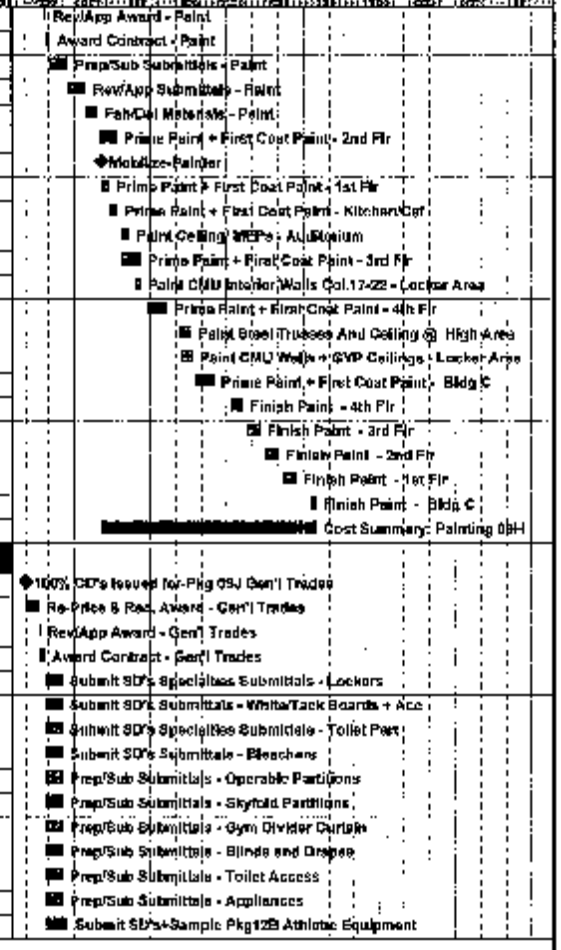
Gilbane



4-5420	Flooring - 4th Flr	15	15	08SEP10	28SEP10	0	-17	09E
3-5420	Flooring - 3rd Flr	15	15	23SEP10	18OCT10	0	-17	09E
2-5420	Flooring - 2nd Flr	15	15	20OCT10	09NOV10	0	-17	09E
5490C	Flooring - Bldg C	20	20	03NOV10	01DEC10	10	-33	09E
1-5420	Flooring - 1st Flr	10	10	10NOV10	23NOV10	0	-17	09E
4752K	Flooring - Kitchen/Caf	10	10	24NOV10	08DEC10	10	-17	09E
09E-COST	Cost Summary: Resilient Flooring 09E	65*	65*	08SEP10	08DEC10	10	-17	09E
E-WOOD (ATHLETIC) FLOORING								
09F-500	100% CD's Issued for Pkg 09F Wood Athletic Floors	0	0		01FEB10	135	-63	09F
09F-503	Prebi Scope-Pkg 09F Wood Athletic Flooring	15	2	20NOV09A	18JAN10	145	-37	09F
09F-504	Bid Period - Pkg 09F Wood Athletic Flooring	15	15	02FEB10	22FEB10	135	-47	09F
09F-508	Rec. Award-Pkg 09F Wood Athletic Flooring	7	7	23FEB10	03MAR10	135	-47	09F
09F-509	RevApp Award-Pkg 09F Wood Athletic Flooring	5	3	04MAR10	08MAR10	135	-47	09F
09F-510	Award Contract-Pkg 09F Wood Athletic Flooring	3	3	09MAR10	11MAR10	135	-47	09F
09F-512C	Submit SD's Submittals Pkg 09F Wood Ath - Bldg C	15	15	12MAR10	01APR10	135	-47	09F
09F-514C	RevApp SD's Submittals Pkg 09F Wood Ath - Bldg C	15	15	02APR10	22APR10	135	-47	09F
09F-516C	Fab/Del MaterialsPkg 09F Wood Athletic Fl Bldg C	30	30	23APR10	04JUN10	135	-47	09F
09F-518	Mobilize-Pkg 09F Wood Athletic Flooring	0	0	23SEP10		60	-33	09F
5440C	Install Gymnasium Flooring	20	20	23SEP10	15OCT10	60	-33	09F
09F-COST	Cost Summary: Wood Athletic Flooring 09F	20*	20*	23SEP10	15OCT10	60	-33	09F
G-EPOXY FLOORING								
09G-500	100% CD's Issued for Pkg 09G Epoxy Floors	0	0		01FEB10	130	-63	09G
09G-504	Re-Bid Period - Epoxy Flooring	15	15	02FEB10	22FEB10	130	-47	09G
09G-508	Rec. Award-Epoxy Flooring	7	7	23FEB10	03MAR10	130	-47	09G
09G-509	RevApp Award-Epoxy Flooring	3	3	04MAR10	08MAR10	130	-47	09G
09G-510	Award Contract Epoxy Flooring	3	3	09MAR10	11MAR10	130	-47	09G
09G-512A	Submit SD's Epoxy Floor Submittals - Bldg A	15	15	12MAR10	01APR10	130	-47	09G
09G-514A	RevApp SD's Epoxy Floor Submittals - Bldg A	15	15	02APR10	22APR10	130	-47	09G
09G-516A	Fab/Del Epoxy Floor Materials+Equip Bldg A	20	20	23APR10	20MAY10	130	-47	09G
09G-518	Mobilize-Epoxy Flooring	0	0	28JUN10		104	-92	09G
4760	Epoxy Flooring - Bldg A Flr 1	10	10	22JUN10	13JUL10	301	22	09G
4750K	Install Epoxy Floor - Kitchen/Caf	10	10	15AUG10	27AUG10	83	-31	09G
4540C	Epoxy Flooring - Locker Area	20	20	16SEP10	12OCT10	50	-58	09G
09G-COST	Cost Summary: Epoxy Flooring 09G	74*	74*	28JUN10	12OCT10	237	-58	09G
H-PAINT -- WALLCOVERING (Pkg)								
09H-500	100% CD's Issued for-Pkg 09H Paint+WallCoverings	0	0		01FEB10	47	-63	09H
09H-504	Bid Period - Paint	15	15	15JAN10*	05FEB10	42	-42	09H
09H-506	Re-Price & Rec. Award - Paint	10	10	08FEB10	22FEB10	42	-42	09H

Start Date 25APR00
Finish Date 16SEP11
Data Date 16MAY10
Run Date 25JUN10 14:28

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Free Float	PR
09H-530	Rev/App Award - Paint	3	3	23FEB10	26FEB10	42	-45	09H
09H-510	Award Contract - Paint	3	3	25FEB10	02MAR10	42	-45	09H
09H-512	Prep/Sub Submittals - Paint	15	15	03MAR10	23MAR10	42	-45	09H
09H-514	Rev/App Submittals - Paint	15	15	24MAR10	13APR10	42	-45	09H
09H-516A	Fab/Del Materials - Paint	10	10	14APR10	27APR10	42	-45	09H
2-5365	Prime Paint + First Coat Paint - 2nd Flr	15	15	30APR10	20MAY10	70	-17	09H
09H-518	Mobilize-Painter	0	0	03MAY10*		39	-4	09H
1-5365	Prime Paint + First Coat Paint - 1st Flr	8	8	03MAY10	12MAY10	93	28	09H
4736K	Prime Paint + First Coat Paint - Kitchen/Caf	7	7	13MAY10	21MAY10	151	-24	09H
4418C	Paint Ceiling/MEPs - Auditorium	6	6	20MAY10	04JUN10	22	0	09H
3-5365	Prime Paint + First Coat Paint - 3rd Flr	15	15	20MAY10	18JUN10	35	-17	09H
4610C	Paint CMU Interior Walls Col 17-22 - Locker Area	5	5	14JUN10	18JUN10	90	33	09H
4-5365	Prime Paint + First Coat Paint - 4th Flr	15	15	28JUN10	19JUL10	0	-17	09H
5-5460	Paint Steel Trusses And Ceiling @ High Area	10	10	04AUG10	17AUG10	79	-44	09H
4529C	Paint CMU Walls + GYP Ceilings - Locker Area	10	10	06AUG10	19AUG10	50	-33	09H
5365C	Prime Paint + First Coat Paint - Bldg C	15	15	24AUG10	14SEP10	10	-33	09H
4-5425	Finish Paint - 4th Flr	10	10	06OCT10	19OCT10	20	17	09H
3-5425	Finish Paint - 3rd Flr	10	10	27OCT10	09NOV10	20	17	09H
2-5425	Finish Paint - 2nd Flr	10	10	17NOV10	01DEC10	20	-17	09H
1-5425	Finish Paint - 1st Flr	10	10	09DEC10	22DEC10	20	-17	09H
5425C	Finish Paint - Bldg C	5	5	13JAN11	14JAN11	0	-17	09H
09H-COST	Cost Summary: Painting 09H	179*	179*	03MAY10	14JAN11	0	17	09H
5- GEN'L TRADES OPEN PAN/TOILET PART/ACCESS ETL								
09J-500	100% CDs Issued for Pkg 05J Gen'l Trades	0	0		01FEB10	107	-65	09J
09J-505	Re-Price & Rec. Award - Gen'l Trades	10	10	02FEB10	15FEB10	107	-40	09J
09J-506	Rev/App Award - Gen'l Trades	3	3	16FEB10	18FEB10	107	-40	09J
09J-510	Award Contract - Gen'l Trades	3	3	19FEB10	23FEB10	107	-40	09J
10A-512	Submit SD's Specialties Submittals - Lockers	15	15	24FEB10	15MAR10	107	35	09J
09J-512D	Submit SD's Submittals - White/Tack Boards + Acc	15	15	24FEB10	15MAR10	142	-40	09J
09J-512E	Submit SD's Specialties Submittals - Toilet Part	15	15	24FEB10	15MAR10	142	-10	09J
10A-512C	Submit SD's Submittals - Bleachers	15	15	24FEB10	15MAR10	147	-35	09J
09J-512	Prep/Sub Submittals - Operable Partitions	15	15	24FEB10	15MAR10	329	-40	09J
09J-512B	Prep/Sub Submittals - Skyfold Partitions	15	15	24FEB10	15MAR10	329	-40	09J
09J-512F	Prep/Sub Submittals - Gym Divider Curtain	15	15	24FEB10	15MAR10	329	-40	09J
09J-512G	Prep/Sub Submittals - Blinds and Drapes	15	15	24FEB10	15MAR10	329	-40	09J
09J-512I	Prep/Sub Submittals - Toilet Access	15	15	24FEB10	15MAR10	329	-40	09J
09J-512H	Prep/Sub Submittals - Appliances	15	15	24FEB10	15MAR10	349	-40	09J
12B-512C	Submit SD's Sample Pkg 12B Athletic Equipment	20	20	24FEB10	22MAR10	142	21	09J



Early Bar
Progress Bar
Critical Activity

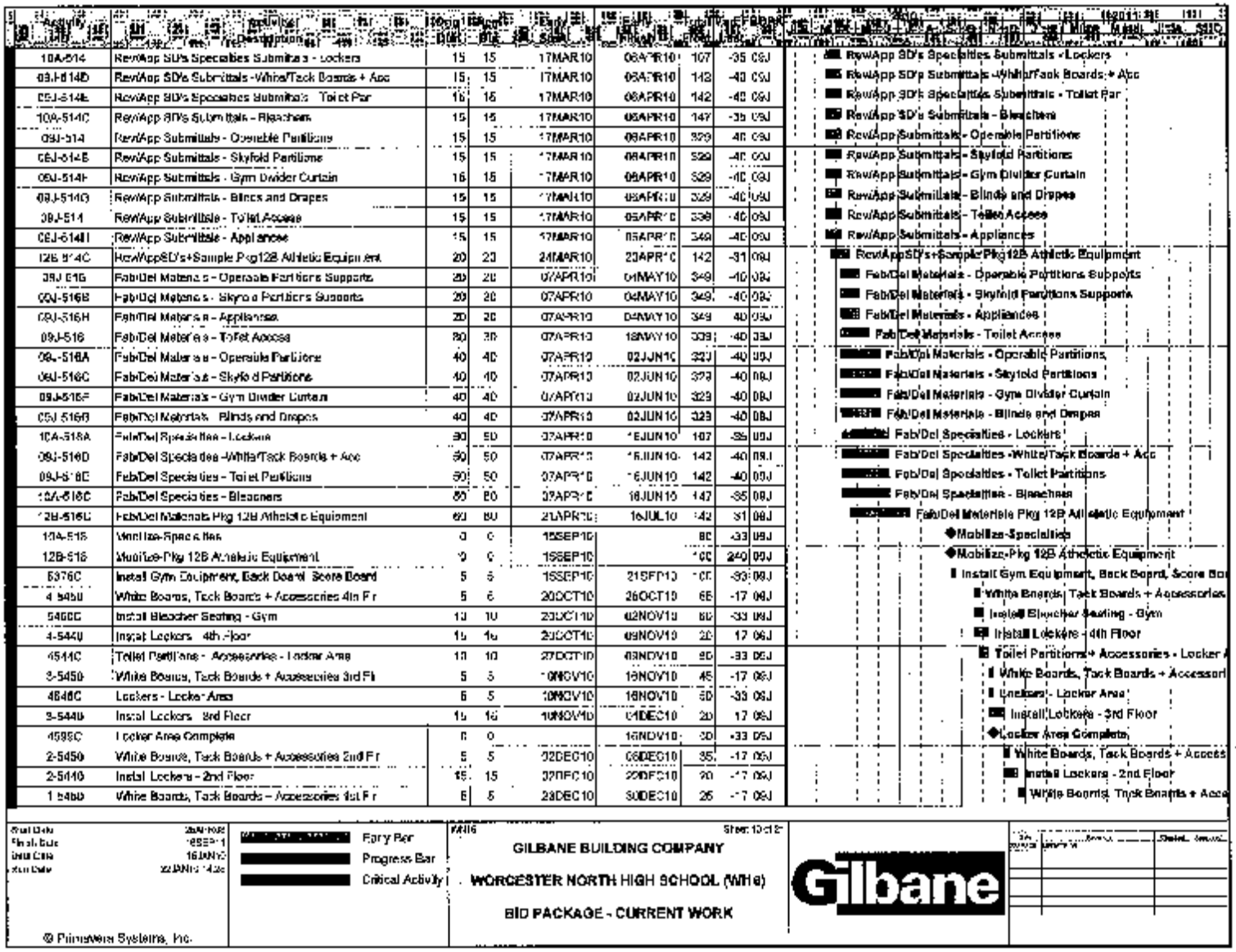
W116 Sheet 12 of 21

GILBANE BUILDING COMPANY

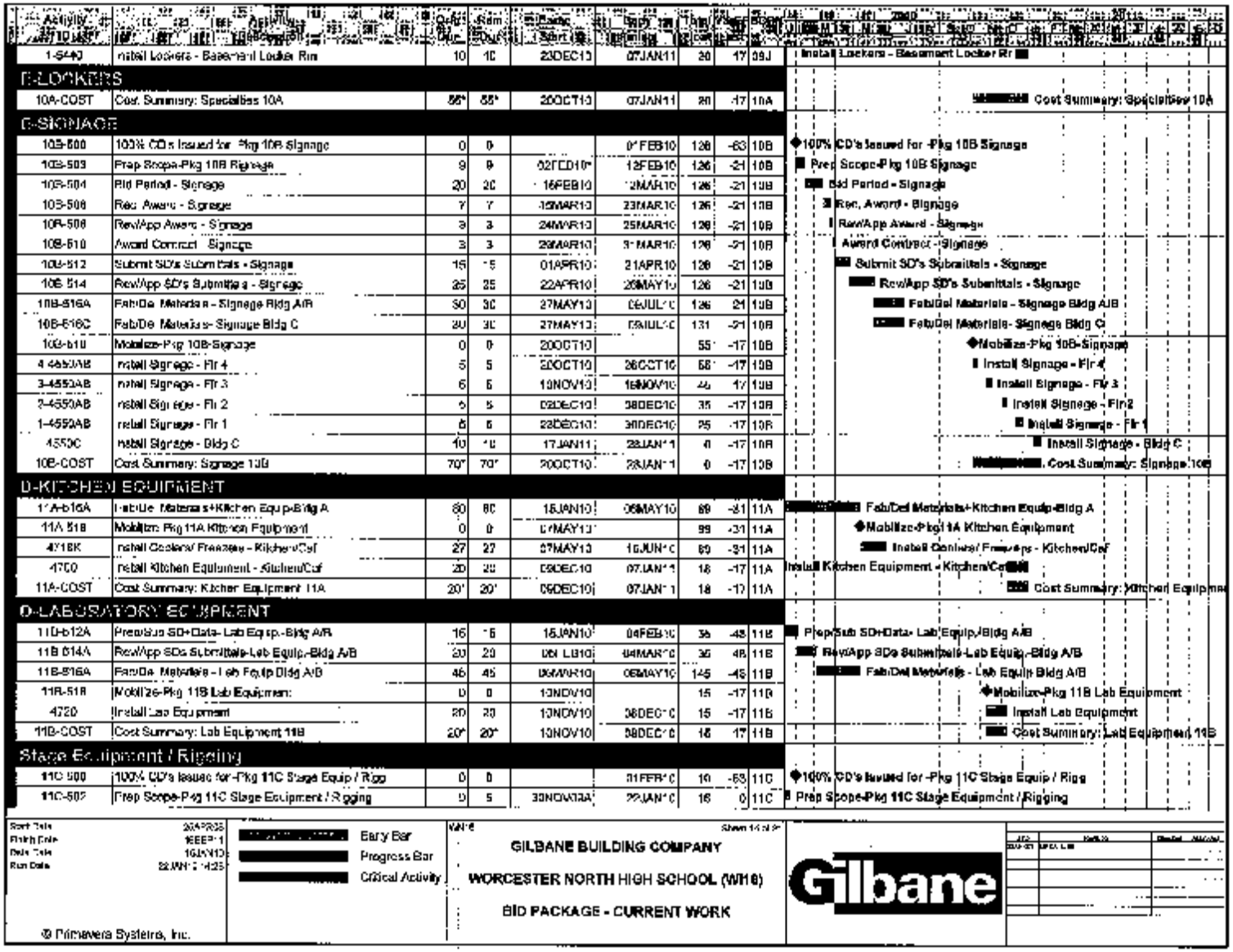
WORCESTER NORTH HIGH SCHOOL (W116)

BID PACKAGE - CURRENT WORK

Gilbane



10A-514	RevApp SD's Specialties Submittals - Lockers	15	15	17MAR10	06APR10	107	-35	09J
09J-514D	RevApp SD's Submittals -White/Tack Boards + Acc	15	15	17MAR10	06APR10	142	-40	09J
09J-514E	RevApp SD's Specialties Submittals - Toilet Par	15	15	17MAR10	06APR10	142	-40	09J
10A-514C	RevApp SD's Submittals - Bleachers	15	15	17MAR10	06APR10	147	-35	09J
09J-514	RevApp Submittals - Operable Partitions	15	15	17MAR10	06APR10	329	-40	09J
09J-514B	RevApp Submittals - Skyfold Partitions	15	15	17MAR10	06APR10	329	-40	09J
09J-514H	RevApp Submittals - Gym Divider Curtain	15	15	17MAR10	06APR10	329	-40	09J
09J-514G	RevApp Submittals - Blinds and Drapes	15	15	17MAR10	06APR10	329	-40	09J
09J-514	RevApp Submittals - Toilet Access	15	15	17MAR10	06APR10	336	-40	09J
09J-514I	RevApp Submittals - Appliances	15	15	17MAR10	06APR10	349	-40	09J
12B-514C	RevAppSD's+Sample Pkg12B Athletic Equipment	20	20	24MAR10	23APR10	142	-31	09J
09J-516	Fab/Del Materials - Operable Partitions Supports	20	20	07APR10	04MAY10	349	-40	09J
09J-516B	Fab/Del Materials - Skyfold Partitions Supports	20	20	07APR10	04MAY10	349	-40	09J
09J-516H	Fab/Del Materials - Appliances	20	20	07APR10	04MAY10	349	40	09J
09J-516	Fab/Del Materials - Toilet Access	20	20	07APR10	18MAY10	336	-40	09J
09J-516A	Fab/Del Materials - Operable Partitions	40	40	07APR10	02JUN10	329	-40	09J
09J-516C	Fab/Del Materials - Skyfold Partitions	40	40	07APR10	02JUN10	329	-40	09J
09J-516F	Fab/Del Materials - Gym Divider Curtain	40	40	07APR10	02JUN10	329	-40	09J
09J-516G	Fab/Del Materials - Blinds and Drapes	40	40	07APR10	02JUN10	329	-40	09J
10A-516A	Fab/Del Specialties - Lockers	60	60	07APR10	16JUN10	107	-35	09J
09J-516D	Fab/Del Specialties -White/Tack Boards + Acc	60	60	07APR10	16JUN10	142	-40	09J
09J-516E	Fab/Del Specialties - Toilet Partitions	60	60	07APR10	16JUN10	142	-40	09J
10A-516C	Fab/Del Specialties - Bleachers	60	60	07APR10	16JUN10	147	-35	09J
12B-516C	Fab/Del Materials Pkg 12B Athletic Equipment	60	60	21APR10	16JUL10	142	31	09J
10A-516	Mobilize-Specialties	0	0	15SEP10		80	-33	09J
12B-516	Mobilize-Pkg 12B Athletic Equipment	0	0	15SEP10		100	240	09J
5376C	Install Gym Equipment, Back Board, Score Board	5	5	15SEP10	21SEP10	100	-33	09J
4-5450	White Boards, Tack Boards + Accessories 4th Fl	5	5	20OCT10	26OCT10	65	-17	09J
5460C	Install Bleacher Seating - Gym	10	10	20OCT10	02NOV10	80	-33	09J
4-5440	Install Lockers - 4th Floor	15	15	20OCT10	09NOV10	20	17	09J
4544C	Toilet Partitions + Accessories - Locker Area	10	10	27OCT10	03NOV10	80	-33	09J
3-5450	White Boards, Tack Boards + Accessories 3rd Fl	5	5	10NOV10	16NOV10	45	-17	09J
4546C	Lockers - Locker Area	5	5	10NOV10	16NOV10	80	-33	09J
3-5440	Install Lockers - 3rd Floor	15	15	10NOV10	01DEC10	20	17	09J
4599C	Locker Area Complete	0	0		16NOV10	80	-33	09J
2-5450	White Boards, Tack Boards + Accessories 2nd Fl	5	5	02DEC10	08DEC10	35	-17	09J
2-5440	Install Lockers - 2nd Floor	15	15	02DEC10	20DEC10	20	-17	09J
1-5450	White Boards, Tack Boards + Accessories 1st Fl	5	5	23DEC10	30DEC10	25	-17	09J



Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Float	Calendar
1-5440	Install Lockers - Basement Locker Rm	10	10	23DEC10	07JAN11	20	17	09J
E-LOCKERS								
10A-COST	Cost Summary: Specialties 10A	55*	55*	20OCT10	07JAN11	20	-17	10A
E-SIGNAGE								
10B-500	100% CDs Issued for -Pkg 10B Signage	0	0		0*FEB10	126	-63	10B
10B-503	Prep Scope-Pkg 10B Signage	9	9	02FEB10*	12FEB10	126	-21	10B
10B-504	Bid Period - Signage	20	20	16FEB10	12MAR10	126	-21	10B
10B-506	Rec. Award - Signage	7	7	15MAR10	23MAR10	126	-21	10B
10B-508	Rev/App Award - Signage	3	3	24MAR10	25MAR10	126	-21	10B
10B-510	Award Contract - Signage	3	3	29MAR10	31MAR10	126	-21	10B
10B-512	Submit SD's Submittals - Signage	15	15	01APR10	21APR10	126	-21	10B
10B-514	Rev/App SD's Submittals - Signage	25	25	22APR10	26MAY10	126	-21	10B
10B-516A	Fab/Del Materials - Signage Bldg A/B	50	50	27MAY10	05JUL10	126	21	10B
10B-516C	Fab/Del Materials - Signage Bldg C	20	30	27MAY10	05JUL10	131	-21	10B
10B-518	Mobilize-Pkg 10B-Signage	0	0	20OCT10		55*	-17	10B
4-4550AB	Install Signage - Flr 4	5	5	20OCT10	26OCT10	55*	-17	10B
3-4550AB	Install Signage - Flr 3	5	5	10NOV10	16NOV10	45	17	10B
2-4550AB	Install Signage - Flr 2	5	5	03DEC10	09DEC10	35	-17	10B
1-4550AB	Install Signage - Flr 1	5	5	23DEC10	30DEC10	25	-17	10B
4550C	Install Signage - Bldg C	10	10	17JAN11	28JAN11	0	-17	10B
10B-COST	Cost Summary: Signage 10B	70*	70*	20OCT10	28JAN11	0	-17	10B
D-KITCHEN EQUIPMENT								
11A-516A	Fab/Del Materials-Kitchen Equip-Bldg A	60	60	15JAN10	06MAY10	89	-31	11A
11A-518	Mobilize-Pkg 11A Kitchen Equipment	0	0	07MAY10		99	-31	11A
4Y18K	Install Coolers/ Freezers - Kitchen/Caf	27	27	07MAY10	16JUN10	89	-31	11A
4700	Install Kitchen Equipment - Kitchen/Caf	20	20	09DEC10	07JAN11	18	-17	11A
11A-COST	Cost Summary: Kitchen Equipment 11A	20*	20*	09DEC10	07JAN11	18	-17	11A
D-LABORATORY EQUIPMENT								
11B-512A	Prep/Sub SD+Data- Lab Equip-Bldg A/B	15	15	15JAN10	04FEB10	35	-45	11B
11B-514A	Rev/App SDs Submittals-Lab Equip-Bldg A/B	20	20	05FEB10	04MAR10	35	45	11B
11B-516A	Fab/Del Materials - Lab Equip Bldg A/B	45	45	05MAR10	06MAY10	145	-45	11B
11B-518	Mobilize-Pkg 11B Lab Equipment	0	0	10NOV10		15	-17	11B
4720	Install Lab Equipment	20	20	10NOV10	06DEC10	15	-17	11B
11B-COST	Cost Summary: Lab Equipment 11B	20*	20*	10NOV10	06DEC10	15	-17	11B
Stage Equipment / Rigging								
11C-500	100% CD's Issued for -Pkg 11C Stage Equip / Rigg	0	0		01FEB10	10	-63	11C
11C-502	Prep Scope-Pkg 11C Stage Equipment / Rigging	5	5	30NOV09A	29JAN10	10	0	11C

Start Date 26APR05
Finish Date 16FEB11
Data Date 16JAN10
Run Date 22JAN10 14:25

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Early Bar
Progress Bar
Critical Activity

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (WH8)

BID PACKAGE - CURRENT WORK

Gilbane

11C-504	Bid Period - 11C Stage Equip / Rigging	17	17	02FEB10	24FEB10	10	-44	11C
11C-505	Rec. Award - 11C Stage Equip / Rigging	7	7	25FEB10	05MAR10	10	-44	11C
11C-506	RevApp Award - 11C Stage Equip / Rigging	3	3	08MAR10	10MAR10	10	-44	11C
11C-510	Award Contract - 11C Stage Equip / Rigging	3	3	11MAR10	15MAR10	10	44	11C
11C-512	Submit SD's Submittals - Stage Equipm / Rigging	15	15	16MAR10	05APR10	10	-44	11C
11C-514	RevApp SD's Submittals - Stage Equip / Rigging	25	25	06APR10	10MAY10	10	-44	11C
11C-516	Fab/Del Materials - Stage Equip / Rigging	30	30	11MAY10	22JUN10	10	-44	11C
11C-518	Mobilize-Pkg 11C Stage Equip / Rigging	0	0	02JUL10		3	261	11C
Theatre Lighting								
11D-500	100% CD's Issued for -Pkg 11D Theatre Lighting	0	0		01FEB10	7	63	11D
11D-502	Prev Scope Pkg 11d Theatre Lighting	5	1	30NOV09A	15JAN10	3	-33	11D
11D-504	Bid Period - 11D Theatre Lighting	15	15	18JAN10	05FEB10	3	-31	11D
11D-506	Rec. Award - 11D Theatre Lighting	7	7	08FEB10	16FEB10	3	-31	11D
11D-508	RevApp Award - 11D Theatre Lighting	3	3	17FEB10	19FEB10	3	21	11D
11D-510	Award Contract - 11D Theatre Lighting	3	3	22FEB10	24FEB10	3	-31	11D
11D-512	Submit SD's Submittals - Theatre Lighting	15	15	25FEB10	17MAR10	3	-31	11D
11D-514	RevApp SD's Submittals - Theatre Lighting	25	25	18MAR10	21APR10	3	-31	11D
11D-516	Fab/Del Materials - Theatre Lighting	60	60	22APR10	04JUL10	3	21	11D
11D-518	Mobilize-Pkg 11D Theatre Lighting	0	0	02JUL10		3	261	11D
E-THEATRE SEATING								
12A-500	100% CD's Issued for -Pkg 12A Theater Seating	0	0		01FEB10	105	-63	12A
12A-502	Re Writs - Scope Pkg 12A Theater Seating	5	5	02FEB10	08FEB10	105	0	12A
12A-504	Bid Period -Pkg 12A Theater Seating	15	15	09FEB10	01MAR10	105	-47	12A
12A-506	Rec. Award-Pkg 12A Theater Seating	7	7	02MAR10	10MAR10	105	-47	12A
12A-508	RevApp Award-Pkg 12A Theater Seating	3	3	11MAR10	15MAR10	105	-47	12A
12A-510	Award Contract-Pkg 12A Theater Seating	3	3	16MAR10	18MAR10	105	47	12A
12A-512C	Submit SD's+Sample Pkg12A Theater Seating Bldg C	20	20	19MAR10	15APR10	105	-47	12A
12A-514C	RevApp SD's+Sample Pkg12A Theater Seating Bldg C	20	20	16APR10	13MAY10	105	-47	12A
12A-516C	Fab/Del Materials Pkg 12A Theater Seating Bldg C	60	60	14MAY10	06AUG10	105	-47	12A
12A-518	Mobilize-Pkg 12A Theater Seating	0	0	05JAN11		3	19	12A
445C	Seating - Auditorium	15	15	05JAN11	25JAN11	3	-19	12A
12A-COST	Cost Summary: Theater Seating 12A	15*	15*	05JAN11	25JAN11	3	-19	12A
D-ELEVATORS (FSE)								
1772C	RevApp SD Elevator C	20	8	08NOV09A	22JAN10	79	-30	14A
14A-513A	Prep/Re-Sub SD+Data 14A-Elev. A	20	5	01DEC09A	21JAN10	130	0	14A
1771A	RevApp SD Elevator A	20	20	22JAN10	18FEB10	130	49	14A
14A-516	Fab/Delv.-Elevator A	60	60	22JUN10	31AUG10*	44	0	14A
1750C	Fab/Delv.-Elevator C	60	60	22JUN10	31AUG10*	44	0	14A

Start Date 30APR09
Finish Date 15SEP11
Data Date 15JAN10
Run Date 22JAN10 14:28

Early Bar
Progress Bar
Critical Activity

Sheet 15 of 21

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (WI16)

BID PACKAGE - CURRENT WORK

Gilbane

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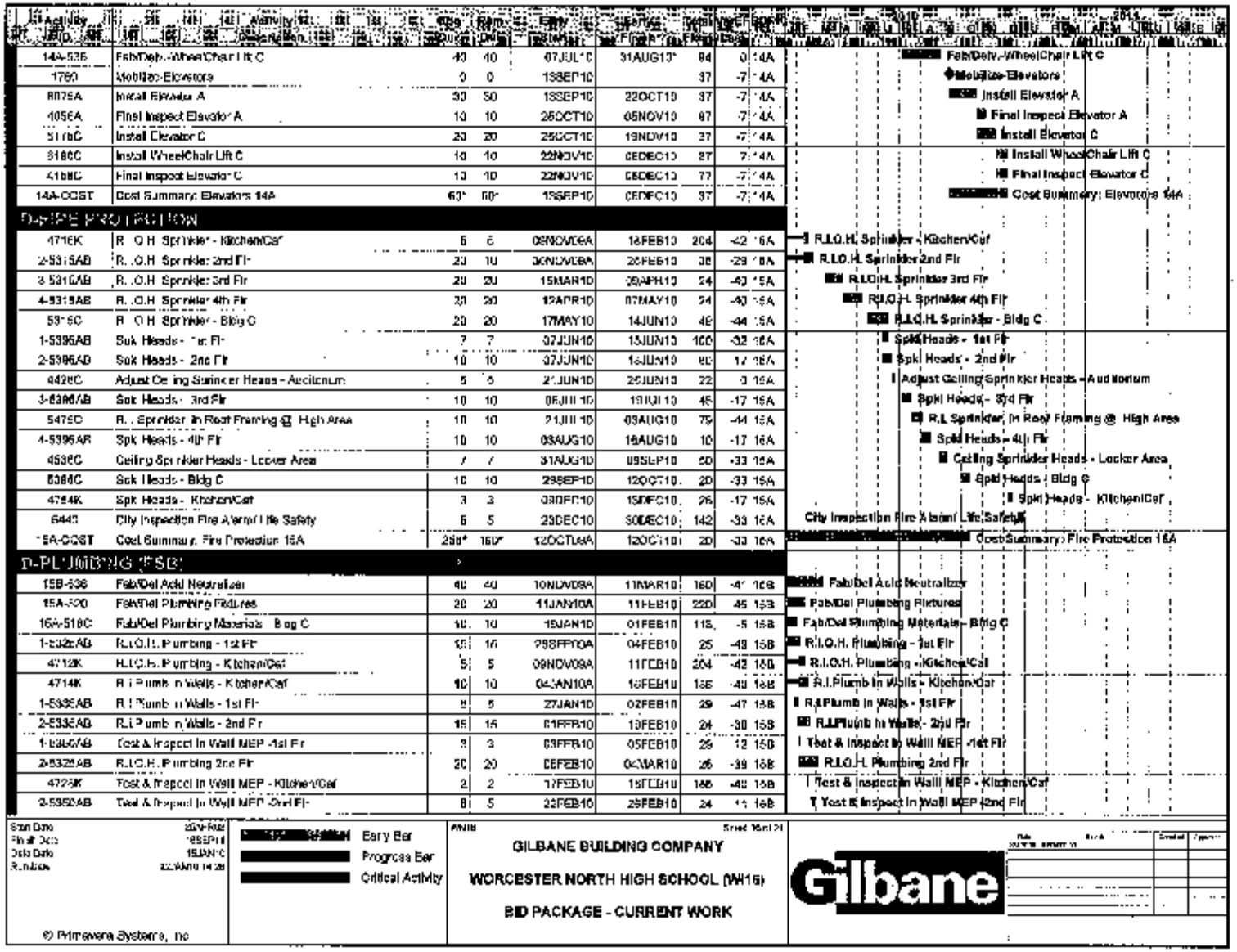
Activity ID
Activity Description
Orig Dur
Rem Dur
Early Start
Early Finish
Total Float
Activity Code
14A-535 Fab/Delv.-Wheelchair Lift C 40 10 07JUL10 31AUG10* 84 0 14A
1760 Mobilize-Elevators 0 0 13SEP10 37 -7 14A
8075A Install Elevator A 30 30 13SEP10 22OCT10 37 -7 14A
1056A Final Inspect Elevator A 10 10 25OCT10 05NOV10 37 -7 14A
5170C Install Elevator C 20 20 25OCT10 19NOV10 37 -7 14A
5180C Install Wheelchair Lift C 10 10 22NOV10 06DEC10 37 -7 14A
4188C Final Inspect Elevator C 10 10 22NOV10 06DEC10 77 -7 14A
14A-COST Cost Summary: Elevators 14A 60* 60* 13SEP10 06DEC10 37 -7 14A
D-SPRINKLER PROTECTION
4716K R.O.H. Sprinkler - Kitchen/Caf 5 5 09NOV09A 18FEB10 204 -42 16A
2-5315AB R..O.H. Sprinkler 2nd Flr 20 10 30NOV09A 26FEB10 38 -29 16A
3-5316AB R..O.H. Sprinkler 3rd Flr 20 20 15MAR10 09APR10 54 -40 16A
4-5315AB R..O.H. Sprinkler 4th Flr 30 20 12APR10 07MAY10 54 -40 16A
5315C R..O.H. Sprinkler - Bldg C 20 20 17MAY10 14JUN10 49 -44 16A
1-5395AB Spk Heads - 1st Flr 7 7 07JUN10 15JUN10 100 -32 16A
2-5396AB Spk Heads - 2nd Flr 10 10 07JUN10 18JUN10 90 -17 16A
4428C Adjust Ceiling Sprinkler Heads - Auditorium 5 5 21JUN10 25JUN10 22 -3 16A
3-5396AB Spk Heads - 3rd Flr 10 10 05JUL10 19JUL10 45 -17 16A
5475C R..Sprinkler in Roof Framing @ High Area 10 10 21JUL10 03AUG10 79 -44 16A
4-5395AB Spk Heads - 4th Flr 10 10 03AUG10 16AUG10 10 -17 16A
4536C Ceiling Sprinkler Heads - Locker Area 7 7 31AUG10 09SEP10 50 -33 16A
5386C Spk Heads - Bldg C 10 10 23SEP10 12OCT10. 20 -33 16A
4754K Spk Heads - Kitchen/Caf 3 3 03DEC10 15DEC10 26 -17 16A
6440 City Inspection Fire Alarm/ Life Safety 5 5 23DEC10 30DEC10 142 -33 16A
15A-COST Cost Summary: Fire Protection 15A 250* 160* 12OCT10A 12OCT10A 20 -33 16A
D-PLUMBING (ESB)
15B-536 Fab/Del Acid Neutralizer 40 40 10NOV09A 11MAR10 160 -47 16B
15A-500 Fab/Del Plumbing Fixtures 20 20 11JAN10A 11FEB10 220 -45 15B
16A-516C Fab/Del Plumbing Materials - Bldg C 10 10 15JAN10 01FEB10 115 -5 15B
1-5326AB R.I.O.H. Plumbing - 1st Flr 15 15 29SEP09A 04FEB10 25 -48 15B
4712K R.I.O.H. Plumbing - Kitchen/Caf 5 5 09NOV09A 11FEB10 204 -42 16B
4714K R.I.Plumb in Walls - Kitchen/Caf 10 10 04JAN10A 16FEB10 166 -40 16B
1-5335AB R.I Plumb in Walls - 1st Flr 5 5 27JAN10 02FEB10 29 -47 15B
2-5334AB R.I Plumb in Walls - 2nd Flr 15 15 01FEB10 19FEB10 24 -30 15B
1-5360AB Test & Inspect in Wall MEP -1st Flr 3 3 03FEB10 05FEB10 29 -12 15B
2-5325AB R.I.O.H. Plumbing 2nd Flr 20 20 08FEB10 04MAR10 26 -39 15B
4725K Test & Inspect in Wall MEP - Kitchen/Caf 2 2 17FEB10 18FEB10 166 -40 15B
2-5350AB Test & Inspect in Wall MEP -2nd Flr 8 5 22FEB10 25FEB10 24 -11 15B
2010
2011
Fab/Delv.-Wheelchair Lift C
Mobilize-Elevators
Install Elevator A
Final Inspect Elevator A
Install Elevator C
Install Wheelchair Lift C
Final Inspect Elevator C
Cost Summary: Elevators 14A
R.I.O.H. Sprinkler - Kitchen/Caf
R.I.O.H. Sprinkler 2nd Flr
R.I.O.H. Sprinkler 3rd Flr
R.I.O.H. Sprinkler 4th Flr
R.I.O.H. Sprinkler - Bldg C
Spk Heads - 1st Flr
Spk Heads - 2nd Flr
Adjust Ceiling Sprinkler Heads - Auditorium
Spk Heads - 3rd Flr
R.I. Sprinkler in Roof Framing @ High Area
Spk Heads - 4th Flr
Ceiling Sprinkler Heads - Locker Area
Spk Heads - Bldg C
Spk Heads - Kitchen/Caf
City Inspection Fire Alarm/ Life Safety
Cost Summary: Fire Protection 15A
Fab/Del Acid Neutralizer
Fab/Del Plumbing Fixtures
Fab/Del Plumbing Materials - Bldg C
R.I.O.H. Plumbing - 1st Flr
R.I.O.H. Plumbing - Kitchen/Caf
R.I.Plumb in Walls - Kitchen/Caf
R.I Plumb in Walls - 1st Flr
R.I Plumb in Walls - 2nd Flr
Test & Inspect in Wall MEP -1st Flr
R.I.O.H. Plumbing 2nd Flr
Test & Inspect in Wall MEP - Kitchen/Caf
Test & Inspect in Wall MEP -2nd Flr
Start Date 25JAN10
Finish Date 16SEP11
Data Date 15JAN10
Run Date 22JAN10 14:28
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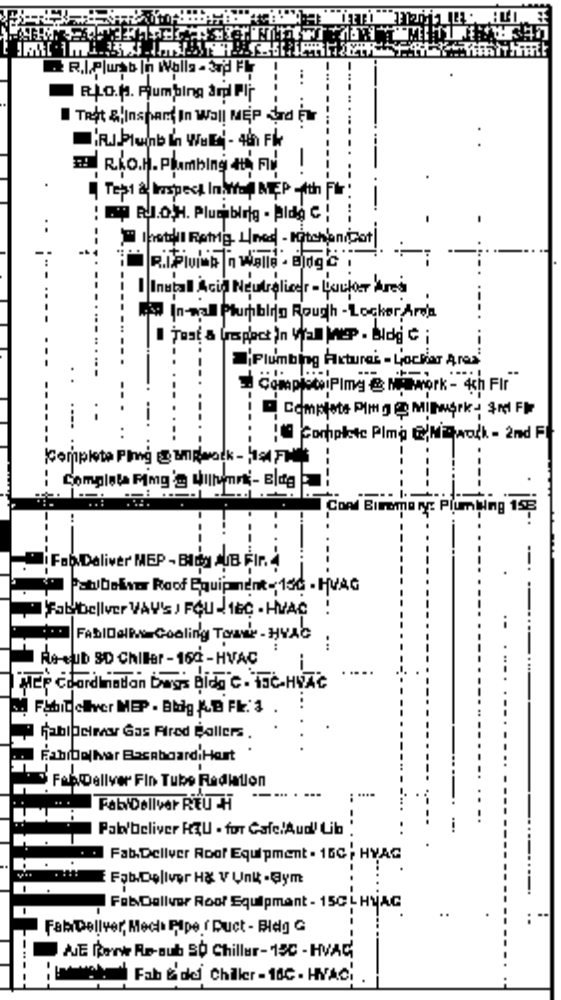
Early Bar
Progress Bar
Critical Activity
WN18
GILBANE BUILDING COMPANY
WORCESTER NORTH HIGH SCHOOL (WN16)
BID PACKAGE - CURRENT WORK
Gilbane

ID								
3-5336AB	R...Plumb n Walls - 3rd Fl	15	15	25FEB10	18MAR10	25	-29	15B
3-5339AB	R...O.H. Plumbing 3rd Flr	20	20	05MAR10	31APR10	25	-39	15B
3-5360AB	Test & Inspect In Wall MEP - 3rd Fl	5	5	19MAR10	25MAR10	25	-29	15B
4-5336AB	R...Plumb n Walls - 4th Flr	15	15	02APR10	22APR10	20	-34	15B
4-5339AB	R...O.H. Plumbing 4th Flr	20	20	08APR10	29APR10	25	-33	15B
4-5360AB	Test & Inspect In Wall MEP -4th Flr	5	5	23APR10	29APR10	20	34	15B
5328C	R...O.H. Plumbing - Bldg C	20	20	10MAY10	07JUN10	49	-44	15B
4712K	Install Refrig. Lines - Kitchen/Caf	10	10	02JUN10	15JUN10	69	-31	15B
5330C	R...Plumb n Walls - Bldg C	15	15	07JUN10	25JUN10	10	-33	15B
4812C	Install Acid Neutralizer - Locker Area	5	5	21JUN10	25JUN10	90	33	15B
4820C	In-wall Plumbing Rough - Locker Area	20	20	21JUN10	19JUL10	60	-33	15B
5350C	Test & Inspect In Wall MEP - Bldg C	5	5	15JUL10	19JUL10	10	-33	15B
4812C	Plumbing Fixtures - Locker Area	10	10	19OCT10	26OCT10	50	-33	15B
4-5418AB	Complete Plmg @ Millwork - 4th Flr	10	10	20OCT10	02NOV10	20	-17	15B
3-5418AB	Complete Plmg @ Millwork - 3rd Flr	10	10	17NOV10	01DEC10	10	-17	15B
2-5418AB	Complete Plmg @ Millwork - 2nd Flr	10	10	03DEC10	22DEC10	5	-17	15B
1-5418AB	Complete Plmg @ Millwork - 1st Flr	10	10	23DEC10	07JAN11	5	-17	15B
5418C	Complete Plmg @ Millwork - Bldg C	10	10	10JAN11	21JAN11	5	-17	15B
15B-COST	Cost Summary: Plumbing 15B	336*	260*	28SEP09A	21JAN11	5	-17	15B
D-HVAC (F505)								
15C-546	Fab/Deliver MEP - Bldg A/B Flr 4	16	16	02OCT09A	25FEB10	20	-36	15C
15C-546	Fab/Deliver Roof Equipment - 15C - HVAC	60	48	12OCT09A	19MAR10	30	-53	15C
15C-576	Fab/Deliver VAV's / FCU - 15C - HVAC	17	26	15DEC09A	19FEB10	34	0	15C
15C-578	Fab/DeliverCooling Tower - HVAC	50	50	15DEC09A	25MAR10	377	0	15C
15C-622	Re-sub SD Chiller - 15C - HVAC	20	20	04JAN10A	11FEB10	327	0	15C
15C-10-01	MEP Coordination Dwgs Bldg C - 15C-HVAC	40	2	15JAN10	18JAN10	53	15	15C
15C-560	Fab/Deliver MEP - Bldg A/B Flr 3	16	16	15JAN10	04FEB10	30	45	15C
15C-564	Fab/Deliver Gas Fired Boilers	20	20	15JAN10	11FEB10	407	0	15C
15C-566	Fab/Deliver Baseboard Heat	20	20	15JAN10	11FEB10	407	0	15C
15C-568	Fab/Deliver Fin Tube Radiation	30	30	15JAN10	25FEB10	397	0	15C
15C-550	Fab/Deliver RTU 4I	70	70	15JAN10	22APR10	357	0	15C
15C-552	Fab/Deliver RTU - for Cafe/Aud/ Lib	70	70	15JAN10	22APR10	357	0	15C
15C-526	Fab/Deliver Roof Equipment - 15C - HVAC	80	80	15JAN10	06MAY10	5	-31	15C
15C-550	Fab/Deliver HS V Unit -Gym	60	60	15JAN10	06MAY10	347	0	15C
15C-526	Fab/Deliver Roof Equipment - 15C - HVAC	80	80	15JAN10	06MAY10	347	0	15C
15C-289	Fab/Deliver Mech Pipe / Duct - Bldg C	20	20	19JAN10	16FEB10	83	-6	15C
15C-623	A/E Revs Re-sub SD Chiller - 15C - HVAC	20	20	12FEB10	11MAR10	327	0	15C
15C-625	Fab & del Chiller - 15C - HVAC	60	60	12MAR10	04JUN10	327	0	15C



Early Bar
Progress Bar
Critical Activity

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (WI16)

BID PACKAGE - CURRENT WORK

Gilbane

Activity ID	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Budget Cost
2-9320AB	R.I.O.H. Mechanical Piping - 2nd Flr	20	6	14DEC09A	21JAN10	45	-16 15C
2-9305AB	R.I.O.H. HVAC - 3rd Flr	20	6	29DEC09A	11FEB10	25	-24 15C
4704K	R.I.O.H. Mechanical Piping - Kitchen/Caf	5	5	15JAN10	21JAN10	214	-32 15C
3-9320AB	R.I.O.H. Mechanical Piping - 3rd Flr	20	16	05FEB10	26FEB10	95	-25 15C
4602C	R.I.O.H. Mechanical - Locker Area	15	15	16FEB10	08MAR10	63	-5 15C
1-9305AB	Install VAV's / FCU's / CUH - 1st Flr	6	6	22FEB10	26FEB10	24	-70 15C
4740K	Set RTU-1 - Kitchen/Caf	2	2	26FEB10	01MAR10	207	-42 15C
4-9305AB	R.I.O.H. HVAC - 4th Flr	20	20	26FEB10	25MAR10	20	-94 15C
4720K	Install VAV's / FCU's / CUH - Kitchen/Caf	5	5	01MAR10	05MAR10	27	-70 15C
1-9306AB	Duct Tie In To VAV's - 1st Flr	6	6	01MAR10	10MAR10	24	-70 15C
1-9307AB	Piping Tie In To VAV's - 1st Flr	9	9	01MAR10	11MAR10	18	-70 15C
2-9306AB	Install VAV's / FCU's / CUH - 2nd Flr	10	10	01MAR10	12MAR10	24	-50 15C
4724K	Duct Tie In To VAV's - Kitchen/Caf	2	2	11MAR10	12MAR10	24	-70 15C
4-9320AB	R.I.O.H. Mechanical Piping - 4th Flr	20	20	12MAR10	09APR10	20	-94 15C
4722K	Piping Tie In To VAV's - Kitchen/Caf	1	1	15MAR10	15MAR10	197	-70 15C
2-9306AB	Duct Tie In To VAV's - 2nd Flr	10	10	15MAR10	26MAR10	24	-50 15C
3-9306AB	Install VAV's / FCU's / CUH - 3rd Flr	10	10	15MAR10	26MAR10	24	-46 15C
2-9307AB	Piping Tie In To VAV's - 2nd Flr	10	10	15MAR10	29MAR10	44	-50 15C
3-9307AB	Piping Tie In To VAV's - 3rd Flr	10	10	29MAR10	09APR10	24	-46 15C
3-9308AB	Duct Tie In To VAV's - 3rd Flr	10	10	29MAR10	09APR10	24	-46 15C
1-9415AB	Firestop Duct Penetrations - 1st Flr	3	3	02APR10	06APR10	124	-17 15C
4-9306AB	Install VAV's / FCU's / CUH - 4th Flr	10	10	09APR10	22APR10	20	-33 15C
4402C	R.I. Mechanical - Auditorium	30	30	09APR10	20MAY10	22	3 15C
9305C	R.I.O.H. HVAC - Bldg C	20	20	12APR10	07MAY10	24	-44 15C
4-9307AB	Piping Tie In To VAV's - 4th Flr	10	10	23APR10	06MAY10	25	-38 15C
4-9308AB	Duct Tie In To VAV's - 4th Flr	10	10	23APR10	06MAY10	25	-38 15C
9307C	R.I.O.H. Mechanical Piping - Bldg C	20	20	26APR10	21MAY10	49	-44 15C
4734K	Firestopping - Kitchen/Caf	2	2	30APR10	03MAY10	158	-17 15C
2-9415AB	Firestop Duct Penetrations - 2nd Flr	5	5	30APR10	06MAY10	80	-17 15C
4301AB	Set Mechanical Roof Equipment - Classroom Bldg	10	10	07MAY10	20MAY10	6	31 15C
4301C	Set Mechanical Equipment Gym	13	13	07MAY10	25MAY10	162	-31 15C
9306C	Install VAV's / FCU's / CUH - 1st Flr Bldg C	10	10	17MAY10	28MAY10	99	-44 15C
3-9415AB	Firestop Duct Penetrations - 3rd Flr	5	5	28MAY10	04JUN10	45	-17 15C
9307C	Piping Tie In To VAV's - Bldg C	10	10	01JUN10	14JUN10	59	-44 15C
9308C	Duct Tie In To VAV's - Bldg C	10	10	01JUN10	14JUN10	59	-44 15C
1-6400AB	Install RGD - 1st Flr	8	8	07JUN10	16JUN10	99	-32 15C
2-6400AB	Install RGD - 2nd Flr	15	15	07JUN10	25JUN10	76	-17 15C
4-9415AB	Firestop Duct Penetrations - 4th Flr	5	5	25JUN10	02JUL10	10	-17 15C

Start Date 01APR10
Finish Date 16SEP11
Data Date 16JAN10
Run Date 22JAN10 14:28

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Early Bar
Progress Bar
Critical Activity

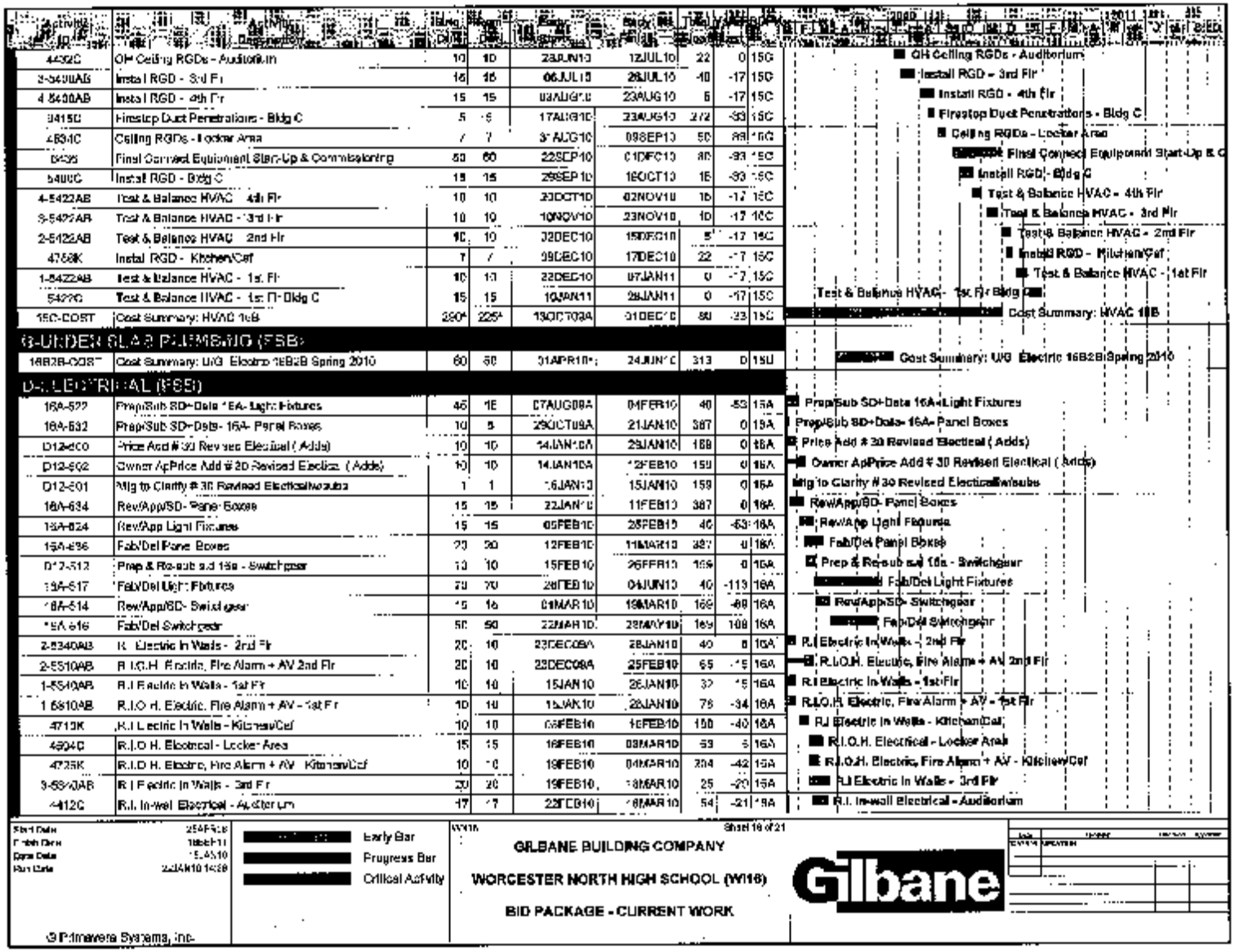
WWC Sheet 10 of 10

GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (W18)

BID PACKAGE - CURRENT WORK

Gilbane



4432C	OH Ceiling RGDs - Auditorium	10	10	23JUN10	12JUL10	22	0	15C
3-5430AB	Install RGD - 3rd Flr	15	15	06JUL10	26JUL10	40	-17	15C
4-5430AB	Install RGD - 4th Flr	15	15	03AUG10	23AUG10	5	-17	15C
3415C	Firestop Duct Penetrations - Bldg C	5	5	17AUG10	23AUG10	272	-93	15C
4531C	Ceiling RGDs - Locker Area	7	7	31AUG10	09SEP10	50	-93	15C
5435	Final Connect Equipment Start-Up & Commissioning	60	60	22SEP10	01DEC10	80	-93	15C
5400C	Install RGD - Bldg C	15	15	29SEP10	19OCT10	15	-93	15C
4-5422AB	Test & Balance HVAC - 4th Flr	10	10	20OCT10	02NOV10	15	-17	15C
3-5422AB	Test & Balance HVAC - 3rd Flr	10	10	10NOV10	23NOV10	10	-17	15C
2-5422AB	Test & Balance HVAC - 2nd Flr	10	10	02DEC10	15DEC10	5	-17	15C
4756K	Install RGD - Kitchen/Caf	7	7	09DEC10	17DEC10	22	-7	15C
1-5422AB	Test & Balance HVAC - 1st Flr	10	10	22DEC10	07JAN11	0	-7	15C
5422C	Test & Balance HVAC - 1st Flr Bldg C	15	15	10JAN11	28JAN11	0	-17	15C
15C-COST	Cost Summary: HVAC 16B	290*	225*	13OCT09A	31DEC10	60	-23	15C
G-UNDERSLAB PLUMBING (FSB)								
16B2B-COST	Cost Summary: U/G Electric 16B2B Spring 2010	60	60	01APR10*	24JUN10	313	0	15U
D-ELECTRICAL (FSB)								
16A-522	Prep/Sub SD+Data 16A-Light Fixtures	45	15	07AUG09A	09FEB10	40	-53	16A
16A-532	Prep/Sub SD+Data- 16A- Panel Boxes	10	5	29OCT09A	21JAN10	387	0	16A
D12-600	Price Add # 30 Revised Electical (Adds)	10	10	14JAN10A	28JAN10	168	0	16A
D12-602	Owner ApPrice Add # 30 Revised Electical (Adds)	10	10	14JAN10A	12FEB10	159	0	16A
D12-601	Mig to Clarify # 30 Revised ElectricalSwisubs	1	1	15JAN10	15JAN10	159	0	16A
16A-634	Rev/App/SD- Panel Boxes	15	15	22JAN10	11FEB10	387	0	16A
16A-624	Rev/App Light Fixtures	15	15	05FEB10	25FEB10	40	-53	16A
16A-636	Fab/Del Panel Boxes	20	20	12FEB10	11MAR10	387	0	16A
D12-512	Prep & Re-sub s.d 15a - Switchgear	10	10	15FEB10	26FEB10	159	0	15A
15A-617	Fab/Del Light Fixtures	70	70	26FEB10	04JUN10	40	-113	16A
15A-614	Rev/App/SD- Switchgear	15	15	01MAR10	19MAR10	169	-88	16A
15A-616	Fab/Del Switchgear	50	50	22MAR10	28MAY10	169	108	16A
2-5340AB	R.I Electric In Walls - 2nd Flr	20	10	23DEC09A	25JAN10	40	0	16A
2-5510AB	R.I.O.H. Electric, Fire Alarm + AV 2nd Flr	20	10	23DEC09A	25FEB10	65	-15	16A
1-5340AB	R.I Electric In Walls - 1st Flr	10	10	15JAN10	28JAN10	32	-15	16A
1-5510AB	R.I.O.H. Electric, Fire Alarm + AV - 1st Flr	10	10	15JAN10	28JAN10	76	-34	16A
4713K	R.I Electric In Walls - Kitchen/Caf	10	10	05FEB10	16FEB10	150	-40	16A
4504C	R.I.O.H. Electrical - Locker Area	15	15	16FEB10	09MAR10	59	-5	16A
4725K	R.I.O.H. Electric, Fire Alarm + AV - Kitchen/Caf	10	10	19FEB10	04MAR10	204	-42	16A
3-5340AB	R.I Electric In Walls - 3rd Flr	20	20	19FEB10	18MAR10	25	-20	16A
4412C	R.I. In-wall Electrical - Auditorium	17	17	22FEB10	16MAR10	54	-21	16A

Start Date 25APR08
Finish Date 18MAY11
Data Date 15JAN10
Run Date 22JAN10 14:09

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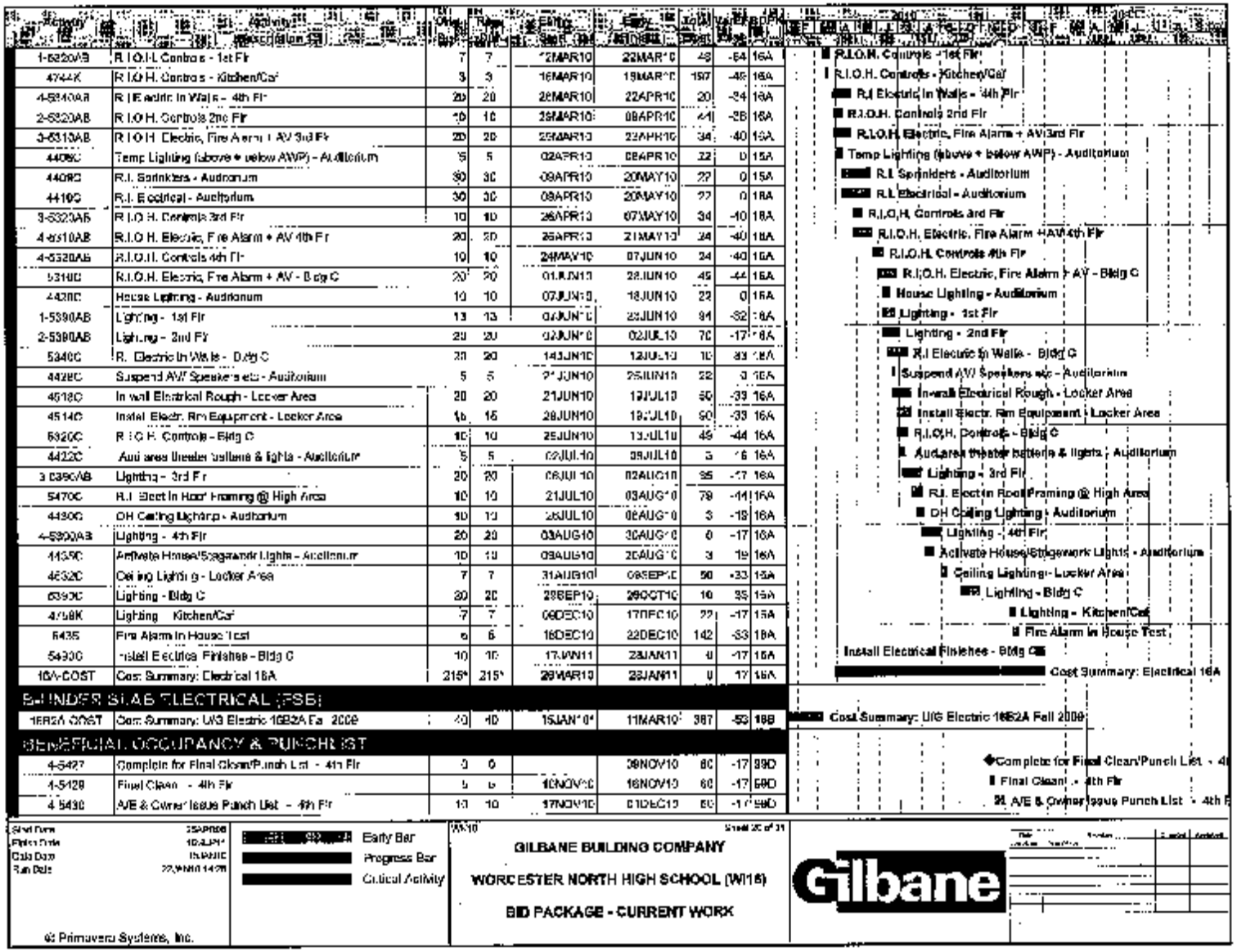

Activity	Activity Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Variance BL0 Finish	Activity Code
1-5220AB	R.I.O.H. Controls - 1st Flr	7	7	12MAR10	22MAR10	48	-64	16A
4744K	R.I.O.H. Controls - Kitchen/Caf	3	3	16MAR10	18MAR10	197	-48	16A
4-5240AB	R.I.Electric In Walls - 4th Flr	20	20	26MAR10	22APR10	20	-24	16A
2-5320AB	R.I.O.H. Controls 2nd Flr	10	10	25MAR10	08APR10	44	-28	16A
3-5310AB	R.I.O.H. Electric, Fire Alarm + AV 3rd Flr	20	20	25MAR10	22APR10	34	-40	16A
4408C	Temp Lighting (above + below AWP) - Auditorium	5	5	02APR10	08APR10	22	0	16A
4409C	R.I. Sprinklers - Auditorium	30	30	09APR10	20MAY10	22	0	16A
4410C	R.I. Electrical - Auditorium	30	30	09APR10	20MAY10	22	0	16A
3-5320AB	R.I.O.H. Controls 3rd Flr	10	10	26APR10	07MAY10	34	-40	16A
4-5310AB	R.I.O.H. Electric, Fire Alarm + AV 4th Flr	20	20	26APR10	21MAY10	24	-40	16A
4-5320AB	R.I.O.H. Controls 4th Flr	10	10	24MAY10	07JUN10	24	-40	16A
5310C	R.I.O.H. Electric, Fire Alarm + AV - Bldg C	20	20	01JUN10	28JUN10	45	-44	16A
4428C	House Lighting - Auditorium	10	10	07JUN10	18JUN10	22	0	16A
1-5390AB	Lighting - 1st Flr	13	13	07JUN10	23JUN10	94	-52	16A
2-5390AB	Lighting - 2nd Flr	20	20	02JUN10	02JUL10	70	-17	16A
5340C	R. Electric In Walls - Bldg C	30	30	14JUN10	12JUL10	10	-33	16A
4429C	Suspend AV Speakers etc - Auditorium	5	5	21JUN10	25JUN10	22	0	16A
4518C	In wall Electrical Rough - Locker Area	20	20	21JUN10	19JUL10	50	-33	16A
4514C	Install Electr. Rm Equipment - Locker Area	15	15	28JUN10	19JUL10	50	-33	16A
5320C	R.I.O.H. Controls - Bldg C	10	10	25JUN10	13JUL10	45	-44	16A
4422C	Aud area theater batterie & lights - Auditorium	5	5	02JUL10	08JUL10	3	-16	16A
3-5390AB	Lighting - 3rd Flr	20	20	06JUL10	02AUG10	95	-17	16A
5470C	R.I. Elect In Roof Framing @ High Area	10	10	21JUL10	03AUG10	79	-11	16A
4430C	DH Ceiling Lighting - Auditorium	10	10	26JUL10	06AUG10	3	-16	16A
4-5390AB	Lighting - 4th Flr	20	20	03AUG10	30AUG10	0	-17	16A
4429C	Activate House/Stagework Lights - Auditorium	10	10	09AUG10	20AUG10	3	-16	16A
4532C	Ceiling Lighting - Locker Area	7	7	31AUG10	08SEP10	50	-33	16A
5390C	Lighting - Bldg C	20	20	23SEP10	29OCT10	10	-33	16A
4758K	Lighting - Kitchen/Caf	7	7	09DEC10	17DEC10	22	-17	16A
5435	Fire Alarm In House Test	5	5	16DEC10	22DEC10	142	-33	16A
5430C	Install Electrical Finishes - Bldg C	10	10	17JAN11	28JAN11	0	-17	16A
16A-COST	Cost Summary: Electrical 16A	215*	215*	28MAR10	28JAN11	0	17	16A
SUNDER SLAB ELECTRICAL (FSB)								
16B2A COST	Cost Summary: U/G Electric 16B2A Fa 2009	40	40	15JAN10*	11MAR10*	387	-53	16B
SUBSTANTIAL OCCUPANCY & PUNCH LIST								
4-5427	Complete for Final Clean/Punch List - 4th Flr	0	0		29NOV10	60	-17	99D
1-5428	Final Clean - 4th Flr	5	5	16NOV10	16NOV10	60	-17	99D
4-5430	A/E & Owner Issue Punch List - 4th Flr	10	10	17NOV10	01DEC10	60	-17	99D

Early Bar
Progress Bar
Critical Activity

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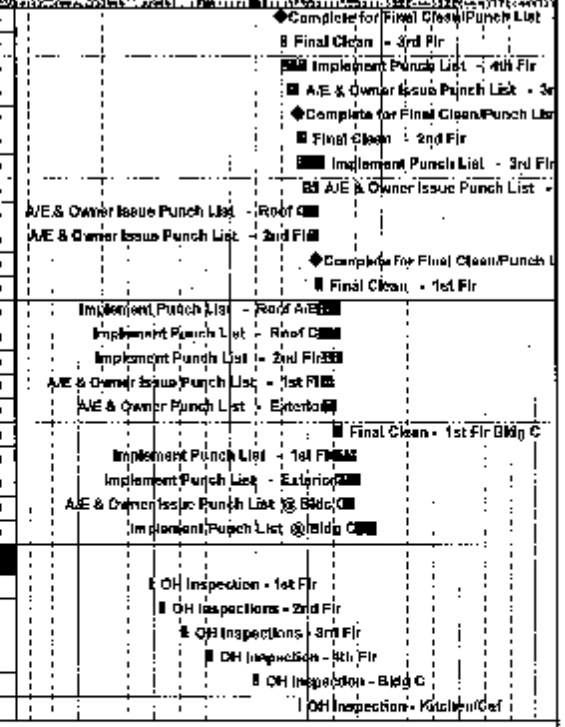
GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (WI16)

BID PACKAGE - CURRENT WORK

Gilbane

Activity ID	Activity Name	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	Float Less	Calendar
3-5427	Complete for Final Clean/Punch List - 3rd Fl	0	0		01DEC10	45	-17	99D
3-5429	Final Clean - 3rd Flr	5	5	02DEC10	08DEC10	45	-17	99D
4-5436	Implement Punch List - 4th Fl	20	20	02DEC10	30DEC10	60	-17	99D
3-5430	A/E & Owner Issue Punch List - 3rd Flr	10	10	09DEC10	22DEC10	45	-17	99D
2-5427	Complete for Final Clean/Punch List - 2nd Flr	0	0		22DEC10	30	-17	66D
2-5429	Final Clean - 2nd Flr	5	5	23DEC10	30DEC10	20	-17	99D
3-5436	Implement Punch List - 3rd Flr	20	20	23DEC10	21JAN11	45	-17	99D
R-5430AB	A/E & Owner Issue Punch List - Roof A/B	10	10	30DEC10	13JAN11	31	-22	99D
R-5430C	A/E & Owner Issue Punch List - Roof C	10	10	30DEC10	13JAN11	31	-22	99D
2-5430	A/E & Owner Issue Punch List - 2nd Flr	10	10	03JAN11	14JAN11	30	-17	66D
1-5427	Complete for Final Clean/Punch List - 1st Fl	0	0		11JAN11	18	-17	66D
1-5429	Final Clean - 1st Flr	5	5	12JAN11	18JAN11	18	-17	99D
R-5436AB	Implement Punch List - Roof A/B	20	20	14JAN11	10FEB11	51	-22	99D
R-5436C	Implement Punch List - Roof C	20	20	14JAN11	10FEB11	51	-22	99D
2-5436	Implement Punch List - 2nd Flr	20	20	17JAN11	11FEB11	30	-17	66D
1-5430	A/E & Owner Issue Punch List - 1st Flr	10	10	19JAN11	01FEB11	18	-17	66D
5440AB	A/E & Owner Punch List - Exterior	10	10	21JAN11	03FEB11	16	-22	99D
5424C	Final Clean - 1st Fl Bldg C	10	10	31JAN11	11FEB11	0	-17	99D
1-5436	Implement Punch List - 1st Flr	20	20	02FEB11	01MAR11	18	-17	99D
5448AB	Implement Punch List - Exterior	20	20	04FEB11	03MAR11	16	-22	99D
G-5430	A/E & Owner Issue Punch List @ Bldg C	10	10	14FEB11	25FEB11	0	-17	99D
G-5436	Implement Punch List @ Bldg C	20	20	28FEB11	25MAR11	0	-17	99D
INSPECTION								
1-6000AB	OH Inspection - 1st Flr	3	3	24JUN10	28JUN10	94	-32	INS
2-6000AB	OH Inspections - 2nd Flr	5	5	06JUL10	12JUL10	70	-17	INS
3-6000AB	OH Inspections - 3rd Flr	6	6	03AUG10	09AUG10	35	-17	INS
4-6000AB	OH Inspection - 4th Flr	6	6	31AUG10	07SEP10	0	-17	INS
6000C	OH Inspection - Bldg C	6	6	27OCT10	02NOV10	10	-33	INS
4760K	OH Inspection - Kitchen/Caf	2	2	20DEC10	21DEC10	22	-17	INS



Start Date 25NOV09
Finish Date 18SEP11
Data Date 15JAN10
Run Date 22JAN10 14:29

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Early Bar
Progress Bar
Critical Activity

WH16 Sheet 31 of 31

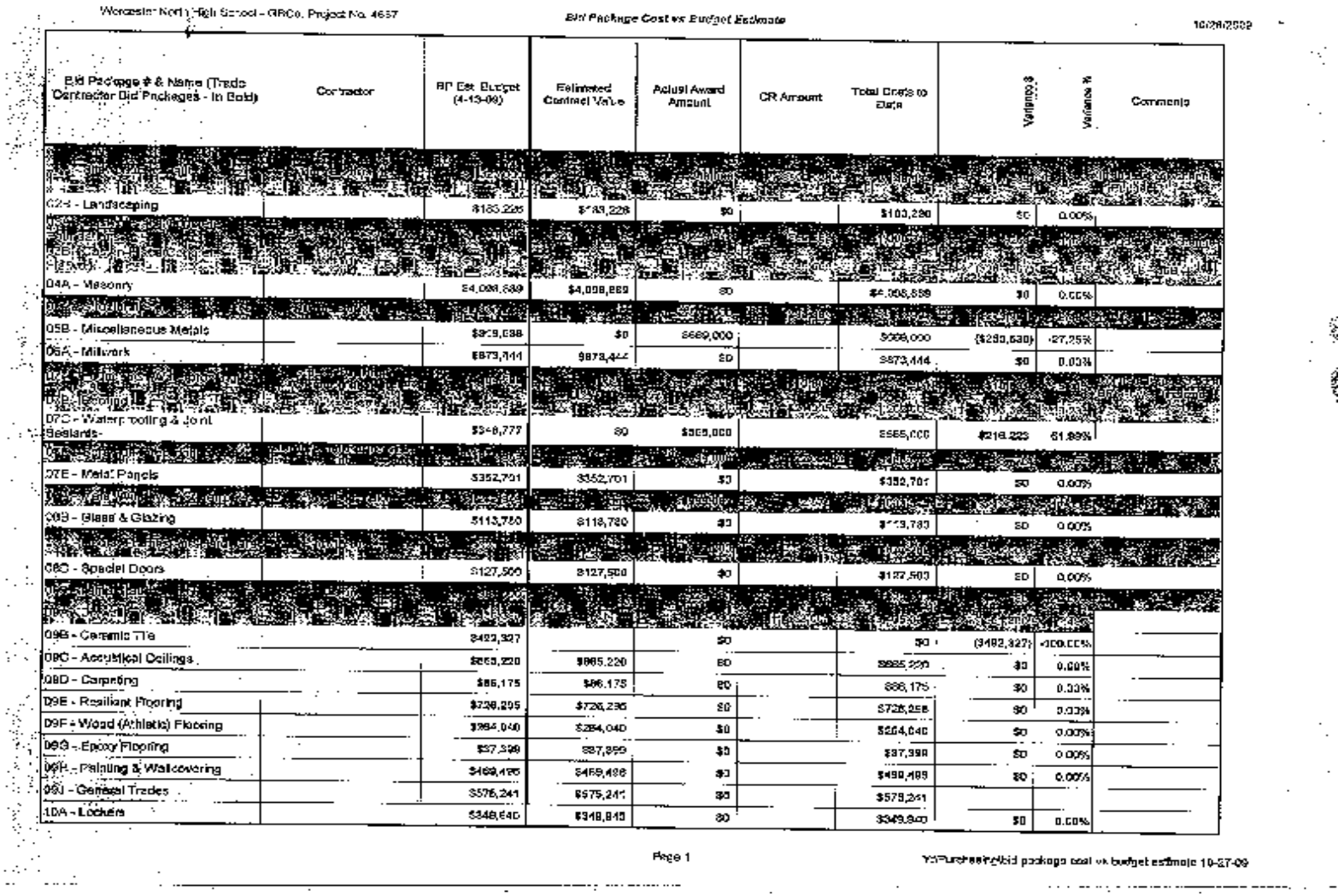
GILBANE BUILDING COMPANY

WORCESTER NORTH HIGH SCHOOL (WH16)

BID PACKAGE - CURRENT WORK

Gilbane

Appendix C: Bid Package Cost vs. Budget Estimate

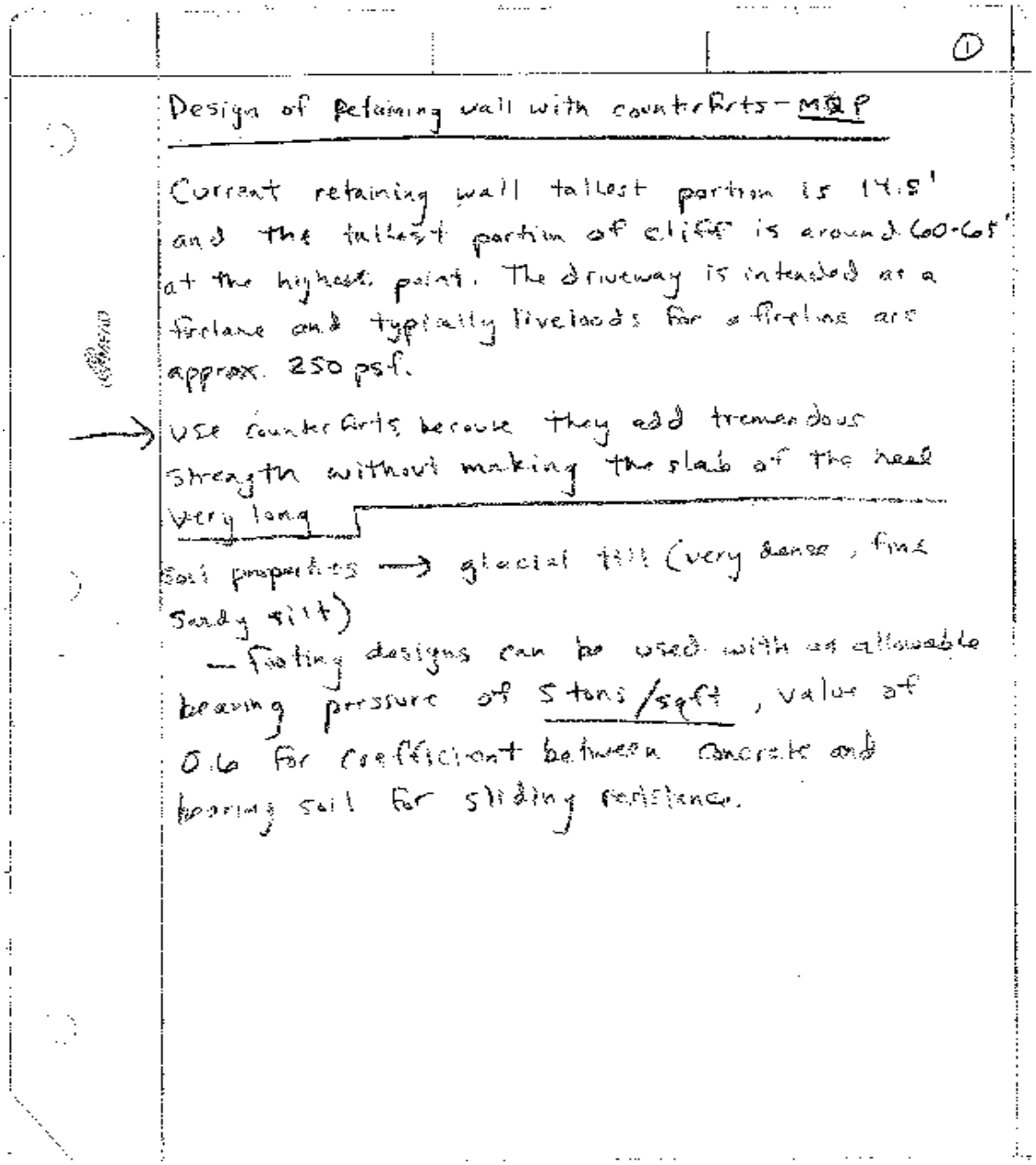


Worcester North High School - GRCo. Project No. 4657 — Bid Package Cost vs Budget Estimate — 10/28/2009

Bid Package # & Name (Trade Contractor Bid Packages - In Bold)	Contractor	BP Est. Budget (4-13-09)	Estimated Contract Value	Actual Award Amount	CR Amount	Total Costs to Date	Variance $	Variance %	Comments
02H - Landscaping		$183,226	$183,226	$0		$183,226	$0	0.00%	
04A - Masonry		$4,098,889	$4,098,889	$0		$4,098,889	$0	0.00%	
05B - Miscellaneous Metals		$639,638	$0	$669,000		$669,000	($29,362)	-27.25%	
06A - Millwork		$873,444	$873,444	$0		$873,444	$0	0.00%	
07C - Waterproofing & Joint Sealants		$346,777	$0	$565,000		$565,000	$218,223	61.89%	
07E - Metal Panels		$352,701	$352,701	$0		$352,701	$0	0.00%	
08B - Glass & Glazing		$113,783	$113,783	$0		$113,783	$0	0.00%	
08C - Special Doors		$127,500	$127,500	$0		$127,500	$0	0.00%	
09B - Ceramic Tile		$492,327		$0		$0	($492,327)	-100.00%	
09C - Acoustical Ceilings		$665,220	$665,220	$0		$665,220	$0	0.00%	
09D - Carpeting		$86,175	$86,175	$0		$86,175	$0	0.00%	
09E - Resilient Flooring		$726,295	$726,295	$0		$726,295	$0	0.00%	
09F - Wood (Athletic) Flooring		$264,040	$264,040	$0		$264,040	$0	0.00%	
09G - Epoxy Flooring		$37,399	$37,399	$0		$37,399	$0	0.00%	
09H - Painting & Wallcovering		$469,485	$469,485	$0		$469,485	$0	0.00%	
09J - General Trades		$575,241	$575,241	$0		$575,241			
10A - Lockers		$349,840	$349,840	$0		$349,840	$0	0.00%	

Page 1 — Y:\Purchasing\bid package cost vs budget estimate 10-27-09

Appendix D: Retaining Wall Design



① Design of Retaining wall with counterforts – M&P

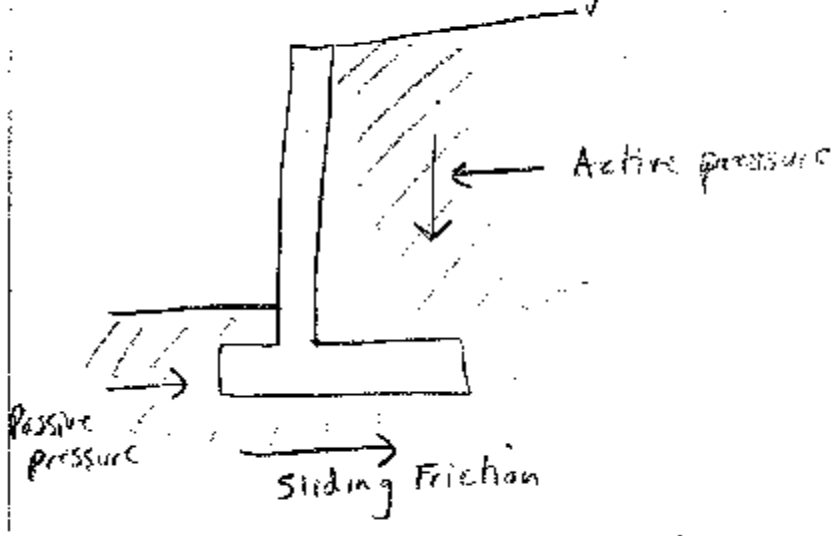
Current retaining wall tallest portion is 14.5' and the tallest portion of cliff is around 60-65' at the highest point. The driveway is intended as a fireland and typically liveloads for a fireline are approx. 250 psf.

→ Use counterforts because they add tremendous strength without making the slab of the heel very long

Soil properties → glacial till (very dense, fine sandy silt)

– footing designs can be used with an allowable bearing pressure of 5 tons/sqft, value of 0.6 for coefficient between concrete and bearing soil for sliding resistance.

General pressures on retaining walls



① Determine DL and LL for the wall

We need to design the wall for the driveway that is intended as a fireland. Typically for firelanes, LL = 250 psf

$U = 1.4D + 1.7L$

There is no DL on the wall, so

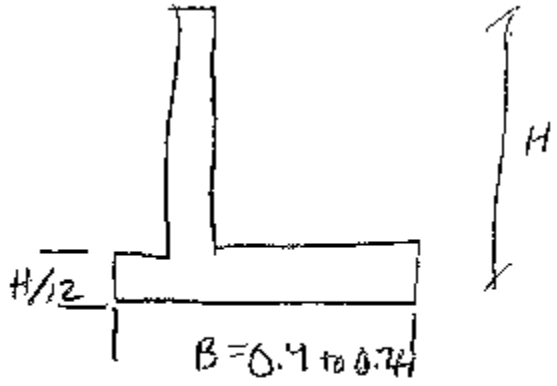
$U = 1.7L = 1.7(250psf) = 425\ psf$

Design for $f'_c = 4000\ psi$; $f_y = 60{,}000\ psi$

Need to assume wall dimensions

Assume wall = 10' high

We used this general association for the dimensions



Our wall

Height = 10'
Footer = 4' x 1'
Wall thickness = 13"
Counter forts = 8" thick every 3'

Our problem

Design a cantaliever wall to retain a bank of 65' whose horizontal surface is subjected to a live load surcharge of 250 psf. the soil is glacial till very dense, fine sandy silt.

Properties of soil can be classified as

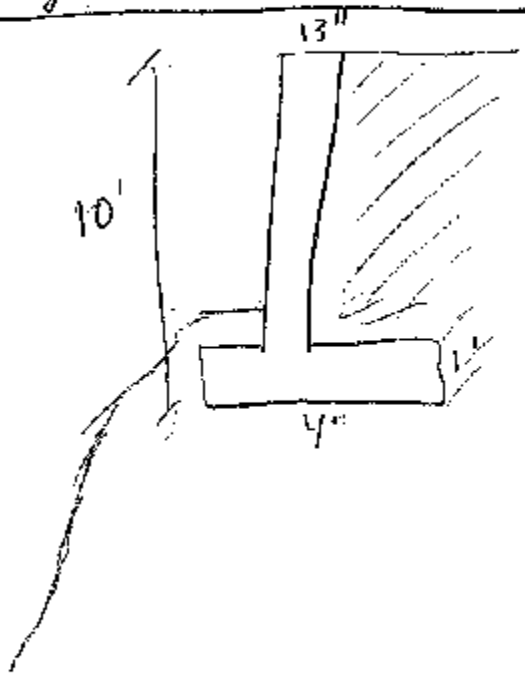
Soil numbers

unit wt/pcf = 110 - 120 pcf ϕ = 25 - 30°

f = 0.6 / per vita from Collinan

q_u = 5 tns / sqft = 10,000 psf

a general look to our wall



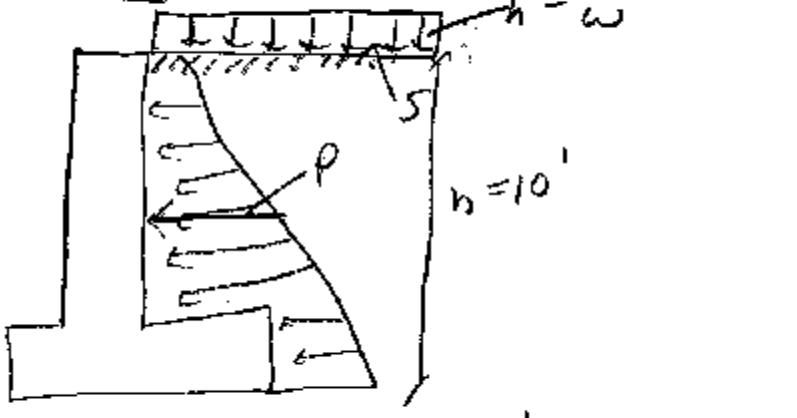
Find h' due to the surcharge of the LL

$h' = \frac{S}{w}$ assume $w = 120$ pcf

$S = 425$ psf

$h' = \frac{425 \text{ psf}}{120 \text{ pcf}} = \underline{3.27'}$

Assumed pressures



Our estimated base thickness = 1' 50

If $h = 10'$ our free arm distance will be $\underline{9'}$

$C_a = \frac{1 - \sin\phi}{1 + \sin\phi} = \frac{1 - \sin 30^\circ}{1 + \sin 30^\circ} = \underline{0.333}$

Asume $\phi = 30^\circ$

Pressure P

$$P = \frac{1}{2} C a h \, w h (h + 2h')$$

$$= \frac{1}{2}(0.333)(120)(9')(9' + 2(3.27)')$$

Total P from Surcharge = 2974.22 ≈ 2794 lbs

$$y = \frac{h^2 + 3hh'}{3(h+2h')} = \frac{(9')^2 + 3(9)(3.27)}{3(15.54)} \quad \frac{169.29}{46.62}$$

$$y = 3.63'$$

$$M_U = 1.7\,(2794)\,(3.63') = 17246 \text{ ft-lbs}$$

Find the size of steel

$$P_b = \frac{0.85(4000)}{60{,}000}(0.85)\left(\frac{87{,}000}{87{,}000 + 60{,}000}\right) =$$

$$P_b = 0.0284$$

↙ Shear

$$P_{all} = \left(\frac{P_b}{2}\right)(0.75)$$

$$P_{all} = 0.01066 \approx 0.011$$

Look in appendix for $\frac{M_U}{bd^2}$ value

From the book → appendix A Graph A.1b

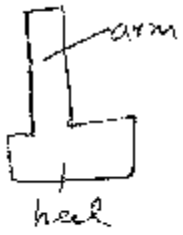
$$\frac{Mu}{\phi b d^2} = 590$$

unit length of wall ($b = 12''$) with $\phi = 0.90$

$$d = \sqrt{\frac{Mu \times 12}{0.90 \times 12 \times 590}} =$$

$$d = \sqrt{\frac{17246 \times 12}{0.90 \times 12 \times 590}} = \sqrt{\frac{206952}{6372}} = \sqrt{32.42}$$

$d = 5.69'' \approx 5.70''$



Assume $\frac{1}{2}''$ diameter of rebar

also, $2''$ cover over steel

$d = 5.70'' + 2.0'' + .5'' = 8.2''$ make

$10'' = d$ at base of arm

Check arm for shear at distance d above the base

$$d = \frac{10''}{12''} = 0.833' = \text{distance} = 9' - 0.833' = 8.1667'$$

Check shear away from beam

$P = \frac{1}{2} \times 0.333 \times 120 \times 8.1667 \times 15.54 =$

$= 2535$ lbs

$V_u = 1.7 \times 2535 =$ **4310.6 lbs**

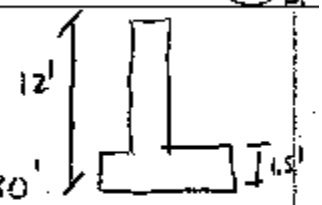
$\phi V_c = 2\phi \sqrt{f'_c}\, bd$

$= 2(.85)(\sqrt{4000})(12)(10")$

$= 2(.85)(63.24)(12)(10) =$ **12902 lbs**

4,310 lbs < 12,902 lbs

passes shear test ✓



Design for a 12' wall

Soil numbers remain the same

- unit wt = 110-120 pcf ϕ = 25-30'

f = 0.6 /per vito from Collinan

q = 5 tons / sq ft = 10,000 psf

Find h' due to the surcharge – will be the same

$h' = \frac{S}{w}$ assume w = 120 pcf

S = 425 psf

h' = 3.27'

Cah will be the same as well = 0.333

Pressure $P = \frac{1}{2} Cah\ w h (h + 2h')$

estimated footing thickness = 1.5' / effective height = 10.5'

$P = \frac{1}{2}(0.333)(120)(10.5')(10.5 + 2(3.27'))$

$= 3574.82$ lbs

$y = \frac{h^2 + 3hh'}{3(h+2h')} = \frac{10.5^2 + 3(10.5)(3.27)}{3(17.04)} = 4.17'$

$M_u = 1.7(3574.82)(4.17) = \underline{25341.88 \text{ ft-lbs}}$

P_{all} the same as the previous wall

$\underline{P_{all} = 0.011}$

look in appendix for $\frac{M_u}{bd^2}$ value

$F_y = 60_{psi}$ $f'_c = 4000_{psi}$

$\frac{M_u}{bd^2} = 590$ from chart

$d = \sqrt{\frac{mu \times 12}{0.90 \times 12 \times 590}} = \sqrt{\frac{25342 \times 12}{0.90(12)(590)}} = \underline{6.9''}$

Assume $\frac{1}{2}''$ diameter for Rebar

also, 2" cover for steel

$d = 6.9'' + 2'' + .5'' = 9.4'' \approx \underline{10''}$

Check arm for shear distance above base

$d = \frac{10''}{12''} = 0.833' =$ distance $= 10.5' - .833' =$

$9.667'$

Check shear away from base

$P = \frac{1}{2} \times 0.333 \times 120 \times 9.667 \times 17.04 =$

3291.2 lbs

$1.7(3291.2) = 5594.7$ lbs

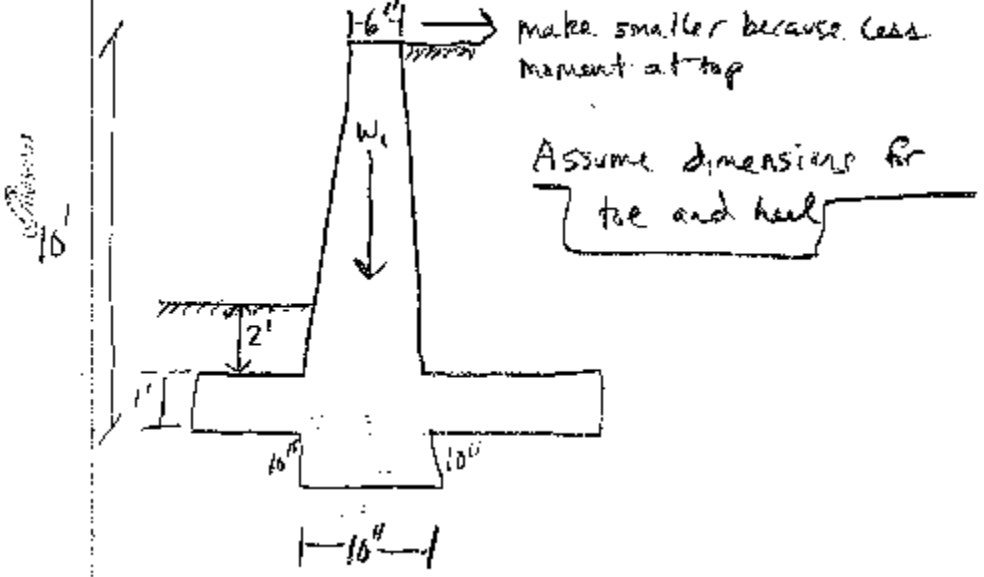
$\phi V_c = 2\phi\sqrt{f_c'}\, bd = 12902$ lbs

5594.7 lbs < 12902 lbs

passes shear ✓

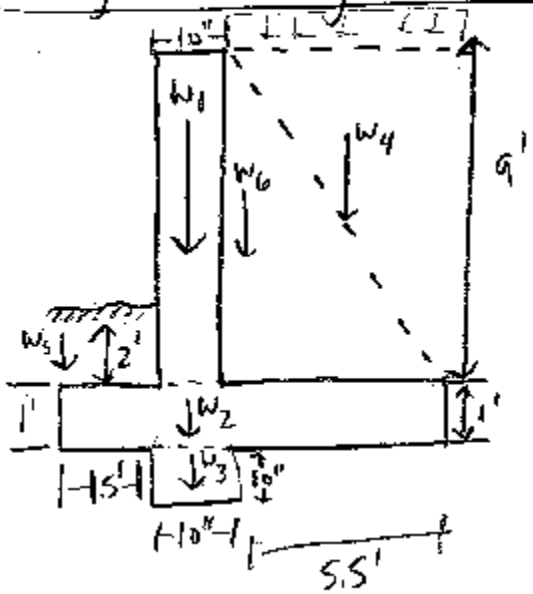
b) stability investigation

Drawing of Retaining wall right now (10' wall)



b) Stability investigation

Drawing of retaining wall as it looks now



Component weight table → Distance from center of W to front of wall

CW	W lbs	$\bar{x}$ ft	Mr ft·lbs
$W_1 = (\frac{5}{6}')(9')(150)$	1125	1.92'	2160
$W_2 = (1')(7.833)(150)$	1175	3.92'	4606
$W_3 = (\frac{5}{6})(\frac{5}{6})(150)$	104	1.92'	199.68
$W_4 = (9')(5.5')(120)$	5940	5.083'	30,193
$W_5 = (2')(1.5')(126)$	360	0.75'	270
$W_6 = \frac{1}{2}(9')(5.5')(150)$	3713	4.16'	15,446
Totals:	12,417		52,875

Total soil pressure $P = 0.5(ch)(w)(h)(q + 2h')$

$P = 0.5(0.333)(120)(10')(10' + 6.54)$

$P = 3305$ lbs

$$y = \frac{h^2 + 3hh'}{3(h + 2h')}$$

$$= \frac{(100) + 3(10)(3.27)}{3(10 + 6.54)} = 3.99 \approx 4.00'$$

$M_o = 3305 \text{ lbs} \times 4.00' = 13,220$ Ft. lbs

Distance of resultant from front edge

$$a = \frac{52,875 - 13,220}{12\,417} = 3.19'$$

Resultant is inside middle 3rd

Using the formula $\Rightarrow$ max bearing pressure =

$$q_1 = (4L - 6a)\frac{R_v}{L^2} =$$

~~$q_1 = \frac{(31.32 - 19.14)}{61.36}$~~

Surcharge

$W_{Tot.} = 12,117 + 425 \text{ psf} \times 5.5$

$= 14754.5 \text{ lbs}$

$M_6 = 52875 + 425(5.37)(5.5)$

$= 65427.4 \text{ lbs.ft}$

$\text{New } a = \frac{65,427.4 - 13,220}{14754.5} = 3.54'$

Inside middle 3rd Surcharge to a

$q_1 = \frac{(31.32 - 21.24)(14754.5)}{61.36}$

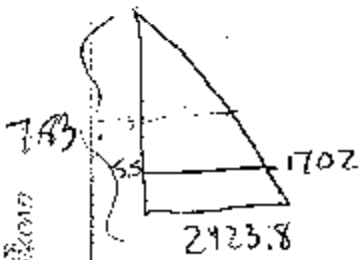
$q_1 = 2423.8 \text{ psf}$

$F.O.S = \frac{52875}{13,220} = 3.99$

Friction Force $= 0.5 \times 12417 =$

6208.5 lbs

Frichon at the toe



$\frac{7.83}{5.5} = \frac{2423.8}{x}$

$x = 1702$

Frichon toe : $(2423.8+1702) \times .5 \times 1.5 \times 0.577$

$= 1785.5$ lbs

Frichon heel, key : $1702 \times .5 \times 1.333 \times 05$

$= 2695$ lbs

Passive Earth Pressure $= 0.5 \times 120 \times 3.0 \times 1.833^{1}$

$= 329$ lbs

Total Resistance to sliding $= 4809.5$ lbs

$P = 3305$ lbs

F.S. $= 1.45 =$ adequate

External stability is ascertained

Steel for the arm and key 10" arm − 2" cover + .5"

$M_o = 17,246$ ft-lbs from before

#6 @ 24

.22

$$\frac{M_o}{\phi b d^2} = \frac{17,246\,(12)}{0.9(12)(7.5)^2} = 340.6$$

$f_y = 60,000$ $f'_c = 4000$

Steel ratio from chart = 0.006

$A_s = 0.006 \times 12 \times 7.5 = 0.54\ in^2/ft$

Use #7 bars @ 12" on center ($A_s = 0.60\ in^2/ft$)

From 4.5' #7 bars @ 24" on center

Control temperature and cracking

Not less than 0.0012 times the gross concrete area must be provided

Gross Area = $12'' \times 7.5'' = 90\ in^2$

$(0.0012)(90\ in^2) = 0.108$

Vertical Bars exposed face

$\frac{1}{2}(0.108)$ Bars $> 0.054\ in^2/ft$

#4 Bars @ 24" O.C ($A_s = 0.10\ in^2 ft$)

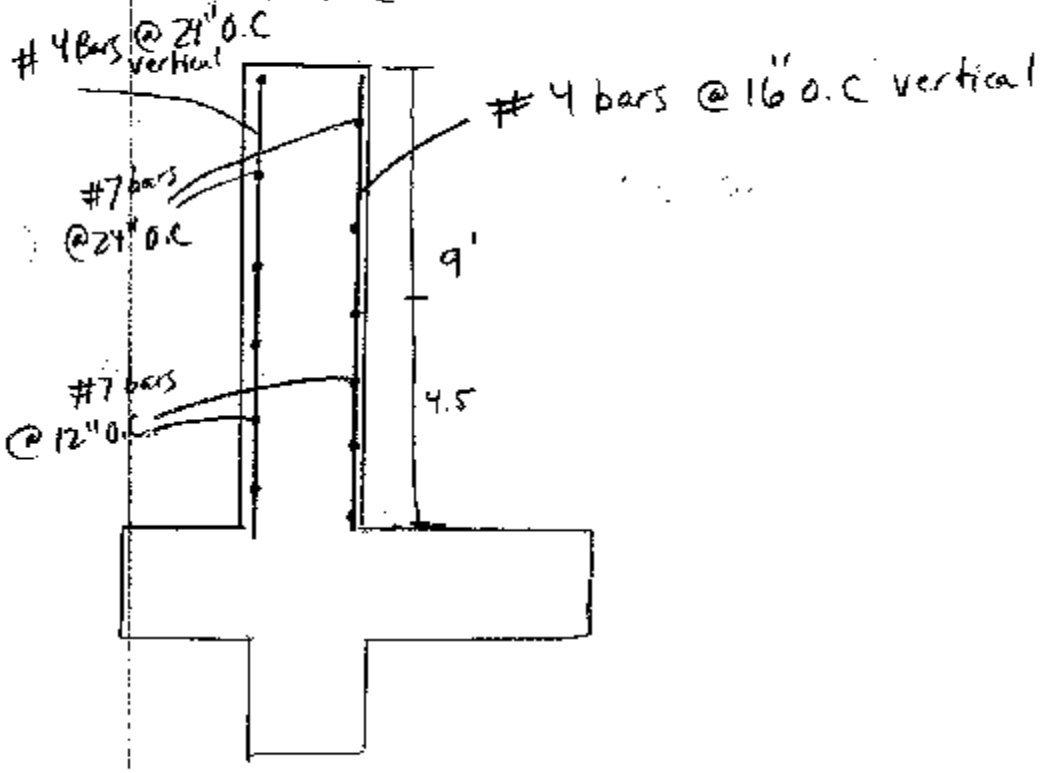
Non exposed face

Use #4 Bars @ 16 in O.C
($A_s = 0.145\ in^2/ft$)

horizontal Steel

$0.0020\ (12" \times 7.5") = \frac{0.18\ in^2/ft}{2} = 0.09\ in^2/ft$

= #4 @ 20 in O.C



Design Steel for Toe Slab

2710

load factor of 1.7

Find moment = to point C

$$M_0 = 1.7\left(\frac{2423.8}{2} \times 1.5^2 \times \frac{2}{3}\right.$$

Find w from a to C M_0 = the same

$$a = \frac{52,875 - 13220}{12417} = 3.19'$$

inside middle 3rd

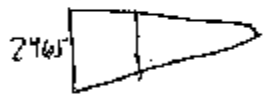
Bigger

$$q = (4L - 6a)\frac{R_v}{L^2}$$

$$q_1 = \left(7.833(4) - 6(3.19)\left(\frac{12417}{7.833^2}\right)\right)$$

$$(31.32 - 19.14)(202.37) =$$

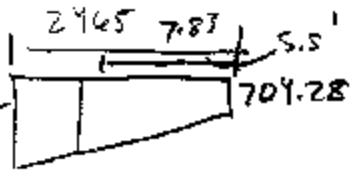
$q_1 = 2465$ lbs



$$q_2 = (6a - 2L)\frac{R_v}{L^2}$$

$$= (19.14 - 15.66)(202.37)$$

$q_2 = 704.28$ lbs



Surcharge to b $\frac{1761}{7.83} = \frac{x}{6.33}$

Surcharge at b = 1423

Toe Slab (18)

Find moment

$$M_u = 1.7\left(\frac{2423.8}{2} \times 1.5^2 \times \frac{2}{3} + \frac{1423}{2} \times 1.5^2 \times \frac{1}{3}\right) - 0.9\left(150 \times 1.5^2 \times \frac{1}{2}\right)$$

$$= 1.7(1818 + 533.1) - 0.9(168.75)$$

$$M_u = 3996.87 - 151.875 =$$

$M_u = 3845$ ft-lbs

For Concrete case exposed to Earth, protective cover of 3in is required bar $\phi = 1''$

effective depth $= 12'' - 3.0'' - 0.5'' = \underline{8.5''}$

$$\frac{M_u}{\phi b d^2} = \frac{3845 \times 12}{0.9 \times 12 \times 72.25} = 59.13 \leftarrow$$ Graph is less

Minimum required $\rho b = \frac{200}{60{,}000} = \underline{0.0033}$ ← use

$A_s = 0.0033 \times 12 \times 8.5 = \underline{0.3366 in^2/ft}$

6 bars @ 12" O.C ($A_s = 0.44 in^2/ft$)

Reflecting 12 in lateral spacing,
the bars will be continued 21" past the face of the wall.

Check Shear

Shear will be checked from edge of toe = 1'6" = 1.67733' from edge of toe

$$V_u = 1.7\left(2465 \times \tfrac{1}{2} \times 1 + 1536 \times \tfrac{1}{2} \times 1\right) - 0.9(150 \times 1)$$

$$= 3400.85 - 135 =$$

$V_u = 3266$ lbs

$\frac{2710}{2218} = \frac{9.75}{7.21}$

2465

$\frac{1761}{7.83} = \frac{x}{6.83}$

Design Shear strength =

$$\phi V_c = 2 \times 0.85 \sqrt{4000} \times 12 \times 8.5$$

$\phi V_c = 10966.7$ lbs ✓ passes shear test

$\phi V_c > V_u$

Use #3 bars at 12" O.C for Cracking Control

Design for Heel Slab total length = 5.5'

L.L. surcharge = 250 psf

$M_U = 1.7\left(250 \times 5.5^2 \times \frac{1}{2}\right) + 1.4\left(1423 + 5.5^2 \times \frac{1}{2} + 150 \times 5.5^2 \times \frac{1}{2}\right)$

$M_U = 6428.2 + 33308$

$= 39736.5$ ft·lbs

$\frac{M_U}{\phi b d^2} = \frac{39736.5 \times 12}{0.9 \times 12 \times 72.25} = 611.1$

$\rho_b = 0.0155$ from graph A.1b

$A_s = 0.0155 \times 12 \times 8.5 = 1.58$ in²/ft

Use #9 bars at 7" O.C $A_s = 1.70$ in²/ft

$V_U = 1.7(250 \times 5.5) + 1.4(1236.9 \times 5.5)$

$\frac{1761}{7.83} = \frac{x}{5.5}$

$V_U = 11861.5$ lbs > 10966.7

Does not pass

Increase effective depth to 9.5"

So, height of toe and slab will be 13"

with height = 13" effective depth will be 9.5"

$$\phi V_c = 2 \times 0.85\sqrt{4000} \times 12 \times 9.5 =$$

$$12256.98 \text{ lbs}$$

$\phi V_c > V_u = 11861.5$ lbs passes shear ✓

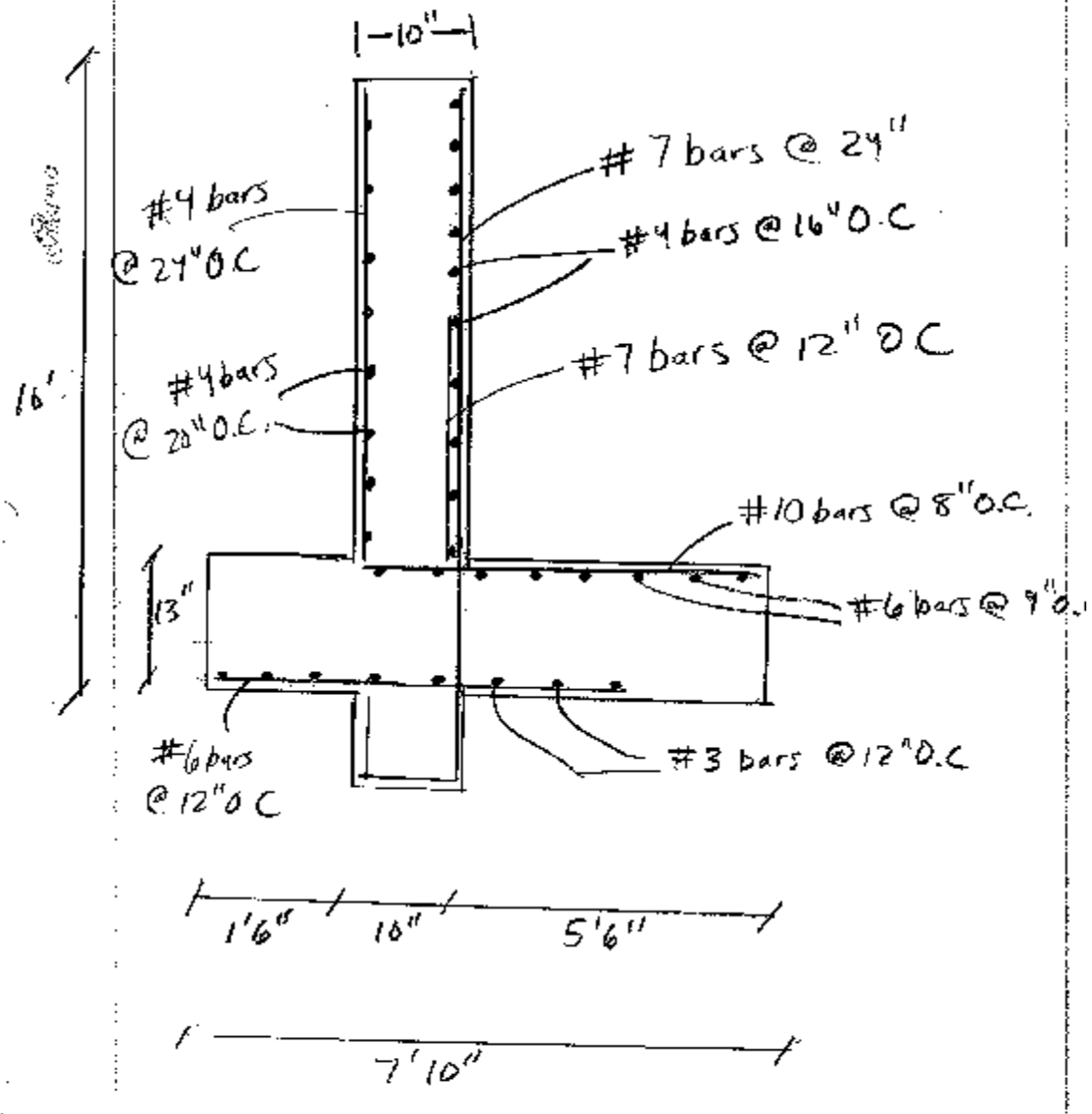
increase bars to #10 bars @ 8" O.C

$A_s = 1.80 \text{ in}^2/\text{ft}$

Use #6 bars @ 9" O.C for Crack Control

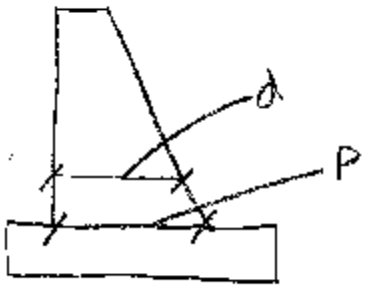
increase the same, 21" past the slcm

Diagram of the Wall



Design of Counterforts

Total wall length = 84'

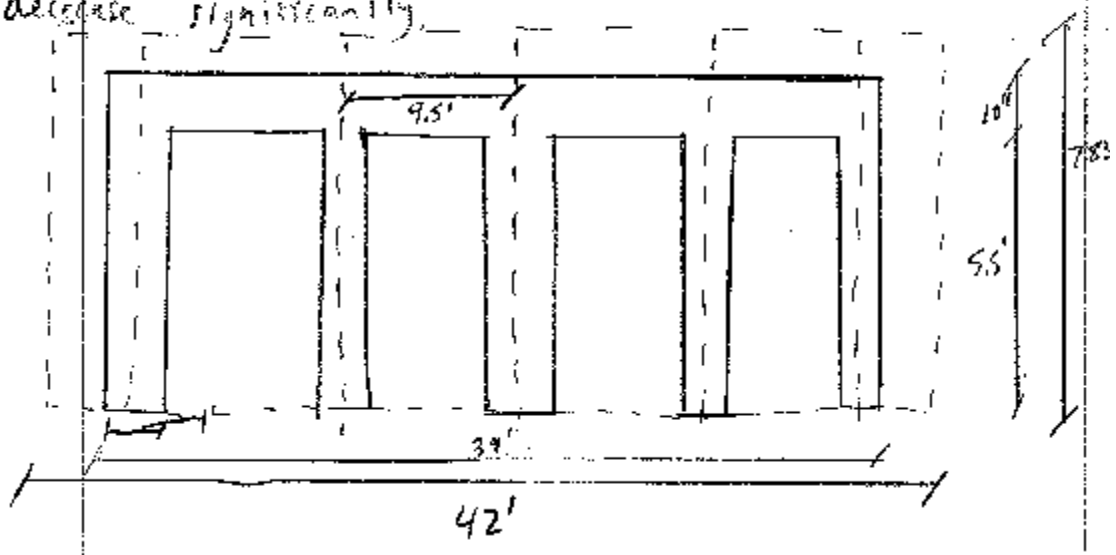


M = total pressure @ bottom of wall

P

$$M = \frac{Pl^2}{10} \text{ or } \frac{Pl^2}{12}$$

Since the total wall length is approx 84' and the drop off is less we will only make wall 42' long the after, the wall height can decrease significantly.



Counterfirt steel design

$M_u = \frac{pl^2}{10}$ p = pressure at bottom of wall

P = 3305 lbs from previous calculations

$M_u = \frac{3305(9.5' \times 12)^2}{10}$

$M_u = 4,295,178 \text{ in}^2\text{-lb}$

jd = typically .875d

$A_h = \frac{M_u}{\phi f_y (jd)} = \frac{4,295,178}{0.9(60,000)(0.875)(9.5)(12)}$

0.9 ↗ 0.875d

$A_h = 0.797 \text{ in}^2/\text{ft}$

Use #9 bars @12 in O.C

$M_u = \frac{pl^2}{12}$ $p = 3305$ lbs $M_u = \frac{3305(9.5 \cdot 12)^2}{12}$

$l = 9.5'(12)$

$M_u = 3,579,315 \text{ lb-in}^2$

$A_h = \frac{M_u}{\phi f_y jd}$

$A_h = \frac{3,579,315}{0.9(60,000)(.875)(9.5)(12)} = \boxed{0.665 \text{ in}^2/\text{ft}}$

Use # 8 bars @ 12" O.C

(25)

$A_v = \frac{V_u}{\phi f_y d}$ $\quad V_1 = V + \frac{M}{d}(\tan\theta + \tan\phi)$

ϕ: 0.85 (shear) $\quad \theta$: 0 $\quad \phi$: 30°

$V_1 =$

Shrinkage Steel =
$0.0035 b \times d$

$V_1 = 11861 \text{ lbs} + \frac{3,579,315}{8''}(0.577)$

$A_v = \frac{11861}{\phi 60000 (8)} = 0.027 \text{ in}^2/\text{ft}$

Use #3 bars @ 24in O.C

$A_s = 0.055$

Shrinkage steel

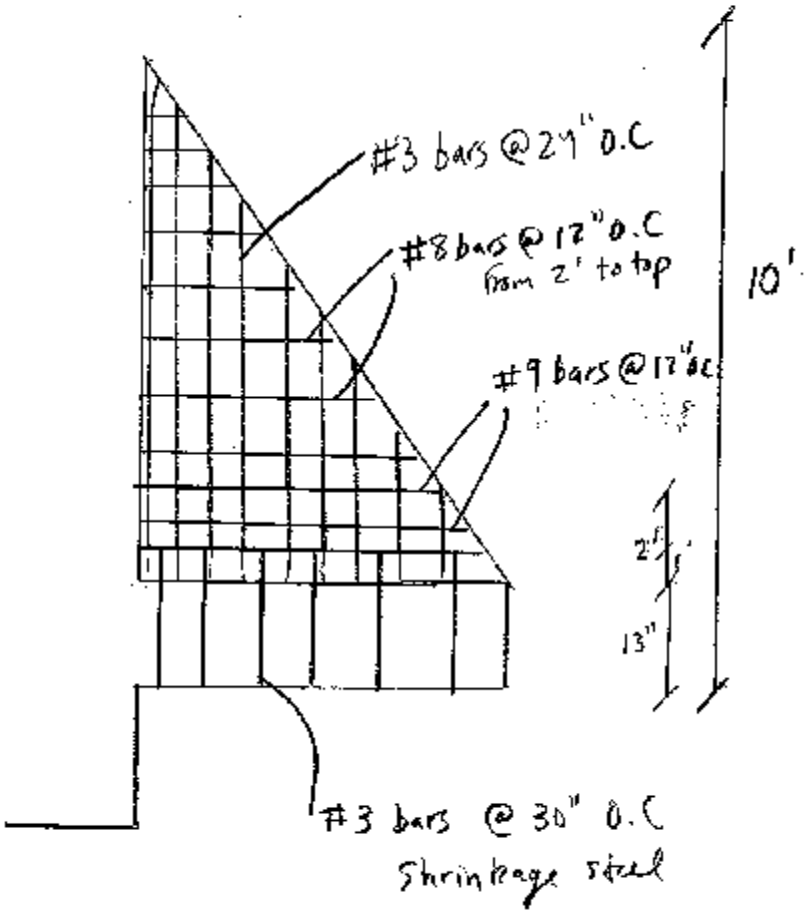
$0.0035 b \times d =$
$0.0035 \times 1 \times 10' = 0.035 \text{ in}^2/\text{ft}$

Use #3 bars @ 30" O.C

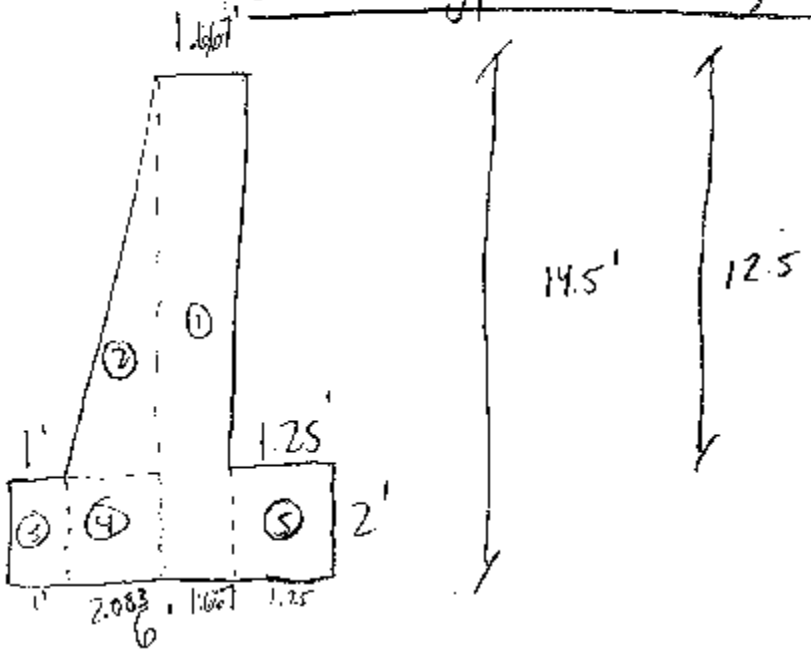
No 3, No 5 V

No 16, No 18 bottom
top

Counter fort Design



Collinan Typical Retaining Wall



Total Area of Section

① $1.667' \times 14.5' = 24.17'^2$

② $2.083' \times 12.5' \times \frac{1}{2} = 13.02'^2$

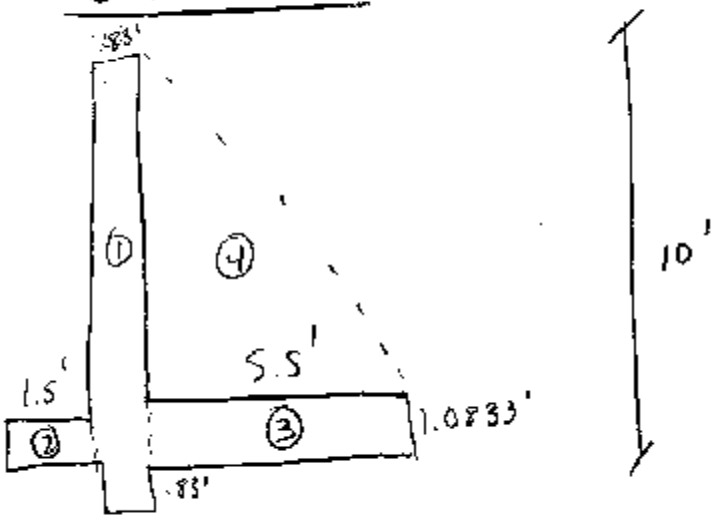
③ $1' \times 2' = 2'^2$

④ $2.083' \times 2' = 4.167'^2$

⑤ $1.25' \times 2' = 2.5'$

Total = 45.857 sq.ft for Collinan wall at highest point

Our wall



Total Area of Section

① = 10.83 x .83 = 8.98' ^{2}

② = 1.5' x 1.0833' = 1.624 ^{2}

③ = 5.5' x 1.0833' = 5.95' ^{2}

Totals = 16.56 ^{2} w/o Counterforts

④ = 5.5 x 8.9 x $\frac{1}{2}$ = 24.475

Totals = 41.03 ft ^{2} w/ Counterforts

Lower

Volume

Cullinan

$42' (45857 \text{ sq ft}) = 1925 \text{ ft}^3$

Ours

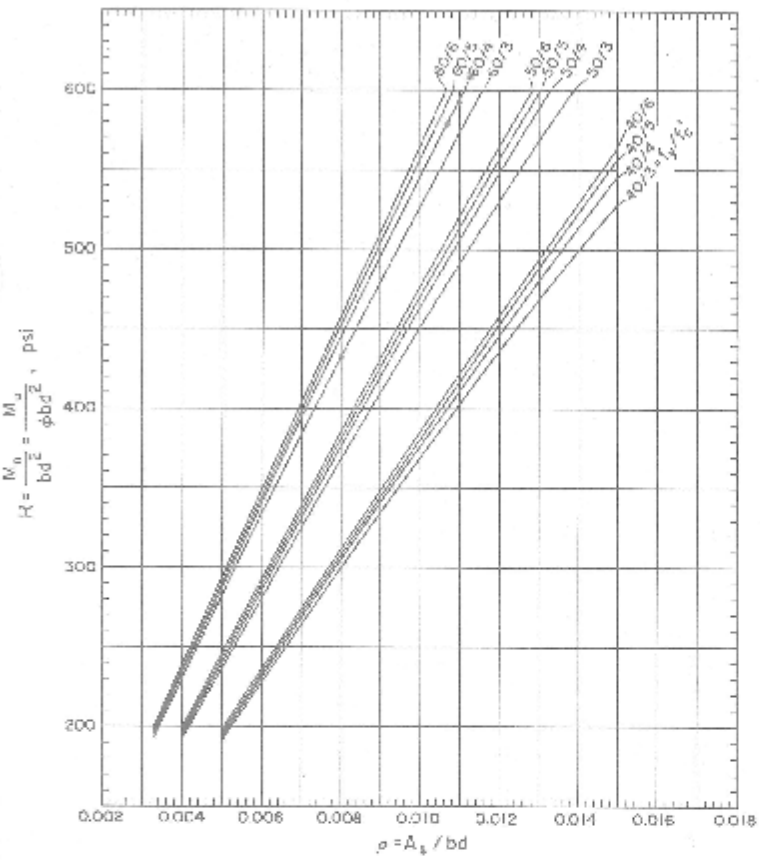
$3866.5' (16.56 \text{ sq ft}) = 640.3 \text{ ft}^3$

Ours with Countersink

$\text{ft}^3 + 3667' (5) (41.03) \text{ ft}^2$

$= 640.3 \text{ ft}^3 + 136.8 \text{ ft}^3$

$= 777.1 \text{ ft}^3$



GRAPH A.15
Moment capacity of rectangular sections.

Table A.2 Areas of groups of standard bars, in²

Bar No.	Number of bars											
	1	2	3	4	5	6	7	8	9	10	11	12
3	0.20	0.39	0.58	0.78	0.98	1.18	1.37	1.57	1.77	1.96	2.16	2.36
4	0.31	0.61	0.91	1.23	1.53	1.84	2.15	2.45	2.76	3.07	3.37	3.68
5	0.44	0.88	1.32	1.77	2.21	2.65	3.09	3.53	3.98	4.42	4.86	5.30
6	0.60	1.20	1.80	2.41	3.01	3.61	4.21	4.81	5.41	6.01	6.61	7.22
7	0.79	1.57	2.35	3.14	3.93	4.71	5.50	6.28	7.07	7.85	8.64	9.43
8	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00
9	1.27	2.53	3.79	5.06	6.33	7.59	8.86	10.12	11.39	12.66	13.92	15.19
10	1.56	3.12	4.68	6.25	7.81	9.37	10.94	12.50	14.06	15.62	17.19	18.75
11	2.25	4.50	6.75	9.00	11.25	13.50	15.75	18.00	20.25	22.50	24.75	27.00
14	4.00	8.00	12.00	16.00	20.00	24.00	28.00	32.00	36.00	40.00	44.00	48.00

Table A.3 Perimeters of groups of standard bars, in.

Bar No.	Number of bars											
	1	2	3	4	5	6	7	8	9	10	11	12
4	1.6	3.1	4.7	6.2	7.8	9.4	11.0	12.6	14.1	15.7	17.2	18.8
5	2.0	3.5	5.9	7.5	9.8	11.8	13.7	15.7	17.7	19.5	21.6	23.6
6	2.4	4.7	7.1	9.4	11.8	14.1	16.5	18.8	21.2	23.6	25.9	28.3
7	2.8	5.5	8.2	11.0	13.7	16.5	19.2	22.0	24.7	27.5	30.2	33.0
8	3.1	6.3	9.4	12.6	15.7	18.9	22.0	25.1	28.3	31.4	34.6	37.7
9	3.5	7.1	10.6	14.2	17.7	21.2	24.8	28.4	31.9	35.4	39.0	42.5
10	4.0	8.0	12.0	16.0	20.0	23.9	27.9	31.9	35.9	39.9	43.9	47.9
11	4.4	8.9	13.2	17.7	22.2	26.6	31.0	35.4	39.9	44.3	48.7	53.2
14	5.3	10.6	16.0	21.3	26.6	31.9	37.2	42.6	47.9	53.2	58.5	63.8
18	7.1	14.3	21.3	28.4	35.5	42.5	49.6	56.7	63.8	70.9	78.0	85.1

Table A.4 Areas of bars in slabs, in²/ft

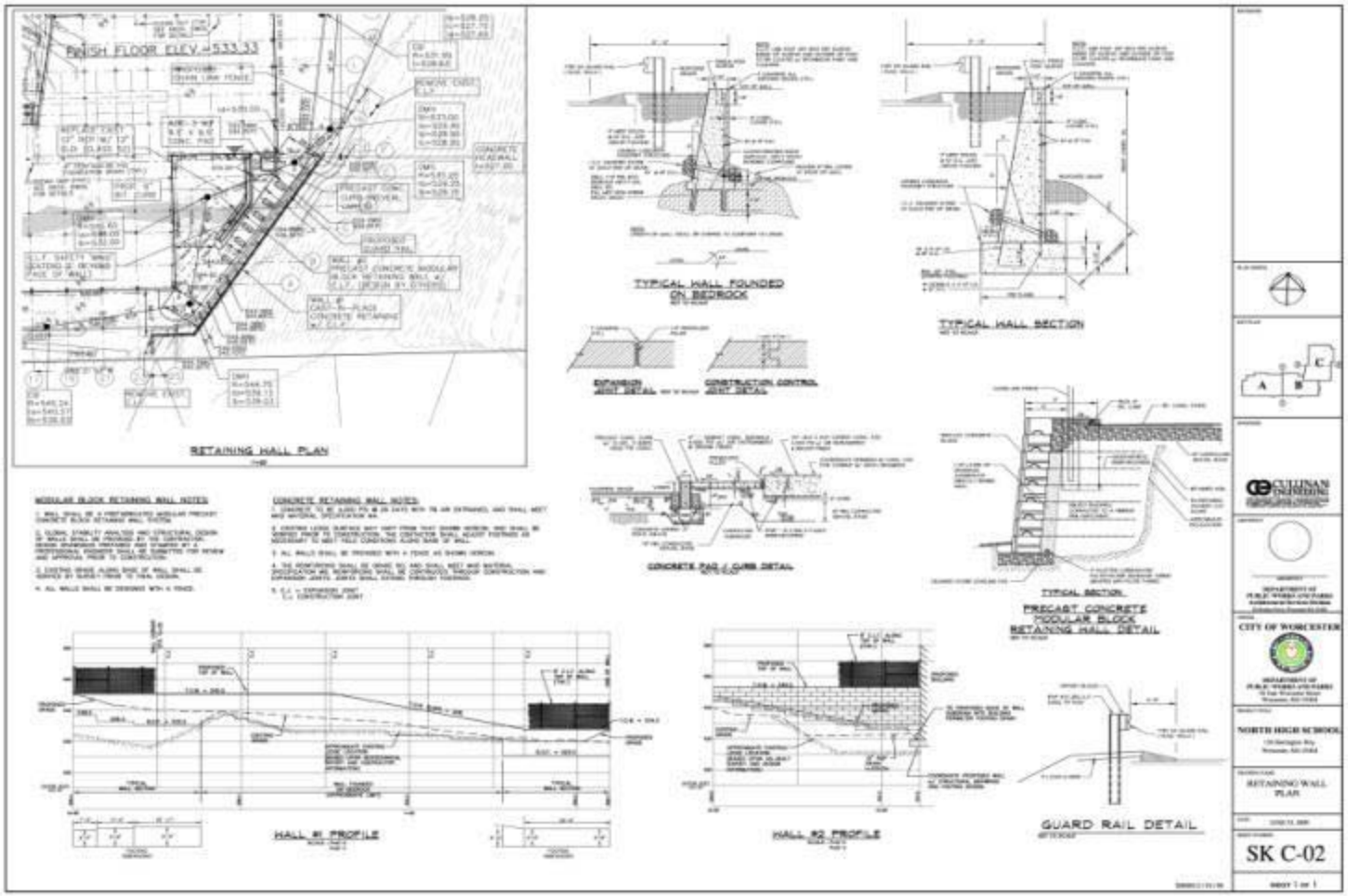
Spacing in.	Bar No.								
	3	4	5	6	7	8	9	10	11
3	0.44	0.78	1.23	1.77	2.40	3.14	4.00	5.00	6.25
3½	0.38	0.67	1.05	1.51	2.06	2.69	3.43	4.34	5.36
4	0.33	0.59	0.92	1.32	1.80	2.36	3.00	3.80	4.68
4½	0.29	0.52	0.82	1.18	1.60	2.09	2.67	3.37	4.19
5	0.26	0.47	0.74	1.06	1.44	1.88	2.40	3.04	3.73
5½	0.24	0.42	0.67	0.96	1.31	1.71	2.18	2.76	3.41
6	0.22	0.39	0.61	0.88	1.20	1.57	2.00	2.53	3.12
6½	0.20	0.36	0.57	0.82	1.11	1.45	1.85	2.34	2.89
7	0.19	0.34	0.53	0.76	1.03	1.35	1.71	2.17	2.68
7½	0.18	0.31	0.49	0.71	0.96	1.26	1.60	2.03	2.50
8	0.17	0.29	0.46	0.66	0.90	1.18	1.50	1.89	2.34
9	0.15	0.26	0.41	0.59	0.80	1.05	1.33	1.69	2.08
10	0.13	0.24	0.37	0.53	0.72	0.94	1.20	1.52	1.87
12	0.11	0.20	0.31	0.44	0.60	0.78	1.00	1.27	1.56

Table A.5 Limiting steel

f_y	f'_c	β_1	ρ'_b
40,000	3000	0.85	0.037
	4000	0.85	0.039
	5000	0.80	0.050
	6000	0.75	0.060
	7000	0.70	0.071
	8000	0.65	0.075
50,000	3000	0.85	0.0277
	4000	0.85	0.0367
	5000	0.80	0.0492
	6000	0.75	0.0586
	7000	0.70	0.0529
	8000	0.65	0.0561
60,000	3000	0.85	0.0214
	4000	0.85	0.0285
	5000	0.80	0.0335
	6000	0.75	0.0377
	7000	0.70	0.0411
	8000	0.65	0.0436
80,000	3000	0.85	0.0141
	4000	0.85	0.0188
	5000	0.80	0.0221
	6000	0.75	0.0249
	7000	0.70	0.0271
	8000	0.65	0.0288

$$\rho'_b = 0.556 \frac{f'_c}{f_y} \frac{87,000}{87,000 - f_y}$$

Appendix E: Cullinan's Retaining Wall Design



Appendix F: Monthly Man Hour Totals

Appendix G: Capstone Design Proposal

11/21/2009
Scott MacDonald
Matt Moreau
Ryan Marques

North High Capstone Design

The original design for the banking on the southeast corner of the building was to cover the banking in rip-rap. As construction began, Gilbane wanted to keep the access road open. This original design of rip-rap could not allow this to happen; as there needed to be more room and Gilbane was concerned about the forces from the construction vehicles so close to the banking. The height of the banking is 62' with a steep drop off, this was an additional concern for the movement of

The solution was to build a cantilevered retaining wall around the banking to accommodate the space for the construction vehicles and the load associated with them. Pictures can be seen on the next page. The design portion of this project will be developing an alternate solution for this problem.

Our retaining wall design will be driven by several factors; ground water and soil conditions, cost and required wall height. The first step in designing the retaining wall will be to get information on the earth's lateral pressure in the area. The basic soil parameters include:

- Soil unit weight
- Angle of internal friction (for sands)
- Cohesion and plasticity indices (for clays)
- The water table location.
- Ledge location

This information should be relatively easy to get since the retaining wall is already constructed on-site.

From here we will be able to size the wall and check for stability; this will include checks for wall overturning, base sliding, and soil bearing capacity failures. After the wall is sized, each wall member will be checked for adequate strength and steel reinforcing can be determined. One area that also needs to be looked at is the necessity to drain the backfill of rainwater and/or groundwater.

Our Solution:

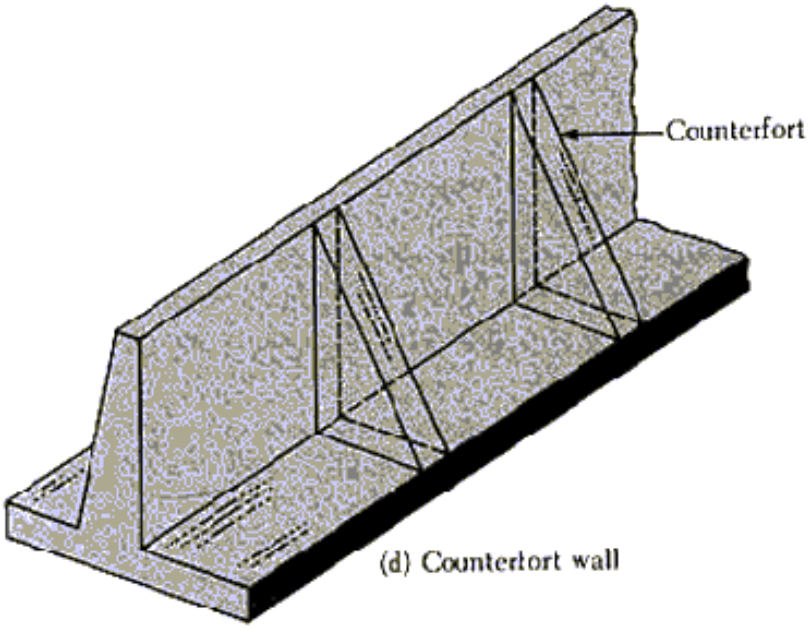
Our group decided to look at a counterfort retaining wall design. A counterfort retaining wall is very similar to a cantilever wall, except that it has one additional feature. This wall has a triangular shaped wall which connects the top of the wall to the back of the footer. This added support wall is hidden within the earthen or gravel backfill of the wall. The footer, retaining wall and support wall must be tied to one another with reinforcing steel. The support walls add a great deal of strength to the retaining wall. The supports make it virtually impossible for the wall to become detached from the footer. Counterforts are usually used for high walls with heights greater than 8 to 12 m. In this case, the wall is only 10' high but this type of design is also used for situations where high lateral pressures occur; where the backfill is heavily surcharged, in this case like North High where there will be a lot of heavy construction vehicles making their way through.

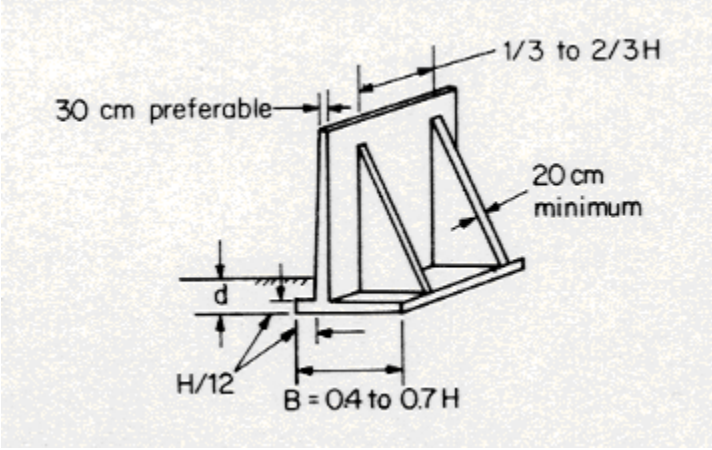
The first step in our design was to size the members, since we already had drawings of the current retaining wall it was relatively easy to realize what the height would need to be. We used the height of the current retaining wall to gather all of our dimensions, such as footing size, wall thickness and support sizes. These dimensions were based on a function of the retaining wall height from equations found in the foundation engineering handbook.

Dimensions of Retaining Wall

Height: 10'
Footer: 4' x 1'
Wall Thickness: 13"
Counterforts: 8" thick; spaced every 3'

Counterfort Retaining Wall





Design Analysis:

There are three pressures acting on a retaining wall:

Active earth pressure: The pressure exerted on the back of the wall

Bearing pressure: The vertical bearing pressure of the soil of rock supports the footing

Passive earth pressure: Lateral movement of the wall is resisted by passive earth pressure

Current Retaining Wall

Appendix H: Pictures – North High


5045


Genie S-85

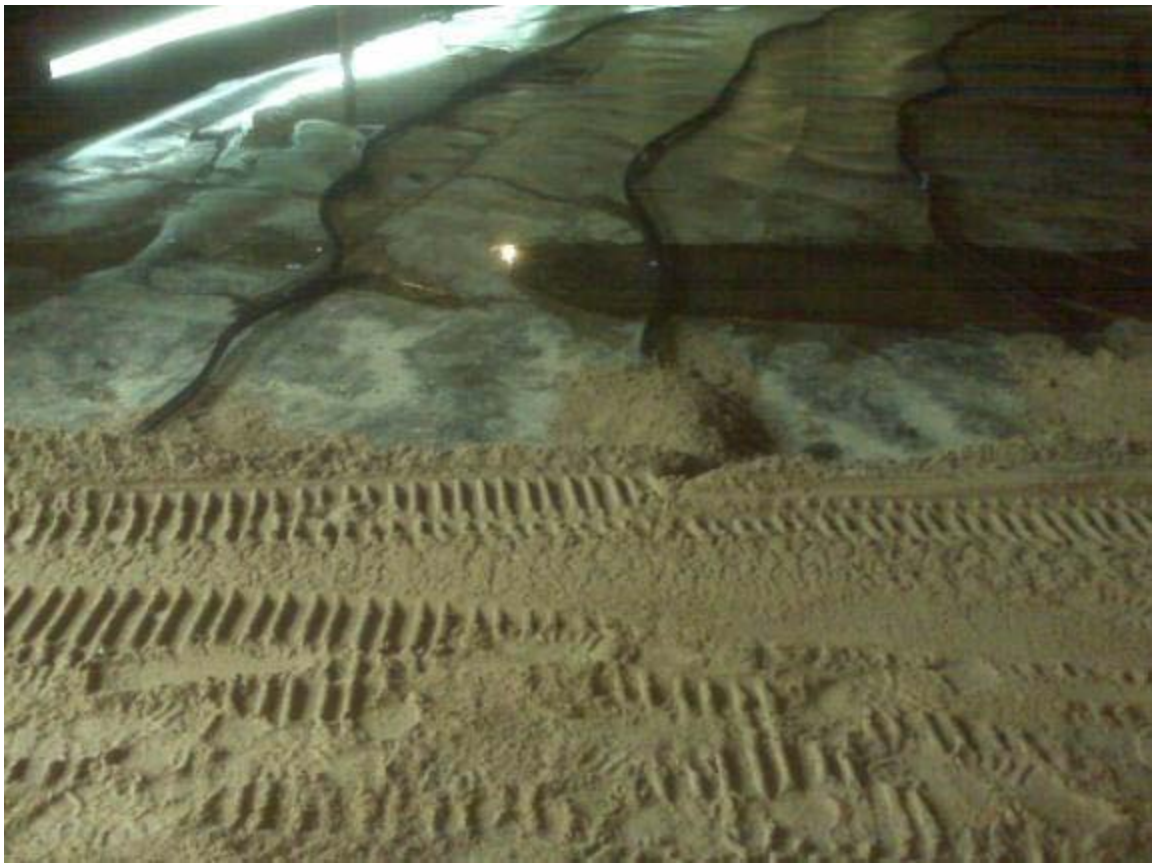
Appendix I: Tank Replacement Project Pictures


S
L11


S
L14


BAGS


ARW




03/11/2009


LINCOLN
ELECTRIC
04/01/2008

Appendix J: Revit Takeoff Sheets

Structural Foundation Schedule

Family and Type	Volume	Unit	Width
Footing-Rectangular: 5x5x2	46.88	CF	5' - 0"
Footing-Rectangular: 5x5x2	46.88	CF	5' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 6x6x2	63.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	63.00	CF	6' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 9x9x2	131.63	CF	9' - 0"
Footing-Rectangular: 4x4x2	30.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	26.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	30.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	30.00	CF	4' - 0"
Footing-Rectangular: 5x5x2	40.63	CF	5' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 5x5x2	40.63	CF	5' - 0"
Footing-Rectangular: 4x4x2	28.33	CF	4' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 8x8x2	112.00	CF	8' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"

Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 9x9x3'11"	276.75	CF	9' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 9x9x3'11"	276.75	CF	9' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 9x9x2	121.50	CF	9' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"

Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Foundation Slab: 6" Foundation Slab	17497.11	CF	
Footing-Rectangular: 7x7x2	91.88	CF	7' - 0"
Footing-Rectangular: 8x8x2.5	128.00	CF	8' - 0"
Footing-Rectangular: 4x4x2	28.00	CF	4' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 9x9x2	141.75	CF	9' - 0"
Footing-Rectangular: 5x5x2	46.88	CF	5' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 6x6x2	63.00	CF	6' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 10x10x3'11"	341.67	CF	10' - 0"
Footing-Rectangular: 7x7x2	85.75	CF	7' - 0"
Footing-Rectangular: 7x7x2	80.50	CF	7' - 0"
Footing-Rectangular: 8x8x2	96.00	CF	8' - 0"
Foundation Slab: 6" Foundation Slab	4711.00	CF	
Foundation Slab: 6" Foundation Slab	18208.19	CF	
Foundation Slab: 6" Foundation Slab	16694.44	CF	
Foundation Slab: 6" Foundation Slab	16694.44	CF	
Foundation Slab: 6" Foundation Slab	12872.40	CF	
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 5x5x2	37.50	CF	5' - 0"

Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 6x6x2	54.00	CF	6' - 0"
Footing-Rectangular: 5x5x2	37.50	CF	5' - 0"
Footing-Rectangular: 7x7x2	73.50	CF	7' - 0"
Footing-Rectangular: 7x7x2	73.50	CF	7' - 0"
Footing-Rectangular: 7x7x2	73.50	CF	7' - 0"
Footing-Rectangular: 7x7x2	73.50	CF	7' - 0"
Footing-Rectangular: 7x7x2	73.50	CF	7' - 0"
Footing-Rectangular: 9x9x3'11"	276.75	CF	9' - 0"
Footing-Rectangular: 5x5x2	43.75	CF	5' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	55.06	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	40.89	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	83.64	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	83.64	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	46.32	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	80.58	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	170.25	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	37.13	CF	3' - 0"
Wall Foundation: Bearing Footing - 36" x 12"	144.62	CF	
Foundation Slab: 6" Foundation Slab	5931.37	CF	
Total	**113385.03**	**CF**	
Total	**4200**	**CY**	

Structural Framing Schedule

Family and Type	Volume	Unit	Length
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 4 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"

HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.53	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.51	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.46	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"

HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 7/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 7/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 7 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 7 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.48	CF	13' - 8 1/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 8 7/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.47	CF	13' - 8 7/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.49	CF	13' - 7 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.66	CF	13' - 7 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.68	CF	18' - 6"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 10"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 7 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 7 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.68	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.66	CF	18' - 10"
HSS-Hollow Structural Section: HSS5X5X5/16	0.78	CF	18' - 6"
HSS-Hollow Structural Section: HSS5X5X5/16	0.78	CF	22' - 2 5/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.8	CF	22' - 2 5/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.8	CF	22' - 6 1/2"
HSS-Hollow Structural Section: HSS5X5X5/16	0.78	CF	22' - 6 1/2"

HSS-Hollow Structural Section: HSS5X5X5/16	0.81	CF	22' - 10 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.79	CF	22' - 10 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.81	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.79	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.81	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.79	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.81	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.79	CF	22' - 11 3/4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.81	CF	22' - 11 3/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	22' - 11 3/8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.67	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.95	CF	18' - 8"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	26' - 0"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	18' - 3"

HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.65	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.39	CF	18' - 3"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	11' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.63	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.63	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.63	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.63	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.62	CF	17' - 4"
HSS-Hollow Structural Section: HSS5X5X5/16	0.02	CF	17' - 4"
W-Wide Flange: W8X10	0.17	CF	1' - 0"
W-Wide Flange: W8X10	0.22	CF	9' - 1 1/2"
W-Wide Flange: W8X10	0.03	CF	11' - 4"
W-Wide Flange: W8X10	0.07	CF	2' - 0"
W-Wide Flange: W8X10	0.23	CF	4' - 0"
W-Wide Flange: W8X18	0.23	CF	7' - 4"
W-Wide Flange: W8X18	0.18	CF	7' - 4"
W-Wide Flange: W8X18	0.18	CF	5' - 9 3/8"
W-Wide Flange: W8X18	0.18	CF	5' - 9 3/8"
W-Wide Flange: W8X18	0.18	CF	5' - 9 3/8"
W-Wide Flange: W8X18	0.28	CF	5' - 9 3/8"
W-Wide Flange: W8X18	0.28	CF	8' - 2 5/8"
W-Wide Flange: W8X18	0.15	CF	8' - 2 5/8"
W-Wide Flange: W10X12	0.15	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	7' - 0"
W-Wide Flange: W10X12	0.2	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	9' - 0"
W-Wide Flange: W10X12	0.2	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	9' - 0"
W-Wide Flange: W10X12	0.2	CF	7' - 0"
W-Wide Flange: W10X12	0.15	CF	9' - 0"
W-Wide Flange: W10X12	0.2	CF	7' - 0"
W-Wide Flange: W10X12	0.09	CF	9' - 0"
W-Wide Flange: W10X12	0.14	CF	4' - 4"

W-Wide Flange: W10X12	0.07	CF	6' - 7"
W-Wide Flange: W10X12	0.1	CF	3' - 8"
W-Wide Flange: W10X12	0.09	CF	4' - 6 1/8"
W-Wide Flange: W10X12	0.09	CF	4' - 3 3/8"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.1	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4 5/8"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.09	CF	4' - 4"
W-Wide Flange: W10X12	0.1	CF	4' - 4"
W-Wide Flange: W10X12	2.66	CF	4' - 6 1/2"
W-Wide Flange: W10X12	2.66	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"

W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.03	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.21	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"

W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	10' - 0"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"

W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.03	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.21	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	10' - 0"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"

W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.67	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.03	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.2	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	10' - 0"

W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	11' - 0 3/8"
W-Wide Flange: W10X12	2.66	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.22	CF	111' - 11 3/4"
W-Wide Flange: W10X12	0.03	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.21	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"

W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.22	CF	10' - 0"
W-Wide Flange: W10X12	0.23	CF	10' - 0"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.2	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.23	CF	11' - 0 3/8"
W-Wide Flange: W10X12	0.54	CF	11' - 0 3/8"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"

W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 6"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"

W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 7 3/4"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.54	CF	18' - 10"
W-Wide Flange: W10X15	0.54	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 8"
W-Wide Flange: W10X15	0.55	CF	18' - 10"
W-Wide Flange: W10X15	0.55	CF	18' - 10"
W-Wide Flange: W10X15	0.92	CF	18' - 10"
W-Wide Flange: W10X22	0.92	CF	21' - 4"
W-Wide Flange: W10X22	0.35	CF	21' - 4"
W-Wide Flange: W10X22	0.35	CF	8' - 7"
W-Wide Flange: W10X22	0.38	CF	8' - 7"
W-Wide Flange: W10X22	0.64	CF	9' - 1 1/2"
W-Wide Flange: W10X22	0.81	CF	15' - 0"
W-Wide Flange: W10X22	0.8	CF	18' - 10"
W-Wide Flange: W10X22	0.8	CF	18' - 8"
W-Wide Flange: W10X22	0.8	CF	18' - 8"
W-Wide Flange: W10X22	0.46	CF	18' - 8"
W-Wide Flange: W10X22	0.46	CF	11' - 4"

W-Wide Flange: W10X22	0.79	CF	11' - 4"
W-Wide Flange: W10X22	0.78	CF	18' - 10"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.79	CF	18' - 8"
W-Wide Flange: W10X22	0.8	CF	18' - 10"
W-Wide Flange: W10X22	0.8	CF	18' - 8"
W-Wide Flange: W10X22	0.8	CF	18' - 8"
W-Wide Flange: W10X22	0.8	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.79	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 10"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.78	CF	18' - 8"
W-Wide Flange: W10X22	0.79	CF	18' - 8"
W-Wide Flange: W10X22	0.12	CF	18' - 10"
W-Wide Flange: W12X14	0.12	CF	5' - 0"
W-Wide Flange: W12X14	0.18	CF	5' - 0"
W-Wide Flange: W12X14	0.18	CF	7' - 0"
W-Wide Flange: W12X14	0.12	CF	7' - 0"
W-Wide Flange: W12X14	0.12	CF	5' - 0"
W-Wide Flange: W12X14	0.13	CF	5' - 0"
W-Wide Flange: W12X14	0.13	CF	5' - 0"
W-Wide Flange: W12X14	0.18	CF	5' - 0"
W-Wide Flange: W12X14	0.18	CF	7' - 0"
W-Wide Flange: W12X14	0.18	CF	7' - 0"
W-Wide Flange: W12X14	0.17	CF	7' - 0"
W-Wide Flange: W12X14	0.18	CF	6' - 8"
W-Wide Flange: W12X14	0.17	CF	7' - 0"
W-Wide Flange: W12X14	0.18	CF	6' - 8"
W-Wide Flange: W12X14	0.17	CF	7' - 0"
W-Wide Flange: W12X14	0.18	CF	6' - 8"
W-Wide Flange: W12X14	0.17	CF	7' - 0"
W-Wide Flange: W12X14	0.19	CF	6' - 8"
W-Wide Flange: W12X14	0.19	CF	7' - 4"

W-Wide Flange: W12X14	0.51	CF	7' - 4"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.24	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	9' - 1 1/2"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.52	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 10"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.52	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 10"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.52	CF	18' - 8"
W-Wide Flange: W12X14	0.19	CF	18' - 10"
W-Wide Flange: W12X14	0.19	CF	7' - 4"
W-Wide Flange: W12X14	0.19	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.5	CF	7' - 4"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.18	CF	18' - 8"

W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.19	CF	7' - 4"
W-Wide Flange: W12X14	0.19	CF	7' - 4"
W-Wide Flange: W12X14	0.19	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.18	CF	7' - 4"
W-Wide Flange: W12X14	0.5	CF	7' - 4"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"

W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.51	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.5	CF	18' - 8"
W-Wide Flange: W12X14	0.53	CF	18' - 8"
W-Wide Flange: W12X14	0.62	CF	19' - 8 1/2"
W-Wide Flange: W12X14	0.6	CF	22' - 7 3/8"
W-Wide Flange: W12X14	0.57	CF	21' - 7 3/4"
W-Wide Flange: W12X14	0.51	CF	20' - 8 1/4"
W-Wide Flange: W12X14	0.49	CF	18' - 9"
W-Wide Flange: W12X14	0.46	CF	17' - 9 3/8"
W-Wide Flange: W12X14	0.38	CF	16' - 9 7/8"
W-Wide Flange: W12X16	0.38	CF	12' - 5 3/8"
W-Wide Flange: W12X16	0.31	CF	12' - 5 3/8"
W-Wide Flange: W12X16	0.22	CF	10' - 0"
W-Wide Flange: W12X16	0.67	CF	7' - 3 3/4"
W-Wide Flange: W12X19	0.67	CF	18' - 8"
W-Wide Flange: W12X19	0.67	CF	18' - 8"
W-Wide Flange: W12X19	0.24	CF	18' - 8"
W-Wide Flange: W12X19	0.39	CF	7' - 4"
W-Wide Flange: W12X19	0.99	CF	11' - 4"
W-Wide Flange: W12X19	0.87	CF	26' - 8"
W-Wide Flange: W12X19	0.97	CF	23' - 6 7/8"
W-Wide Flange: W12X19	0.94	CF	25' - 10 3/4"
W-Wide Flange: W12X19	0.91	CF	25' - 1 1/2"
W-Wide Flange: W12X19	1.06	CF	24' - 4 1/4"
W-Wide Flange: W12X26	1.06	CF	21' - 0"
W-Wide Flange: W12X26	1.03	CF	21' - 0"
W-Wide Flange: W12X26	1.05	CF	20' - 8"
W-Wide Flange: W12X26	1.03	CF	21' - 0"
W-Wide Flange: W12X26	1.06	CF	20' - 8"
W-Wide Flange: W12X26	1.06	CF	21' - 0"
W-Wide Flange: W12X26	0.55	CF	21' - 0"
W-Wide Flange: W12X26	0.55	CF	11' - 0"
W-Wide Flange: W12X26	0.58	CF	11' - 0"
W-Wide Flange: W12X26	0.58	CF	11' - 0"
W-Wide Flange: W12X26	1.05	CF	11' - 0"
W-Wide Flange: W12X26	1.05	CF	21' - 0"

W-Wide Flange: W12X26	1.05	CF	21' - 0"
W-Wide Flange: W12X26	1.05	CF	21' - 0"
W-Wide Flange: W12X26	1.41	CF	21' - 0"
W-Wide Flange: W12X26	0.69	CF	27' - 6"
W-Wide Flange: W12X26	0.69	CF	14' - 0"
W-Wide Flange: W12X26	0.69	CF	14' - 0"
W-Wide Flange: W12X26	0.69	CF	14' - 0"
W-Wide Flange: W12X26	0.91	CF	14' - 0"
W-Wide Flange: W12X26	0.85	CF	18' - 2"
W-Wide Flange: W12X26	0.85	CF	17' - 4"
W-Wide Flange: W12X26	0.85	CF	17' - 4"
W-Wide Flange: W12X26	0.85	CF	17' - 4"
W-Wide Flange: W12X26	0.6	CF	17' - 4"
W-Wide Flange: W12X26	0.31	CF	12' - 0"
W-Wide Flange: W12X26	0.92	CF	6' - 0"
W-Wide Flange: W12X26	0.94	CF	18' - 3"
W-Wide Flange: W12X26	0.94	CF	18' - 8"
W-Wide Flange: W12X26	0.94	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.9	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 3"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.93	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 3"
W-Wide Flange: W12X26	0.93	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 3"
W-Wide Flange: W12X26	0.93	CF	18' - 8"
W-Wide Flange: W12X26	0.33	CF	18' - 3"
W-Wide Flange: W12X26	0.92	CF	7' - 4"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 6"
W-Wide Flange: W12X26	0.92	CF	18' - 10"
W-Wide Flange: W12X26	1.31	CF	18' - 8"
W-Wide Flange: W12X26	0.54	CF	26' - 0"

W-Wide Flange: W12X26	0.9	CF	11' - 4"
W-Wide Flange: W12X26	0.9	CF	18' - 3"
W-Wide Flange: W12X26	0.91	CF	18' - 3"
W-Wide Flange: W12X26	0.92	CF	18' - 6"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.9	CF	18' - 8"
W-Wide Flange: W12X26	0.91	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 6"
W-Wide Flange: W12X26	0.9	CF	18' - 7 3/4"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.46	CF	18' - 7 3/4"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.46	CF	18' - 8"
W-Wide Flange: W12X26	0.46	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.46	CF	18' - 8"
W-Wide Flange: W12X26	0.79	CF	18' - 8"

W-Wide Flange: W12X26	0.92	CF	15' - 10 3/8"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.9	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 3"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.96	CF	18' - 8"
W-Wide Flange: W12X26	0.97	CF	18' - 8"
W-Wide Flange: W12X26	0.95	CF	18' - 8"
W-Wide Flange: W12X26	0.92	CF	18' - 8"
W-Wide Flange: W12X26	0.91	CF	18' - 7 3/4"
W-Wide Flange: W12X26	0.92	CF	18' - 6"
W-Wide Flange: W12X26	0.91	CF	18' - 7 3/4"
W-Wide Flange: W12X26	1.1	CF	18' - 6"
W-Wide Flange: W12X30	1.1	CF	18' - 8"
W-Wide Flange: W12X30	1.1	CF	18' - 8"

W-Wide Flange: W12X30	1.1	CF	18' - 8"
W-Wide Flange: W12X30	1.3	CF	18' - 8"
W-Wide Flange: W12X35	1.3	CF	18' - 8"
W-Wide Flange: W12X35	1.05	CF	18' - 8"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	1.05	CF	14' - 0"
W-Wide Flange: W12X40	0.58	CF	14' - 0"
W-Wide Flange: W14X22	0.58	CF	13' - 8"
W-Wide Flange: W14X22	0.58	CF	13' - 8"
W-Wide Flange: W14X22	0.58	CF	13' - 8"
W-Wide Flange: W14X22	0.6	CF	13' - 8"
W-Wide Flange: W14X22	0.6	CF	13' - 8"
W-Wide Flange: W14X22	0.9	CF	13' - 8"
W-Wide Flange: W14X22	0.9	CF	21' - 0"
W-Wide Flange: W14X22	0.88	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.9	CF	20' - 8"
W-Wide Flange: W14X22	0.9	CF	21' - 0"
W-Wide Flange: W14X22	0.88	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.9	CF	20' - 8"
W-Wide Flange: W14X22	0.9	CF	21' - 0"
W-Wide Flange: W14X22	0.88	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.9	CF	20' - 8"
W-Wide Flange: W14X22	0.9	CF	21' - 0"
W-Wide Flange: W14X22	0.88	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	20' - 8"

W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.87	CF	20' - 8"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.88	CF	20' - 8"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.88	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.87	CF	21' - 0"
W-Wide Flange: W14X22	0.87	CF	20' - 8"
W-Wide Flange: W14X22	0.88	CF	20' - 8"
W-Wide Flange: W14X22	0.89	CF	20' - 8"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.91	CF	21' - 0"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.89	CF	21' - 4"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.91	CF	21' - 0"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.91	CF	21' - 4"
W-Wide Flange: W14X22	0.89	CF	21' - 4"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"

W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	1.18	CF	21' - 0"
W-Wide Flange: W14X22	1.18	CF	27' - 6"
W-Wide Flange: W14X22	1.18	CF	27' - 6"
W-Wide Flange: W14X22	1.18	CF	27' - 6"
W-Wide Flange: W14X22	0.89	CF	27' - 6"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.89	CF	21' - 0"
W-Wide Flange: W14X22	0.76	CF	21' - 0"

W-Wide Flange: W14X22	0.76	CF	18' - 2"
W-Wide Flange: W14X22	0.76	CF	18' - 2"
W-Wide Flange: W14X22	0.78	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.73	CF	18' - 2"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.77	CF	17' - 4"
W-Wide Flange: W14X22	0.76	CF	18' - 2"
W-Wide Flange: W14X22	0.76	CF	18' - 2"
W-Wide Flange: W14X22	0.76	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.72	CF	18' - 2"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"

W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.74	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.74	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.74	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.74	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.72	CF	17' - 4"
W-Wide Flange: W14X22	0.74	CF	17' - 4"
W-Wide Flange: W14X22	0.75	CF	17' - 7 1/4"
W-Wide Flange: W14X22	0.77	CF	17' - 9 5/8"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.77	CF	18' - 2"
W-Wide Flange: W14X22	0.73	CF	18' - 2"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.73	CF	17' - 4"
W-Wide Flange: W14X22	0.7	CF	17' - 4"
W-Wide Flange: W14X22	0.65	CF	16' - 6 1/2"
W-Wide Flange: W14X22	0.77	CF	15' - 4 1/4"
W-Wide Flange: W14X22	1.26	CF	18' - 2"
W-Wide Flange: W14X22	0.74	CF	29' - 3"
W-Wide Flange: W14X22	0.75	CF	17' - 7 1/4"
W-Wide Flange: W14X22	0.74	CF	17' - 9 5/8"
W-Wide Flange: W14X22	1.25	CF	17' - 8 1/2"
W-Wide Flange: W14X22	1.26	CF	29' - 3"
W-Wide Flange: W14X22	1.26	CF	29' - 3"
W-Wide Flange: W14X22	1.26	CF	29' - 3"

W-Wide Flange: W14X22	1.23	CF	29' - 3"
W-Wide Flange: W14X22	1.21	CF	28' - 7 1/4"
W-Wide Flange: W14X22	1.18	CF	27' - 11 1/2"
W-Wide Flange: W14X22	0.22	CF	27' - 3 3/4"
W-Wide Flange: W14X22	0.83	CF	4' - 6"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.83	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.85	CF	19' - 9 7/8"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.83	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.83	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.83	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	0.85	CF	20' - 4 1/2"
W-Wide Flange: W14X22	1.24	CF	20' - 4 1/2"
W-Wide Flange: W14X30	1.22	CF	21' - 4"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.24	CF	7' - 0"
W-Wide Flange: W14X30	1.2	CF	21' - 4"
W-Wide Flange: W14X30	1.22	CF	20' - 8"

W-Wide Flange: W14X30	1.2	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.63	CF	21' - 0"
W-Wide Flange: W14X30	1.24	CF	28' - 0"
W-Wide Flange: W14X30	1.24	CF	21' - 4"
W-Wide Flange: W14X30	2.05	CF	21' - 4"
W-Wide Flange: W14X30	2.03	CF	35' - 0"
W-Wide Flange: W14X30	2.03	CF	34' - 8"
W-Wide Flange: W14X30	0.81	CF	34' - 8"
W-Wide Flange: W14X30	0.71	CF	14' - 0"
W-Wide Flange: W14X30	0.81	CF	12' - 0"
W-Wide Flange: W14X30	0.71	CF	14' - 0"
W-Wide Flange: W14X30	1.24	CF	12' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 4"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.24	CF	7' - 0"
W-Wide Flange: W14X30	1.2	CF	21' - 4"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.2	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	2.03	CF	21' - 0"
W-Wide Flange: W14X30	2.03	CF	34' - 8"
W-Wide Flange: W14X30	1.24	CF	34' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 4"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.24	CF	7' - 0"
W-Wide Flange: W14X30	1.2	CF	21' - 4"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.2	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	2.03	CF	21' - 0"

W-Wide Flange: W14X30	2.03	CF	34' - 8"
W-Wide Flange: W14X30	0.81	CF	34' - 8"
W-Wide Flange: W14X30	0.71	CF	14' - 0"
W-Wide Flange: W14X30	0.81	CF	12' - 0"
W-Wide Flange: W14X30	0.71	CF	14' - 0"
W-Wide Flange: W14X30	1.24	CF	12' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 4"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.24	CF	7' - 0"
W-Wide Flange: W14X30	1.2	CF	21' - 4"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.2	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	20' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	2.03	CF	21' - 0"
W-Wide Flange: W14X30	2.03	CF	34' - 8"
W-Wide Flange: W14X30	1.21	CF	34' - 8"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	7' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.8	CF	21' - 0"
W-Wide Flange: W14X30	0.81	CF	14' - 0"
W-Wide Flange: W14X30	1.21	CF	14' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	7' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"

W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.8	CF	21' - 0"
W-Wide Flange: W14X30	0.81	CF	14' - 0"
W-Wide Flange: W14X30	1.22	CF	14' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	7' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.8	CF	21' - 0"
W-Wide Flange: W14X30	0.81	CF	14' - 0"
W-Wide Flange: W14X30	1.22	CF	14' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.38	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	7' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	1.22	CF	21' - 0"
W-Wide Flange: W14X30	0.8	CF	21' - 0"
W-Wide Flange: W14X30	0.81	CF	14' - 0"
W-Wide Flange: W14X30	1.04	CF	14' - 0"
W-Wide Flange: W14X30	0.98	CF	18' - 2"
W-Wide Flange: W14X30	1	CF	17' - 4"
W-Wide Flange: W14X30	1	CF	17' - 4"
W-Wide Flange: W14X30	1.01	CF	17' - 4"
W-Wide Flange: W14X30	0.69	CF	17' - 6 1/4"

W-Wide Flange: W16X26	0.32	CF	14' - 0"
W-Wide Flange: W16X26	1.08	CF	7' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.03	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	0.69	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	14' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.03	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"

W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	0.69	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	14' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.04	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.03	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"

W-Wide Flange: W16X26	1.09	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	0.69	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	14' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.04	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.03	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.09	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	20' - 8"
W-Wide Flange: W16X26	1.03	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	20' - 8"
W-Wide Flange: W16X26	0.69	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	14' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 4"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.08	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 4"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	0.87	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	17' - 6"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	0.39	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	7' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.07	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"

W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.05	CF	21' - 0"
W-Wide Flange: W16X26	1.06	CF	21' - 0"
W-Wide Flange: W16X26	0.92	CF	21' - 0"
W-Wide Flange: W16X26	0.94	CF	18' - 3"
W-Wide Flange: W16X26	0.94	CF	18' - 8"
W-Wide Flange: W16X26	0.94	CF	18' - 8"
W-Wide Flange: W16X26	0.94	CF	18' - 8"
W-Wide Flange: W16X26	1.49	CF	18' - 8"
W-Wide Flange: W16X26	0.94	CF	29' - 3"
W-Wide Flange: W16X26	0.9	CF	18' - 8"
W-Wide Flange: W16X26	0.54	CF	18' - 3"
W-Wide Flange: W16X26	0.75	CF	11' - 4"
W-Wide Flange: W16X26	0.75	CF	15' - 3"
W-Wide Flange: W16X26	0.75	CF	15' - 3"
W-Wide Flange: W16X26	0.75	CF	15' - 3"
W-Wide Flange: W16X26	0.75	CF	15' - 3"
W-Wide Flange: W16X26	0.86	CF	15' - 3"
W-Wide Flange: W16X26	0.86	CF	17' - 4"
W-Wide Flange: W16X26	0.9	CF	17' - 4"
W-Wide Flange: W16X26	0.88	CF	18' - 3"
W-Wide Flange: W16X26	0.85	CF	17' - 6 1/4"
W-Wide Flange: W16X26	0.85	CF	17' - 4"
W-Wide Flange: W16X26	1.25	CF	17' - 4"
W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.25	CF	21' - 0"

W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.25	CF	21' - 0"
W-Wide Flange: W16X31	1.19	CF	21' - 0"
W-Wide Flange: W16X31	1.09	CF	19' - 9 1/8"
W-Wide Flange: W16X31	2.08	CF	18' - 2"
W-Wide Flange: W16X36	2.07	CF	29' - 7"
W-Wide Flange: W16X36	2.08	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	2.1	CF	29' - 7"
W-Wide Flange: W16X36	0.93	CF	29' - 7"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	13' - 8"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	20' - 8"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	20' - 8"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"

W-Wide Flange: W18X35	0.91	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	13' - 8"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	20' - 8"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	20' - 8"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	13' - 8"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	20' - 8"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	20' - 8"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	0.91	CF	13' - 8"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.4	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	20' - 8"
W-Wide Flange: W18X35	1.43	CF	21' - 0"

W-Wide Flange: W18X35	0.91	CF	20' - 8"
W-Wide Flange: W18X35	1.42	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.92	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	1.42	CF	13' - 8"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.91	CF	21' - 0"
W-Wide Flange: W18X35	1.42	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.92	CF	14' - 0"
W-Wide Flange: W18X35	0.89	CF	14' - 0"
W-Wide Flange: W18X35	1.42	CF	13' - 8"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.95	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.92	CF	14' - 0"
W-Wide Flange: W18X35	0.9	CF	14' - 0"
W-Wide Flange: W18X35	1.42	CF	13' - 8"

W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.95	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	14' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	21' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.93	CF	14' - 0"
W-Wide Flange: W18X35	0.92	CF	14' - 0"
W-Wide Flange: W18X35	0.9	CF	14' - 0"
W-Wide Flange: W18X35	1.42	CF	13' - 8"
W-Wide Flange: W18X35	1.42	CF	21' - 0"
W-Wide Flange: W18X35	1.41	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	1.43	CF	21' - 0"
W-Wide Flange: W18X35	0.72	CF	21' - 0"
W-Wide Flange: W18X35	1.15	CF	11' - 4"
W-Wide Flange: W18X35	1.24	CF	17' - 4"
W-Wide Flange: W18X35	1.24	CF	18' - 8"
W-Wide Flange: W18X35	1.22	CF	18' - 8"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.22	CF	18' - 2"
W-Wide Flange: W18X35	1.16	CF	18' - 2"
W-Wide Flange: W18X35	1.17	CF	17' - 4"
W-Wide Flange: W18X35	1.17	CF	17' - 4"
W-Wide Flange: W18X35	1.16	CF	17' - 4"
W-Wide Flange: W18X35	1.14	CF	17' - 4"
W-Wide Flange: W18X35	1.15	CF	17' - 4"
W-Wide Flange: W18X35	1.15	CF	17' - 4"
W-Wide Flange: W18X35	1.15	CF	17' - 4"
W-Wide Flange: W18X35	1.15	CF	17' - 4"

W-Wide Flange: W18X35	1.15	CF	17' - 4"
W-Wide Flange: W18X35	0.91	CF	17' - 4"
W-Wide Flange: W18X35	0.91	CF	13' - 0"
W-Wide Flange: W18X35	0.89	CF	13' - 0"
W-Wide Flange: W18X35	0.89	CF	12' - 8"
W-Wide Flange: W18X35	1.6	CF	12' - 8"
W-Wide Flange: W18X40	1.62	CF	20' - 8"
W-Wide Flange: W18X40	1.6	CF	21' - 0"
W-Wide Flange: W18X40	1.62	CF	20' - 8"
W-Wide Flange: W18X40	1.6	CF	21' - 0"
W-Wide Flange: W18X40	1.62	CF	20' - 8"
W-Wide Flange: W18X40	1.6	CF	21' - 0"
W-Wide Flange: W18X40	1.62	CF	20' - 8"
W-Wide Flange: W18X40	1.62	CF	21' - 0"
W-Wide Flange: W18X40	1.61	CF	21' - 0"
W-Wide Flange: W18X40	1.62	CF	20' - 8"
W-Wide Flange: W18X40	1.61	CF	21' - 0"
W-Wide Flange: W18X40	1.64	CF	20' - 8"
W-Wide Flange: W18X40	1.61	CF	21' - 0"
W-Wide Flange: W18X40	1.64	CF	20' - 8"
W-Wide Flange: W18X40	1.61	CF	21' - 0"
W-Wide Flange: W18X40	1.36	CF	20' - 8"
W-Wide Flange: W18X40	1.36	CF	17' - 4"
W-Wide Flange: W18X40	1.66	CF	17' - 4"
W-Wide Flange: W18X50	1.66	CF	17' - 4"
W-Wide Flange: W18X50	1.77	CF	17' - 4"
W-Wide Flange: W18X50	1.77	CF	18' - 8"
W-Wide Flange: W18X50	1.79	CF	18' - 8"
W-Wide Flange: W18X50	1.81	CF	18' - 8"
W-Wide Flange: W18X50	1.79	CF	18' - 8"
W-Wide Flange: W18X50	1.81	CF	18' - 8"
W-Wide Flange: W18X50	1.79	CF	18' - 8"
W-Wide Flange: W18X50	1.81	CF	18' - 8"
W-Wide Flange: W18X50	1.66	CF	18' - 8"
W-Wide Flange: W18X50	1.66	CF	17' - 4"
W-Wide Flange: W18X50	4.12	CF	17' - 4"
W-Wide Flange: W18X60	4.12	CF	35' - 0"
W-Wide Flange: W18X60	4.12	CF	35' - 0"
W-Wide Flange: W18X60	4.12	CF	35' - 0"
W-Wide Flange: W18X60	2.66	CF	35' - 0"

W-Wide Flange: W18X76	5.64	CF	18' - 3"
W-Wide Flange: W18X97	5.64	CF	29' - 7"
W-Wide Flange: W18X97	1.83	CF	29' - 7"
W-Wide Flange: W21X44	1.79	CF	21' - 4"
W-Wide Flange: W21X44	1.79	CF	21' - 0"
W-Wide Flange: W21X44	1.83	CF	21' - 0"
W-Wide Flange: W21X44	2.11	CF	21' - 4"
W-Wide Flange: W21X44	1.18	CF	24' - 6"
W-Wide Flange: W21X44	1.18	CF	14' - 0"
W-Wide Flange: W21X44	1.18	CF	14' - 0"
W-Wide Flange: W21X44	1.18	CF	14' - 0"
W-Wide Flange: W21X44	1.96	CF	14' - 0"
W-Wide Flange: W21X48	1.96	CF	21' - 0"
W-Wide Flange: W21X48	1.92	CF	21' - 0"
W-Wide Flange: W21X48	1.94	CF	20' - 8"
W-Wide Flange: W21X48	1.91	CF	21' - 0"
W-Wide Flange: W21X48	1.94	CF	20' - 8"
W-Wide Flange: W21X48	1.94	CF	21' - 0"
W-Wide Flange: W21X48	1.94	CF	21' - 0"
W-Wide Flange: W21X48	1.95	CF	21' - 0"
W-Wide Flange: W21X48	2.19	CF	21' - 0"
W-Wide Flange: W21X48	1.63	CF	23' - 6 7/8"
W-Wide Flange: W21X48	1.63	CF	17' - 4"
W-Wide Flange: W21X48	2.99	CF	17' - 4"
W-Wide Flange: W24X55	2.23	CF	28' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.23	CF	21' - 4"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.21	CF	21' - 4"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"

W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.23	CF	21' - 4"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.21	CF	21' - 4"
W-Wide Flange: W24X55	2.27	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.23	CF	21' - 4"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.21	CF	21' - 4"
W-Wide Flange: W24X55	3.77	CF	21' - 0"
W-Wide Flange: W24X55	3.77	CF	35' - 0"
W-Wide Flange: W24X55	2.27	CF	35' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.23	CF	21' - 4"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	20' - 8"
W-Wide Flange: W24X55	2.18	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	20' - 8"
W-Wide Flange: W24X55	2.21	CF	21' - 4"
W-Wide Flange: W24X55	2.6	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	24' - 6"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"

W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.21	CF	21' - 0"
W-Wide Flange: W24X55	2.23	CF	21' - 0"
W-Wide Flange: W24X55	2.25	CF	21' - 0"
W-Wide Flange: W24X55	1.91	CF	21' - 0"

W-Wide Flange: W24X55	1.95	CF	18' - 3"
W-Wide Flange: W24X55	1.95	CF	18' - 8"
W-Wide Flange: W24X55	3.77	CF	18' - 8"
W-Wide Flange: W24X55	3.77	CF	34' - 8"
W-Wide Flange: W24X55	3.75	CF	34' - 8"
W-Wide Flange: W24X55	3.78	CF	34' - 8"
W-Wide Flange: W24X55	3.78	CF	34' - 8"
W-Wide Flange: W24X55	3.75	CF	34' - 8"
W-Wide Flange: W24X55	3.75	CF	34' - 8"
W-Wide Flange: W24X55	3.78	CF	34' - 8"
W-Wide Flange: W24X55	3.78	CF	34' - 8"
W-Wide Flange: W24X55	3.75	CF	34' - 8"
W-Wide Flange: W24X55	1.95	CF	34' - 8"
W-Wide Flange: W24X55	1.95	CF	18' - 8"
W-Wide Flange: W24X55	2.86	CF	18' - 8"
W-Wide Flange: W24X55	1.61	CF	26' - 8"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.63	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	3.36	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	28' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.63	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.63	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.63	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	3.36	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	27' - 6"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"

W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	1.61	CF	14' - 0"
W-Wide Flange: W24X62	2.24	CF	14' - 0"
W-Wide Flange: W24X62	2.24	CF	18' - 8"
W-Wide Flange: W24X62	2.47	CF	18' - 8"
W-Wide Flange: W24X68	4.67	CF	18' - 8"
W-Wide Flange: W24X68	3.9	CF	34' - 8"
W-Wide Flange: W24X68	5.16	CF	29' - 3"
W-Wide Flange: W24X76	5.16	CF	34' - 8"
W-Wide Flange: W24X76	5.16	CF	34' - 8"
W-Wide Flange: W24X76	5.16	CF	34' - 8"
W-Wide Flange: W24X76	5.24	CF	34' - 8"
W-Wide Flange: W24X76	5.24	CF	34' - 8"
W-Wide Flange: W24X76	5.24	CF	34' - 8"
W-Wide Flange: W24X76	5.24	CF	34' - 8"
W-Wide Flange: W24X76	5.22	CF	34' - 8"
W-Wide Flange: W24X76	5.22	CF	34' - 8"
W-Wide Flange: W24X76	6.99	CF	34' - 8"
W-Wide Flange: W27X84	6.99	CF	42' - 0"
W-Wide Flange: W27X84	5.77	CF	42' - 0"
W-Wide Flange: W27X84	6.99	CF	35' - 0"
W-Wide Flange: W27X84	6.99	CF	42' - 0"
W-Wide Flange: W27X84	6.99	CF	42' - 0"
W-Wide Flange: W27X84	6.99	CF	42' - 0"
W-Wide Flange: W27X84	5.77	CF	42' - 0"
W-Wide Flange: W27X84	6.72	CF	35' - 0"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"

W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.79	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	35' - 0"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"

W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"

W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"

W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.75	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	6.72	CF	34' - 8"
W-Wide Flange: W30X99	7.97	CF	34' - 8"
W-Wide Flange: W30X116	7.97	CF	35' - 0"
W-Wide Flange: W30X116	7.97	CF	35' - 0"
W-Wide Flange: W30X116	16.31	CF	35' - 0"
W-Wide Flange: W33X118	16.26	CF	69' - 4"
W-Wide Flange: W33X118	16.26	CF	69' - 4"
W-Wide Flange: W33X118	16.26	CF	69' - 4"
W-Wide Flange: W33X118	16.26	CF	69' - 4"
Totals	**3358.52**	**CF**	

Appendix K: Development of the WPI Recreational Center

Over the past couple years WPI has tried to modernize the buildings and facilities on campus, with the construction of the Bartlett Center, East hall and alumni field; this year the plan was to build a brand new athletic facility. Last spring, when our MQP was assembled, WPI was going through the process of a evaluating a conceptual design of the facility. Construction was slated to start in the summer of 2009 and was our initial project for completing our MQP, unfortunately, due the economy at the time, WPI decided to hold off on the project for at least another year; resulting in us needing to find another MQP.

To get a good understanding of how the different parties worked together we attended the design meetings and watched the interactions between the different groups. WPI is the owner and Gilbane Building Co was hired as the construction manager. Many different people within the WPI community attended these meetings, from the president down to the equipment manager. All parties worked together to develop a conceptual design that looked good and fit in with the surrounding the buildings and a facility that would fall within budget. The budget for the project was roughly 60 million and Gilbane's part of the project at that point was to help WPI decide what parts of the facility were wants vs. needs. We attended roughly 4 meetings and saw the conceptual design change quite a bit from the 1st meeting to the last meeting. Overall, although the project didn't go through, it was a good experience to see how a CM can assist an owner in the early stages of a project. Through this experience, our group has learned the hard way on how quickly a project can change because of the economy.