Photo Courtesy of Burchick Construction

UNIVERSITY OF PITTSBURGH

CHEVRON ANNEX

PITTSBURGH, PENNSYLVANIA

Technical Report 2

October 19
2011

Robert Mroskey | Construction Option

Advisor: Dr. Chimay Anumba

EXECUTIVE SUMMARY

The purpose of Technical Report 2 is to analyze the key features of the University of Pittsburgh's Chevron Annex project. The project is located in Pittsburgh, Pennsylvania and is a two phase project consisting of a renovation and an addition to the University's Chevron Tower and Ashe Auditorium. The addition is a three story addition, consisting of two floors of laboratory space and one story for a mechanical penthouse. The addition will tie into the existing Chevron Tower, east of the addition, on each of the new floors.

This report evaluates the project's schedule, structural and general conditions estimates, LEED information and Building Information Modeling uses. A detailed construction schedule was developed, reflecting the various phasing and construction sequences. This schedule is based off Burchick Construction's baseline schedule, keeping distinctions between the MEP rough-in, distribution and finishes.

Also included in this report, is a detailed structural systems estimate and a general conditions estimate for the Chevron Annex. A detailed estimate for a typical bay of the structural system was produced to help the student gain knowledge in estimating analysis. This typical bay estimate was then used to price the entire structure and compared to the actual costs of the various items included in the structural system. These values were found to differ dramatically, with the variance in cost assumed to be due to the difference in unit prices and items excluded in the estimate.

General Conditions for the Chevron Annex were determined and priced accordingly. These values were also compared to Burchick's and were found to be reasonably close, with the exception of the project staff section. This section was significantly higher than Burchick's estimate because multiple project staffing costs were added.

Additionally, the Chevron Annex is in pursuit of a LEED Gold rating. A LEED Scorecard was developed in this report using the LEED-NC Checklist, with a majority of the project's points coming from the Sustainable Sites and Indoor Environmental Quality sections. The projected points are summarized in detail throughout this report, giving the student an overall understanding of the LEED rating system.

This report is concluded with a Building Information Modeling (BIM) Use Evaluation. Although BIM was not used for the Chevron Annex, an evaluation was performed to determine the appropriateness of the BIM uses and the process for implementation. It was determined, if properly executed, that the use of BIM would prove to be effective in creating a project with increased efficiency and decreased cost from start to completion.

TABLE OF CONTENTS

DETAILED PROJECT SCHEDULE

The detailed project schedule that can be found in Appendix A reflects how the Chevron Annex was built, including the phasing and structural sequences. This schedule is a condensed version of Burchick Construction's baseline schedule, keeping distinctions between the MEP rough-in, distribution and finishes. To better portray the project's timeline, the schedule is also divided into three main sections:

- Preconstruction
- Construction
- Turnover/Commissioning

Included in these three sections are critical dates for the construction and development of the Chevron Annex and are outlined below:

- Phase 1 – Existing Building: 11/20/2009 – 1/3/2011
- Structural Steel Erection: 5/27/2010 - 12/17/10
- Turnover Auditorium to Owner: 1/3/2011

- Phase 2 – Building Expansion: 6/24/2010 – 9/13/2011
- Building Shell: 10/21/2010 – 9/8/2011
- 4th Floor Construction: 7/8/2010 – 8/26/2011
- 3rd Floor Construction: 7/7/2010 – 9/13/2011
- 2nd Floor Construction: 6/24/2010 – 9/13/2011

- Final Completion: 9/19/2011
- University Move-In: 9/19/2011
- Construction Work Complete: 10/14/2011

PRECONSTRUCTION

The Preconstruction section of the schedule consists of a few simple tasks that are typical for a general design-bid-build project. The tasks under this section include the project bidding period, project award, notice to proceed and the submittals and shop drawings timeframe.

The Chevron Annex was set out to bid in August 2009. After the bidding period concluded, the bids were reviewed and the project was awarded on September 28, 2009; with the official notice to proceed given on November 20, 2009. Finally, construction of the first phase of the project began on December 3, 2009.

It is important to note the large gap between the project award and the notice to proceed dates. This is because a large portion of the funds were provided by The Department of General Services (DGS). After the University of Pittsburgh awarded the project to the contractors, they needed to wait for the funds to be processed by the DGS. Processing of these funds took longer than expected, so the University asked the contractors to hold their bids an additional sixty days due to the long process. All of the contractors agreed to this, finally receiving the notice to proceed on November 20, 2009.

CONSTRUCTION

The Construction section is the largest section of the schedule. This section consists of two main phases; the existing building and building expansion phases. The existing building phase consists of the demolition and preparation for the foundation and structural system involved with the building expansion. This phase also includes renovation work to the auditorium, auditorium lobby and the main lobby. Construction of the first phase started on November 20, 2009 and was completed on January 3, 2011.

The second phase of the project includes the construction of the vertical addition above the Ashe Auditorium. Construction of the addition started during the first phase when the foundations and structural systems were being prepared for the new structure. This foundation system utilizes micropiles and pile caps placed throughout the existing Ashe Auditorium, with the structural steel superstructure resting above. Also included in the second phase are the finishing of two levels of laboratory space and one level for a mechanical penthouse. Included in the laboratory spaces is an extensive amount of MEP and millwork tasks. Additionally, portions of walls had to be demolished to allow the addition to tie into the existing Chevron Tower. Construction of the second phase was completed on September 19, 2011.

TURNOVER/COMMISSIONING

The Turnover/Commissioning section of the schedule consists of a number of critical tasks needed to complete the project. The dates of these tasks were crucial for the owner's occupancy. Items included under this section are related to the sequencing, commissioning and testing that was needed for an efficient turnover of the building. In order for many of these tasks to be completed, the lab areas of the building needed to be complete and dust-free before any testing and balancing could begin. Furthermore, the construction work is not to be complete until after the final completion and University move-in tasks. This is because the site work and miscellaneous flashings were exceptions to the final completion.

DETAILED STRUCTURAL SYSTEMS ESTIMATE

A detailed estimate of the structural system for the Chevron Annex was developed by analyzing a typical bay of the building. While exploring the structural system in close detail, the typical bay for the building was discovered. This bay (Figure 1) is located from column lines <C.3 – E.8> to column lines <6.1 – 8.9>, having an area of 1,218 square feet.

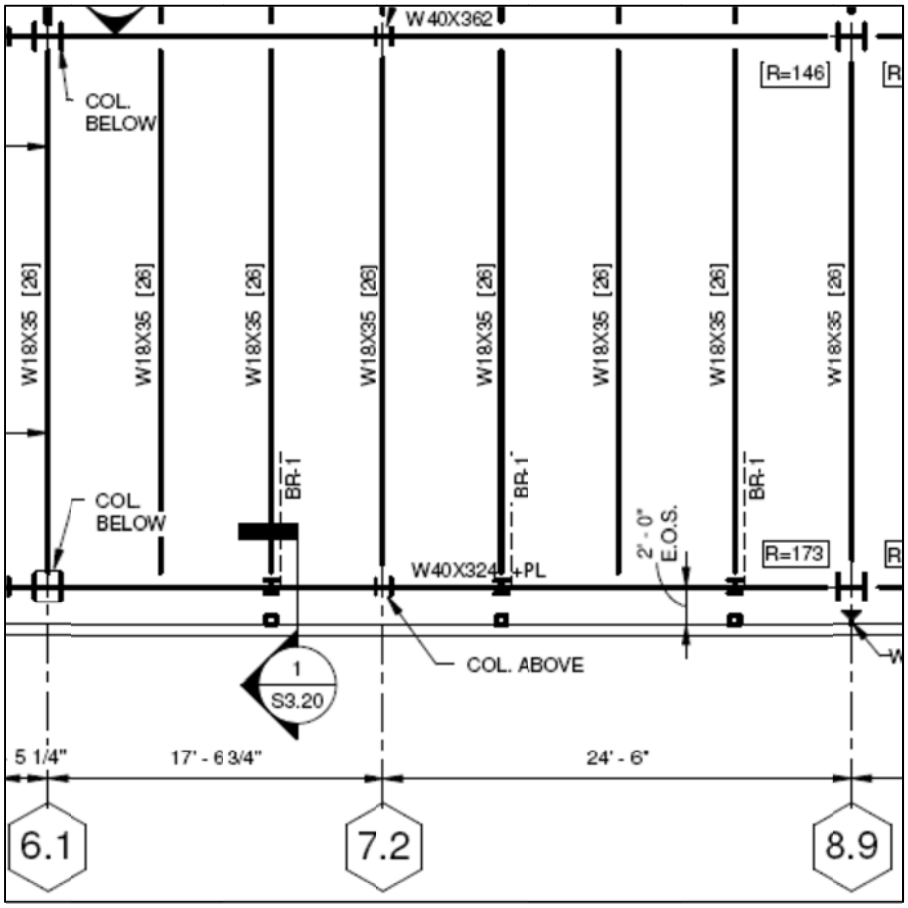


Figure 1 Typical Bay

Determining the location for the typical bay started by evaluating the foundation plan and finding where the pile caps were located. After the pile caps were located, the column schedule was reviewed to find the sizes of the columns supported by the pile caps. During the examination, some of the columns and bays were found to include a braced frame; while others did not. For simplicity of the estimate, the bays that consisted of a braced frame were eliminated. Next, the framing for the second level was analyzed to determine what the typical beams and decking of the flooring system were. Taking all of this into account, the materials and layout of a typical bay were able to be determined.

A breakdown of the detailed estimate can be found in Appendix B. Values used throughout the estimate were taken from *RS Means Building Construction Cost Data 2011.* These values include only material,

labor and equipment costs. The estimate does not include any overhead and profit, thus decreasing the overall cost of the estimate.

There were several factors and assumptions that were used while creating the estimate of the structural system. The estimates produced for the typical bay of the structural system includes micropiles, cast-in-place concrete and structural steel. A multiplier of 1.16 was added to the welded wire fabric and decking to account for the overlaps and waste of material during construction. Additionally, the following items were excluded from the estimate:

- Horizontal bracing
- Braced Frame
- Horizontal Bracing
- Kickers
- Steel connections
- Fireproofing/painting of steel
- Steel Bolts & Plates

Table 1 compares the actual values provided by Burchick to the values estimated for the typical bay. The total price for each system was computed by multiplying the cost per bay by the number of bays included in the building (21). These numbers were found to be significantly off, except for the micropile section. These values were found to be different because the unit prices used from RS Means were significantly higher than the actual values used. Additionally, the cast-in-place concrete section included the price for the pile caps; which were not in every bay. This difference caused the total estimated value to be incomparably higher than the actual value provided.

Comparison of Structural System Cost					
	ACTUAL		ESTIMATED		
SYSTEM	TOTAL	$/SF	TOTAL	$/SF	DIFFERENCE
Micro Piles	$ 791,270	$ 22.61	$ 840,205.80	$ 24.01	1.06
CIP Concrete	$ 330,534	$ 9.44	$ 1,337,150.90	$ 38.20	4.05
Structural Steel	$ 1,654,000	$ 47.26	$ 4,727,188.98	$ 135.06	2.86

Table 1 Comparison of Structural System Cost

After analyzing the superstructure, it was discovered that the structural system's typical bay consisted of the following:

- Piles & Pile Caps
- Structural Steel Beams & Columns
- Concrete Floor Slabs

PILES & PILE CAPS

There are two different pile caps that are used in the typical bay; PC12 & PC15. These pile caps are rectangular and are 54 and 60 inches thick, respectively. Steel reinforcing bars run horizontally in both directions and are spaced according to the schedule; however, the unit numbers used to price the pile caps included reinforcing. Furthermore, the pile caps are supported by two types of piles, P1 & P2. These piles are pre-augered up to thirty feet deep and vary in number, depending on the pile cap. A detailed estimate of the piles and pile caps can be found in Appendix B.

STRUCTURAL STEEL BEAMS AND COLUMNS

The structure of the Chevron Annex consists mainly of steel beams and columns. These members are in various sizes throughout the building and are laid out in a typical perpendicular orientation. The typical bay analyzed includes columns of W10 and W14 shapes and beams of assorted W shapes. Additionally, some of the columns in the typical bay consist of a braced frame. This braced frame is not included in the estimate because it was thought to not be uniform throughout the entire building. Furthermore, structural steel hangers are used on the second floor to add to the structure. These members are W8X46 steel members that are connected at certain spacing per the drawings.

As stated above, the estimate of the typical bay does not include some items that would typically be included in an estimate. The items not included in the estimate are as follows:

- Horizontal Bracing
- Kickers
- Steel connections
- Fireproofing/painting of steel
- Steel Bolts & Plates

The exclusion of the items listed above alters the overall estimate significantly. The labor and material costs of the estimate are especially altered. This is due to the complexity involved with the connections used throughout the building. Furthermore, it is understood that the weather conditions can also alter the costs of labor for the erection of the steel, which can directly affect the costs of the construction.

CONCRETE FLOOR SLABS

The flooring system used throughout the Chevron Annex consists of galvanized composite decking that supports 4,000 psi concrete slabs reinforced by welded wire fabric. Slabs of each of the floors differ slightly, due to the expected use of each of them. Floors two and three use a 1-1/2", 18 gauge galvanized composite deck covered with 4-1/2" of normal weight concrete. The fourth floor uses a 2", 18 gauge galvanized deck covered with 6" of normal weight concrete. Furthermore, the roof uses a 1-1/2" wide ribbed, 20 gauge galvanized steel deck. All of the slabs are reinforced with the same type of welded

wire fabric, 4X4-W4.5XW4.5. Finishing and curing costs of these slabs are included in the unit prices used to develop the estimate.

GENERAL CONDITIONS ESTIMATE

Technical Report 2 also developed a General Conditions estimate for the construction of the Chevron Annex. This estimate is based on the General Conditions produced by Burchick Construction for the project. Items included in Burchick's General Conditions were separated into two bid packages; one for bid package A and E. To assist with an accurate comparison of the prices, the General Conditions estimate provided in this technical report combines bid packages A and E into one overall estimate.

The General Conditions estimate was based on a 95 week duration that was calculated in the detailed project schedule, found in Appendix A. Additionally, the General Conditions are based on a 35,000 square foot building, valued at $10.5 million. A summary of the General Conditions estimate can be found below in Table 3, with a more detailed estimate located in Appendix C. Table 3 combines the General Conditions estimate into five main categories; staffing, temporary facilities, protection and safety, bonds and insurance and other miscellaneous items. The staffing category consists of the project managers, superintendents and foreman involved with the project. Also, the temporary facilities category includes items such as the field office, temporary toilets, temporary sheds, temporary enclosures and other items from the site plan developed in Technical Report 1. Items like barricades, safety programs, floor protection and covered walks are included in the protection and safety category. Additionally, Builder's Risk Insurance, building permits, performance bonds and builder's privilege tax are included in the bonds and insurance category. Any other items from the General Conditions estimate that are not included in the above categories are included in the miscellaneous category.

Not included in the general conditions estimate are temporary utilities; such as power, heat and water. These utilities were not included in the General Conditions estimate because they are required, by contract, to be provided by their respective trades. Additionally, the costs for soil and concrete testing were also not included, because it is the owner's responsibility to perform these items.

General Conditions Summary			
Item	**Total Cost**	**% of GC**	**% of Budget**
Staffing	808,716.00	73%	7.70%
Temporary Facilities	33,712.50	3%	0.32%
Protection & Safety	47,896.00	4%	0.46%
Bonds & Insurance	114,100.00	10%	1.09%
Miscellaneous	104,719.40	9%	1.00%
Total	**$ 1,109,143.90**	**100%**	**10.56%**

Table 3 General Conditions Summary

When comparing the General Conditions in Table 4 below, it was found that the estimated value is over two times larger than the estimate created by Burchick. While analyzing the two General Conditions estimates, a few differences between the two estimates were noted. The main difference between the two estimates was the staffing costs. This is because Burchick's estimate did not include any costs for the project manager or foreman on the job. These costs accounted for roughly seventy percent of the total General Conditions estimate. This difference in cost was assumed to be because the staffing costs were distributed somewhere else in Burchick's estimate. Overall, the estimates were relatively close and accurate to each other. A few other discrepancies were noted throughout the estimates, mainly because the durations used were different. These discrepancies in duration are assumed to be from the use of different initial schedules.

General Conditions Comparison				
Item	**Burchick Actual**	**Estimate**	**Difference**	**Difference**
Staffing	$ 150,028.80	$ 808,716.00	$ (658,687.20)	5.39
Temporary Facilities	$ 32,562.50	$ 33,712.50	$ (1,150.00)	1.04
Protection & Safety	$ 42,216.00	$ 47,896.00	$ (5,680.00)	1.13
Bonds & Insurance	$ 96,200.42	$ 114,100.00	$ (17,899.58)	1.19
Miscellaneous	$ 94,558.08	$ 104,719.40	$ (10,161.32)	1.11
Total	**$ 415,565.80**	**1,109,143.90**	**$ (693,578.10)**	**2.67**

Table 4 General Conditions Comparison

LEED EVALUATION

The Chevron Annex is currently in pursuit of a LEED Gold rating. A LEED Scorecard was developed using the LEED Green Building Rating System for New Construction, Version 2.2. This scorecard is currently under review for certification and can be found in Appendix D. Additionally, a summary of the points expected in each section is provided below in Table 5. It can be seen from this table that the project team is attempting to achieve the Gold rating by completing many of their points in the Sustainable Sites and Indoor Environmental Quality sections.

Yes	?	No		SECTION	POINTS
7	0	7		Sustainable Sites	14 Points
4	0	1		Water Efficiency	5 Points
3	4	10		Energy & Atmosphere	17 Points
4	1	8		Materials & Resources	13 Points
14	0	1		Indoor Environmental Quality	15 Points
4	0	1		Innovation & Design Process	5 Points
Yes	?	No			
36	5	28		Project Totals (pre-certification estimates)	69 Points
Certified 26-32 points	Silver 33-38 points	Gold 39-51 points	Platinum 52-69 points		

Table 5 LEED Points Summary

The Sustainable Sites section has a potential of fourteen total points that can be achieved. Seven of these points are being attempted by the project team to help them reach their goal. They plan to do this by first choosing a site that reduces the environmental impact to the site; as well as one that was previously developed and in an area of adequate density. Pollution from automobiles is also being reduced by encouraging public and alternative ways of transportation. To help with this, bicycle storage was provided and no new parking was added to the building. Furthermore, a reduction of the heat island effect minimized the impact on microclimate and human wildlife habitat.

Additionally, there are five total points that are achievable in the Water Efficiency section; four of which are anticipated by the project team. These points are maximized by limiting the use of potable water, or other natural surface or subsurface water resources available on or near the project site for landscape irrigation. Water efficiency is also maximized by using 30% less water than the water use baseline calculated for the building.

Seven of the seventeen points in the Energy & Atmosphere are attempted by the project team; with four of these points under review. The project team is currently working with the commissioning agent to complete all of the commissioning points under review. Additionally, at least 35% of the building's electricity is coming from renewable sources in at least a two-year renewable energy contract.

Thirteen total points are available under the Materials & Resources section, with five of them anticipated by the project team. At least 75% of the construction, demolition and land-clearing debris was diverted from disposal in landfills and incinerators. Additionally, the recyclable recovered resources were redirected back to the manufacturing process and reusable materials were redirected to appropriate sites. An increased demand for building products that incorporate recycled materials was also incorporated into the project, as well as products within 500 miles of the project site were used for a minimum of 10% of the total materials value. Chain of Custody Certificates were also received by manufacturers and suppliers to achieve the certified wood credit.

An impressive fourteen of fifteen points are expected to be achieved under the Indoor Environmental Quality section. A capacity for ventilation system monitoring and additional air ventilation was provided to help sustain the comfort and well-being of the occupants. Indoor air quality problems from the construction process were reduced during construction and before occupancy. Indoor air contaminants that are odorous, irritating and/or harmful to the occupants were also reduced in the materials and finish products used in the building. Additionally, the building occupants' exposure to potentially hazardous particulates and chemical pollutants were reduced and a comfortable thermal and lighting environment was provided to help support the productivity and well-being of the occupants. A connection between the indoor space and outdoors was also introduced to the building by using large amounts of curtain wall for the facade.

In addition to the above points, four Innovation & Design Process points are being attempted. A LEED Accredited Professional is being utilized on the project, as well as educational signs to gain two of these points. Additionally, over 95% of the construction waste is being recycled and the water savings is over 10%; which adds two more exemplary performance points to the overall score.

In summary, the Chevron Annex is anticipating forty-one out of sixty-nine points. This pre-certification total will help the project obtain a LEED Gold certification for the building. It will also help acknowledge the building in its attempt to implement strategies for better environmental and health performance, as well as adding another LEED certified building to the University of Pittsburgh's campus.

BUILDING INFORMATION MODELING USE EVALUATION

Building Information Modeling (BIM) was not used during any of the phases of the Chevron Annex. However, after reviewing and analyzing the project; it was decided that the use of BIM would have greatly benefitted the building in a number of ways.

The first step in deciding whether or not BIM had a potential value on the Chevron Annex was to define the overall goals for BIM implementation. These goals were based on a number of areas of interest that included reducing the schedule duration, project performance and higher field productivity. After the goals were determined, the specific BIM uses on the project were identified. There are twenty-five common uses for BIM described in Penn State's BIM Project Execution Planning Guide. Of these common uses, five were focused on, proving to be most beneficial to the project. The five uses focused on for this project are as follows:

- Design Reviews
- 3D Coordination
- Phase Planning (4D Modeling)
- Record Modeling
- Digital Fabrication

Using the Design Review as a BIM use is important for this project because it allows the project team to quickly analyze design alternatives and solve design and constructability issues. This use can also create shorter and more efficient design reviews. Furthermore, the Design Review can preview the space aesthetics and layout during design reviews, which allows easy communication of the design to the owner. Additionally, the Design Review creates efficiencies in the design process, as well as reducing the time and cost invested in traditional mock-ups.

3D Coordination was also a common use focused on for this project because of the amount of mechanical and laboratory equipment throughout the building. Coordination between the various trades installing this equipment is critical in reducing and eliminating field conflicts. This will also significantly reduce the number of RFI's; as well as increase the productivity and construction visualization, and decrease the schedule dramatically.

Another potential use for BIM on this project was Phase Planning. This use will help the project team gain a better understanding of the phasing schedule, as well as provide a critical path for the project. Phase Planning is a recommended use on this project because of the sequencing and coordination conflicts encountered throughout the construction of the project. Phase Planning will attempt to decrease the number of these issues, increasing the identification of scheduling and sequencing issues.

Having an extensive amount of mechanical and laboratory equipment throughout this project also allows for the use of Record Modeling. This BIM use contains information related to the main architectural and MEP elements. The Record Model is also useful because it allows the owner to continually update and improve the model. This is important because of the increased technological development involved in the Chemistry field and the equipment used. Information relating to warranties and maintenance history of all of the components in the building is also contained in the Record Model.

Digital Fabrication was the last potential use for BIM that was focused on. Importance of the schedule duration and decreased field conflicts made this an essential BIM use topic. Digital Fabrication automates the building component fabrication, while minimizing tolerances in the field and maximizing fabrication productivity. Decreased tolerances and increased productivity helps with both the schedule and cost of the project. Additionally, the automated fabrication decreases the amount of field conflicts encountered.

Once the uses were identified, a process map was produced. The process map helped show the sequencing and interaction between the primary BIM uses on the project. With the development of the process map, all team members are able to clearly understand how their work processes interact with the process performed by others involved. Also contained in the process map is a high level information exchange that occurs continually throughout the project lifecycle.

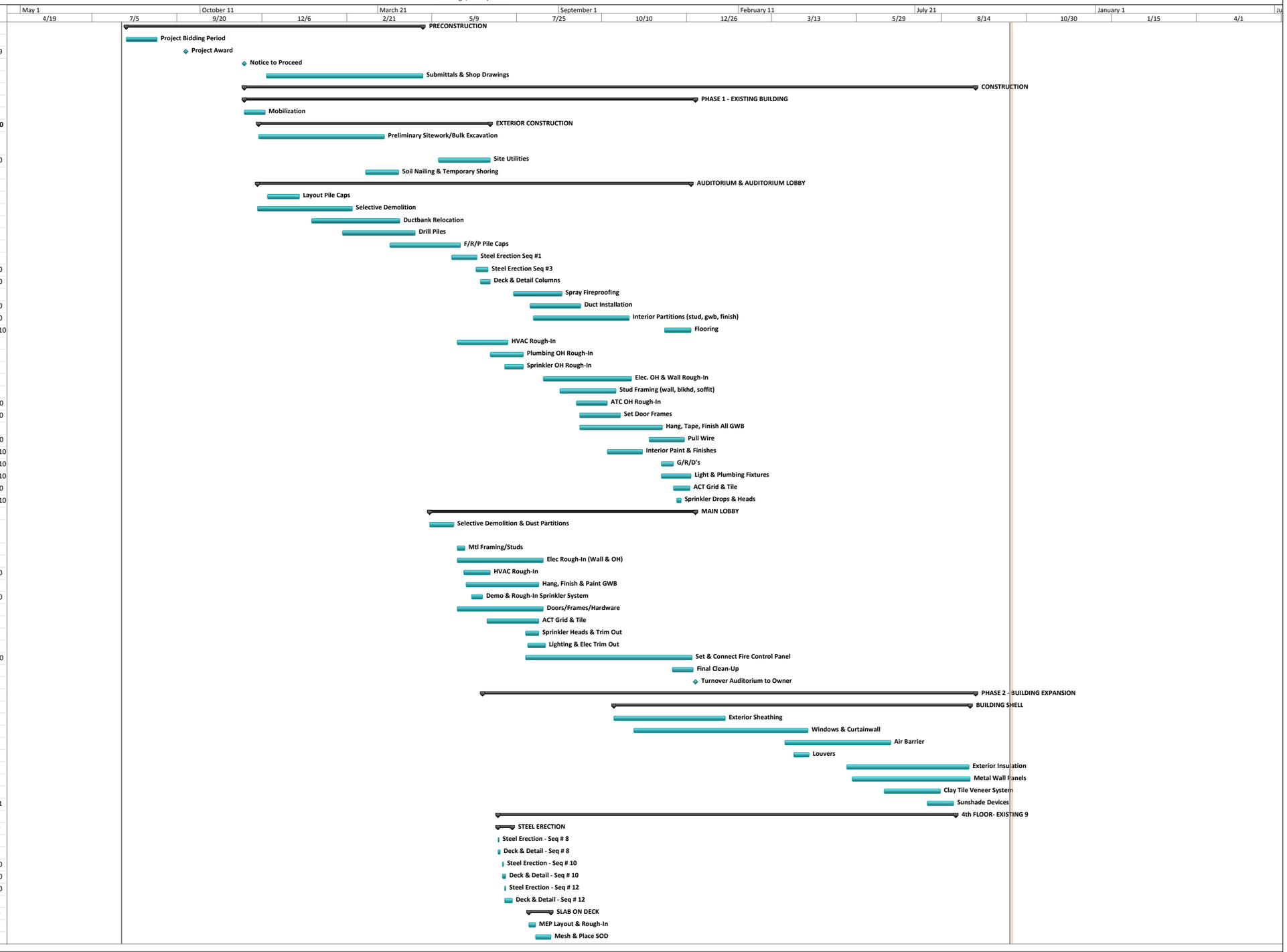
As outlined above, it is determined that the implementation of BIM proves to be an excellent investment. The use of BIM will help decrease the number of conflicts in the field, thus decreasing the overall project schedule. Costs will also be decreased by automating the building component fabrication, minimizing the tolerances in the field and maximizing fabrication productivity. Additionally, BIM will create an accurate record model to turnover to the owner for future use and maintenance of the building.

The complete BIM Use Evaluation and Level 1 process map can be found in Appendix E.

APPENDIX A – DETAILED PROJECT SCHEDULE

University of Pittsburgh Chevron Annex
Pittsburgh, Pennsylvania

ID	Task Mode	Task Name	Duration	Start	Finish
1		**PRECONSTRUCTION**	**193 days**	**Wed 8/5/09**	**Fri 4/30/10**
2		Project Bidding Period	20 days	Wed 8/5/09	Tue 9/1/09
3		Project Award	0 days	Mon 9/28/09	Mon 9/28/09
4		Notice to Proceed	0 days	Fri 11/20/09	Fri 11/20/09
5		Submittals & Shop Drawings	102 days	Thu 12/10/09	Fri 4/30/10
6		**CONSTRUCTION**	**473 days**	**Fri 11/20/09**	**Tue 9/13/11**
7		**PHASE 1 - EXISTING BUILDING**	**291 days**	**Fri 11/20/09**	**Mon 1/3/11**
8		Mobilization	13 days	Fri 11/20/09	Tue 12/8/09
9		**EXTERIOR CONSTRUCTION**	**150 days**	**Thu 12/3/09**	**Wed 6/30/10**
10		Preliminary Sitework/Bulk Excavation	82 days	Thu 12/3/09	Fri 3/26/10
11		Site Utilities	34 days	Sat 5/15/10	Wed 6/30/10
12		Soil Nailing & Temporary Shoring	22 days	Wed 3/10/10	Thu 4/8/10
13		**AUDITORIUM & AUDITORIUM LOBBY**	**281 days**	**Wed 12/2/09**	**Wed**
14		Layout Pile Caps	21 days	Fri 12/11/09	Fri 1/8/10
15		Selective Demolition	62 days	Wed 12/2/09	Thu 2/25/10
16		Ductbank Relocation	58 days	Wed 1/20/10	Fri 4/9/10
17		Drill Piles	48 days	Wed 2/17/10	Fri 4/23/10
18		F/R/P Pile Caps	46 days	Thu 4/1/10	Thu 6/3/10
19		Steel Erection Seq #1	17 days	Thu 5/27/10	Fri 6/18/10
20		Steel Erection Seq #3	7 days	Fri 6/18/10	Mon 6/28/10
21		Deck & Detail Columns	7 days	Tue 6/22/10	Wed 6/30/10
22		Spray Fireproofing	32 days	Thu 7/22/10	Fri 9/3/10
23		Duct Installation	32 days	Fri 8/6/10	Mon 9/20/10
24		Interior Partitions (stud, gwb, finish)	63 days	Mon 8/9/10	Wed 11/3/10
25		Flooring	18 days	Mon 12/6/10	Wed 12/29/10
26		HVAC Rough-In	34 days	Tue 6/1/10	Fri 7/16/10
27		Plumbing OH Rough-In	22 days	Thu 7/1/10	Fri 7/30/10
28		Sprinkler OH Rough-In	13 days	Wed 7/14/10	Fri 7/30/10
29		Elec. OH & Wall Rough-In	58 days	Wed 8/18/10	Fri 11/5/10
30		Stud Framing (wall, blkhd, soffit)	37 days	Thu 9/2/10	Fri 10/22/10
31		ATC OH Rough-In	20 days	Fri 9/17/10	Thu 10/14/10
32		Set Door Frames	27 days	Mon 9/20/10	Tue 10/26/10
33		Hang, Tape, Finish All GWB	55 days	Mon 9/20/10	Fri 12/3/10
34		Pull Wire	24 days	Mon 11/22/10	Thu 12/23/10
35		Interior Paint & Finishes	22 days	Fri 10/15/10	Mon 11/15/10
36		G/R/D's	7 days	Fri 12/3/10	Mon 12/13/10
37		Light & Plumbing Fixtures	19 days	Fri 12/3/10	Wed 12/29/10
38		ACT Grid & Tile	11 days	Tue 12/14/10	Tue 12/28/10
39		Sprinkler Drops & Heads	2 days	Fri 12/17/10	Mon 12/20/10
40		**MAIN LOBBY**	**171 days**	**Fri 5/7/10**	**Mon 1/3/11**
41		Selective Demolition & Dust Partitions	16 days	Fri 5/7/10	Fri 5/28/10
42		Mtl Framing/Studs	5 days	Tue 6/1/10	Mon 6/7/10
43		Elec Rough-In (Wall & OH)	56 days	Tue 6/1/10	Tue 8/17/10
44		HVAC Rough-In	18 days	Mon 6/7/10	Wed 6/30/10
45		Hang, Finish & Paint GWB	48 days	Wed 6/9/10	Fri 8/13/10
46		Demo & Rough-In Sprinkler System	8 days	Mon 6/14/10	Wed 6/23/10
47		Doors/Frames/Hardware	56 days	Tue 6/1/10	Tue 8/17/10
48		ACT Grid & Tile	35 days	Mon 6/28/10	Fri 8/13/10
49		Sprinkler Heads & Trim Out	10 days	Mon 8/2/10	Fri 8/13/10
50		Lighting & Elec Trim Out	12 days	Wed 8/4/10	Thu 8/19/10
51		Set & Connect Fire Control Panel	109 days	Mon 8/2/10	Thu 12/30/10
52		Final Clean-Up	15 days	Mon 12/13/10	Fri 12/31/10
53		Turnover Auditorium to Owner	0 days	Mon 1/3/11	Mon 1/3/11
54		**PHASE 2 - BUILDING EXPANSION**	**319 days**	**Thu 6/24/10**	**Tue 9/13/11**
55		**BUILDING SHELL**	**231 days**	**Thu 10/21/10**	**Thu 9/8/11**
56		Exterior Sheathing	73 days	Thu 10/21/10	Sat 1/29/11
57		Windows & Curtainwall	114 days	Mon 11/8/10	Thu 4/14/11
58		Air Barrier	68 days	Fri 3/25/11	Tue 6/28/11
59		Louvers	11 days	Sat 4/2/11	Fri 4/15/11
60		Exterior Insulation	79 days	Fri 5/20/11	Wed 9/7/11
61		Metal Wall Panels	77 days	Wed 5/25/11	Thu 9/8/11
62		Clay Tile Veneer System	37 days	Thu 6/23/11	Fri 8/12/11
63		Sunshade Devices	18 days	Mon 8/1/11	Wed 8/24/11
64		**4th FLOOR- EXISTING 9**	**297 days**	**Thu 7/8/10**	**Fri 8/26/11**
65		**STEEL ERECTION**	**9 days**	**Thu 7/8/10**	**Tue 7/20/10**
66		Steel Erection - Seq # 8	1 day	Thu 7/8/10	Thu 7/8/10
67		Deck & Detail - Seq # 8	2 days	Thu 7/8/10	Fri 7/9/10
68		Steel Erection - Seq # 10	1 day	Mon 7/12/10	Mon 7/12/10
69		Deck & Detail - Seq # 10	3 days	Mon 7/12/10	Wed 7/14/10
70		Steel Erection - Seq # 12	1 day	Wed 7/14/10	Wed 7/14/10
71		Deck & Detail - Seq # 12	5 days	Wed 7/14/10	Tue 7/20/10
72		**SLAB ON DECK**	**14 days**	**Thu 8/5/10**	**Tue 8/24/10**
73		MEP Layout & Rough-In	4 days	Thu 8/5/10	Tue 8/10/10
74		Mesh & Place SOD	10 days	Wed 8/11/10	Tue 8/24/10



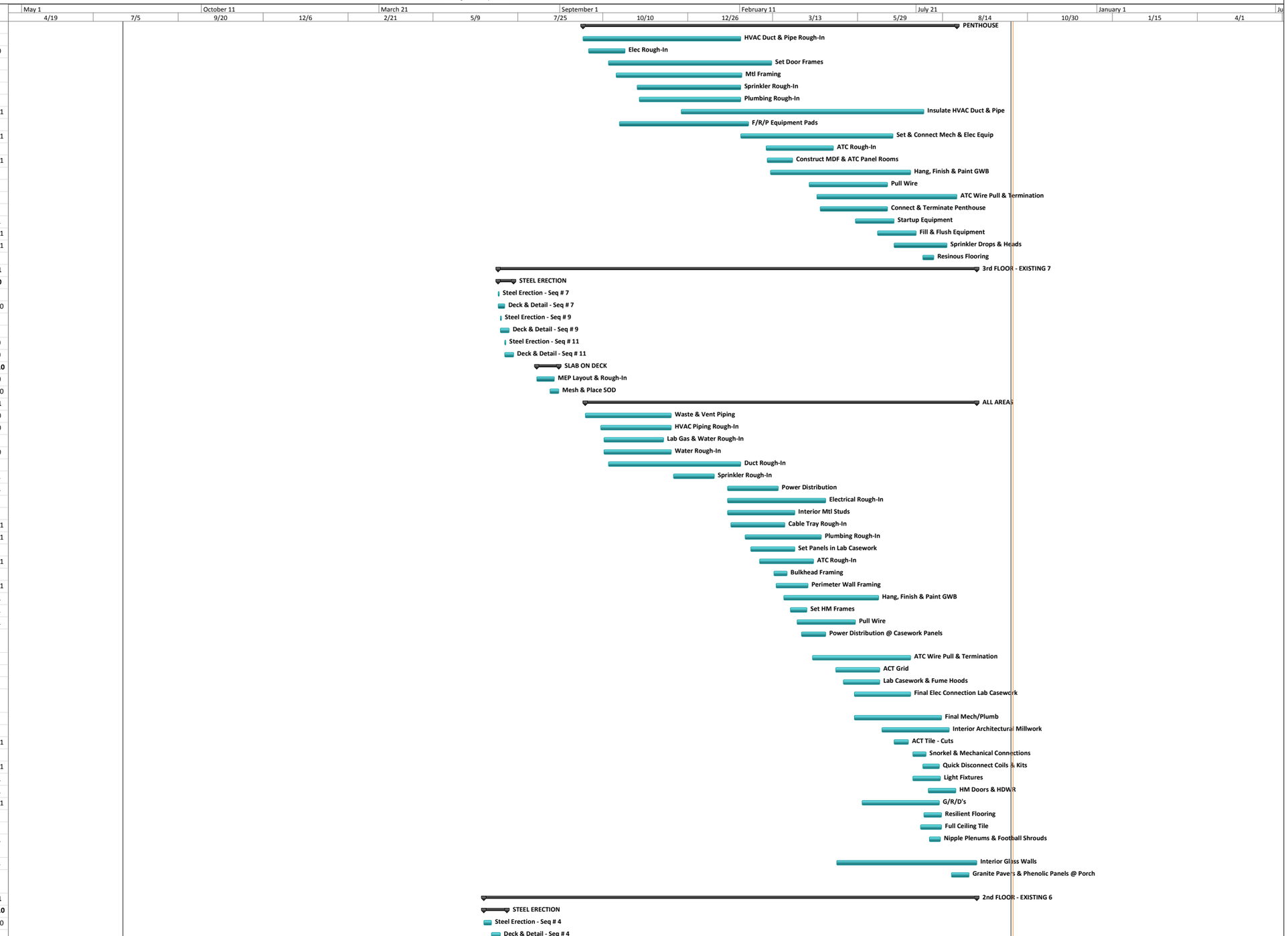
Project: Chevron Detailed Summa
Date: October 19, 2011

Task | Milestone | Project Summary | External Milestone | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | Deadline
Split | Summary | External Tasks | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | Progress

Robert Mroskey

University of Pittsburgh Chevron Annex
Pittsburgh, Pennsylvania

ID	Task Mode	Task Name	Duration	Start	Finish
75		**PENTHOUSE**	**243 days**	**Wed 9/22/10**	**Fri 8/26/11**
76		HVAC Duct & Pipe Rough-In	103 days	Wed 9/22/10	Fri 2/11/11
77		Elec Rough-In	25 days	Mon 9/27/10	Fri 10/29/10
78		Set Door Frames	106 days	Fri 10/15/10	Fri 3/11/11
79		Mtl Framing	82 days	Fri 10/22/10	Sat 2/12/11
80		Sprinkler Rough-In	68 days	Wed 11/10/10	Fri 2/11/11
81		Plumbing Rough-In	66 days	Fri 11/12/10	Fri 2/11/11
82		Insulate HVAC Duct & Pipe	158 days	Mon 12/20/10	Wed 7/27/11
83		F/R/P Equipment Pads	85 days	Mon 10/25/10	Fri 2/18/11
84		Set & Connect Mech & Elec Equip	99 days	Sat 2/12/11	Wed 6/29/11
85		ATC Rough-In	45 days	Mon 3/7/11	Fri 5/6/11
86		Construct MDF & ATC Panel	17 days	Tue 3/8/11	Wed 3/30/11
87		Hang, Finish & Paint GWB	91 days	Fri 3/11/11	Fri 7/15/11
88		Pull Wire	51 days	Fri 4/15/11	Fri 6/24/11
89		ATC Wire Pull & Termination	91 days	Fri 4/22/11	Fri 8/26/11
90		Connect & Terminate Penthouse	45 days	Mon 4/25/11	Fri 6/24/11
91		Startup Equipment	25 days	Fri 5/27/11	Thu 6/30/11
92		Fill & Flush Equipment	25 days	Thu 6/16/11	Wed 7/20/11
93		Sprinkler Drops & Heads	34 days	Fri 7/1/11	Wed 8/17/11
94		Resinous Flooring	8 days	Wed 7/27/11	Fri 8/5/11
95		**3rd FLOOR - EXISTING 7**	**310 days**	**Wed 7/7/10**	**Tue 9/13/11**
96		**STEEL ERECTION**	**10 days**	**Wed 7/7/10**	**Tue 7/20/10**
97		Steel Erection - Seq # 7	1 day	Wed 7/7/10	Wed 7/7/10
98		Deck & Detail - Seq # 7	4 days	Wed 7/7/10	Mon 7/12/10
99		Steel Erection - Seq # 9	1 day	Fri 7/9/10	Fri 7/9/10
100		Deck & Detail - Seq # 9	6 days	Fri 7/9/10	Fri 7/16/10
101		Steel Erection - Seq # 11	1 day	Tue 7/13/10	Tue 7/13/10
102		Deck & Detail - Seq # 11	6 days	Tue 7/13/10	Tue 7/20/10
103		**SLAB ON DECK**	**14 days**	**Wed 8/11/10**	**Mon 8/30/10**
104		MEP Layout & Rough-In	12 days	Wed 8/11/10	Thu 8/26/10
105		Mesh & Place SOD	6 days	Mon 8/23/10	Mon 8/30/10
106		**ALL AREAS**	**253 days**	**Fri 9/24/10**	**Tue 9/13/11**
107		Waste & Vent Piping	56 days	Fri 9/24/10	Fri 12/10/10
108		HVAC Piping Rough-In	46 days	Fri 10/8/10	Fri 12/10/10
109		Lab Gas & Water Rough-In	40 days	Mon 10/11/10	Fri 12/3/10
110		Water Rough-In	45 days	Mon 10/11/10	Fri 12/10/10
111		Duct Rough-In	86 days	Fri 10/15/10	Fri 2/11/11
112		Sprinkler Rough-In	27 days	Mon 12/13/10	Tue 1/18/11
113		Power Distribution	34 days	Mon 1/31/11	Thu 3/17/11
114		Electrical Rough-In	65 days	Mon 1/31/11	Fri 4/29/11
115		Interior Mtl Studs	45 days	Mon 1/31/11	Fri 4/1/11
116		Cable Tray Rough-In	35 days	Thu 2/3/11	Wed 3/23/11
117		Plumbing Rough-In	49 days	Wed 2/16/11	Mon 4/25/11
118		Set Panels in Lab Casework	30 days	Mon 2/21/11	Fri 4/1/11
119		ATC Rough-In	35 days	Tue 3/1/11	Mon 4/18/11
120		Bulkhead Framing	10 days	Mon 3/14/11	Fri 3/25/11
121		Perimeter Wall Framing	21 days	Wed 3/16/11	Wed 4/13/11
122		Hang, Finish & Paint GWB	62 days	Wed 3/23/11	Thu 6/16/11
123		Set HM Frames	11 days	Tue 3/29/11	Tue 4/12/11
124		Pull Wire	39 days	Mon 4/4/11	Thu 5/26/11
125		Power Distribution @ Casework Panels	16 days	Fri 4/8/11	Fri 4/29/11
126		ATC Wire Pull & Termination	65 days	Mon 4/18/11	Fri 7/15/11
127		ACT Grid	30 days	Mon 5/9/11	Fri 6/17/11
128		Lab Casework & Fume Hoods	25 days	Mon 5/16/11	Fri 6/17/11
129		Final Elec Connection Lab Casework	37 days	Thu 5/26/11	Fri 7/15/11
130		Final Mech/Plumb	57 days	Thu 5/26/11	Fri 8/12/11
131		Interior Architectural Millwork	45 days	Mon 6/20/11	Fri 8/19/11
132		ACT Tile - Cuts	9 days	Fri 7/1/11	Wed 7/13/11
133		Snorkel & Mechanical	10 days	Mon 7/18/11	Fri 7/29/11
134		Quick Disconnect Coils & Kits	11 days	Wed 7/27/11	Wed 8/10/11
135		Light Fixtures	19 days	Mon 7/18/11	Thu 8/11/11
136		HM Doors & HDWR	19 days	Mon 8/1/11	Thu 8/25/11
137		G/R/D's	50 days	Thu 6/2/11	Wed 8/10/11
138		Resilient Flooring	12 days	Thu 7/28/11	Fri 8/12/11
139		Full Ceiling Tile	15 days	Mon 7/25/11	Fri 8/12/11
140		Nipple Plenums & Football Shrouds	8 days	Tue 8/2/11	Thu 8/11/11
141		Interior Glass Walls	91 days	Tue 5/10/11	Tue 9/13/11
142		Granite Pavers & Phenolic Panels @ Porch	12 days	Mon 8/22/11	Tue 9/6/11
143		**2nd FLOOR - EXISTING 6**	**319 days**	**Thu 6/24/10**	**Tue 9/13/11**
144		**STEEL ERECTION**	**15 days**	**Thu 6/24/10**	**Wed 7/14/10**
145		Steel Erection - Seq # 4	5 days	Thu 6/24/10	Wed 6/30/10
146		Deck & Detail - Seq # 4	6 days	Thu 7/1/10	Thu 7/8/10



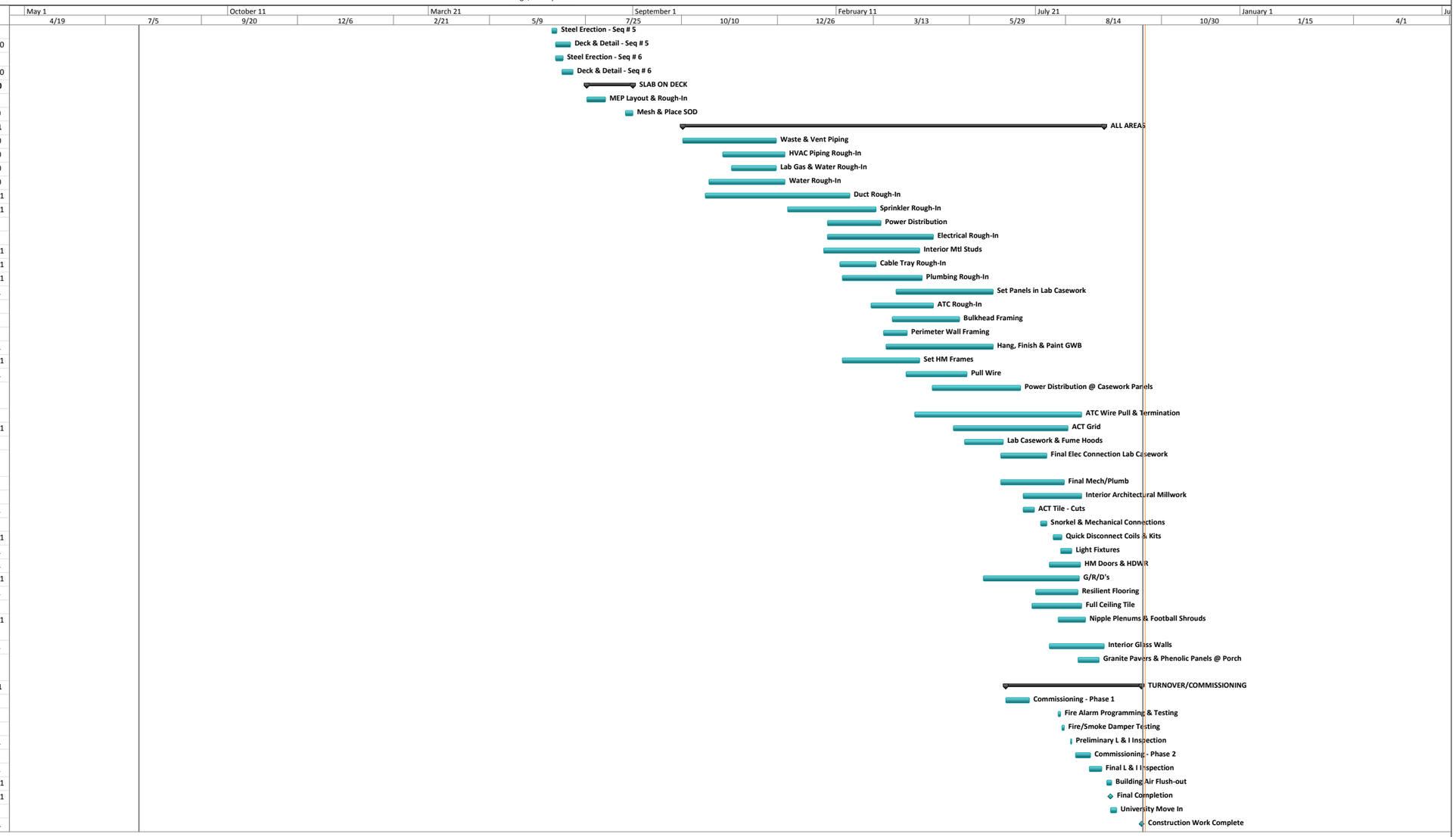
Project: Chevron Detailed Summa
Date: October 19, 2011

Task | Milestone | Project Summary | External Milestone | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | Deadline
Split | Summary | External Tasks | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | Progress

Robert Mroskey

University of Pittsburgh Chevron Annex
Pittsburgh, Pennsylvania

ID	Task Mode	Task Name	Duration	Start	Finish
147		Steel Erection - Seq # 5	4 days	Mon 6/28/10	Thu 7/1/10
148		Deck & Detail - Seq # 5	8 days	Thu 7/1/10	Mon 7/12/10
149		Steel Erection - Seq # 6	4 days	Thu 7/1/10	Tue 7/6/10
150		Deck & Detail - Seq # 6	7 days	Tue 7/6/10	Wed 7/14/10
151		**SLAB ON DECK**	**27 days**	**Mon 7/26/10**	**Tue 8/31/10**
152		MEP Layout & Rough-In	11 days	Mon 7/26/10	Mon 8/9/10
153		Mesh & Place SOD	4 days	Thu 8/26/10	Tue 8/31/10
154		**ALL AREAS**	**242 days**	**Mon**	**Tue 9/13/11**
155		Waste & Vent Piping	55 days	Mon 10/11/10	Fri 12/24/10
156		HVAC Piping Rough-In	36 days	Fri 11/12/10	Fri 12/31/10
157		Lab Gas & Water Rough-In	26 days	Fri 11/19/10	Fri 12/24/10
158		Water Rough-In	45 days	Mon 11/1/10	Fri 12/31/10
159		Duct Rough-In	82 days	Fri 10/29/10	Mon 2/21/11
160		Sprinkler Rough-In	51 days	Mon 1/3/11	Mon 3/14/11
161		Power Distribution	31 days	Fri 2/4/11	Fri 3/18/11
162		Electrical Rough-In	61 days	Fri 2/4/11	Fri 4/29/11
163		Interior Mtl Studs	55 days	Tue 2/1/11	Mon 4/18/11
164		Cable Tray Rough-In	21 days	Mon 2/14/11	Mon 3/14/11
165		Plumbing Rough-In	46 days	Wed 2/16/11	Wed 4/20/11
166		Set Panels in Lab Casework	56 days	Thu 3/31/11	Thu 6/16/11
167		ATC Rough-In	36 days	Fri 3/11/11	Fri 4/29/11
168		Bulkhead Framing	40 days	Mon 3/28/11	Fri 5/20/11
169		Perimeter Wall Framing	15 days	Mon 3/21/11	Fri 4/8/11
170		Hang, Finish & Paint GWB	62 days	Wed 3/23/11	Thu 6/16/11
171		Set HM Frames	44 days	Wed 2/16/11	Mon 4/18/11
172		Pull Wire	35 days	Fri 4/8/11	Thu 5/26/11
173		Power Distribution @ Casework Panels	51 days	Fri 4/29/11	Fri 7/8/11
174		ATC Wire Pull & Termination	96 days	Fri 4/15/11	Fri 8/26/11
175		ACT Grid	66 days	Mon 5/16/11	Mon 8/15/11
176		Lab Casework & Fume Hoods	23 days	Wed 5/25/11	Fri 6/24/11
177		Final Elec Connection Lab Casework	27 days	Thu 6/23/11	Fri 7/29/11
178		Final Mech/Plumb	37 days	Thu 6/23/11	Fri 8/12/11
179		Interior Architectural Millwork	35 days	Mon 7/11/11	Fri 8/26/11
180		ACT Tile - Cuts	7 days	Mon 7/11/11	Tue 7/19/11
181		Snorkel & Mechanical	5 days	Mon 7/25/11	Fri 7/29/11
182		Quick Disconnect Coils & Kits	5 days	Thu 8/4/11	Wed 8/10/11
183		Light Fixtures	7 days	Wed 8/10/11	Thu 8/18/11
184		HM Doors & HDWR	19 days	Mon 8/1/11	Thu 8/25/11
185		G/R/D's	55 days	Thu 6/9/11	Wed 8/24/11
186		Resilient Flooring	24 days	Thu 7/21/11	Tue 8/23/11
187		Full Ceiling Tile	30 days	Mon 7/18/11	Fri 8/26/11
188		Nipple Plenums & Football Shrouds	16 days	Mon 8/8/11	Mon 8/29/11
189		Interior Glass Walls	32 days	Mon 8/1/11	Tue 9/13/11
190		Granite Pavers & Phenolic Panels @ Porch	13 days	Wed 8/24/11	Fri 9/9/11
191		**TURNOVER/COMMISSIONING**	**79 days**	**Mon 6/27/11**	**Fri 10/14/11**
192		Commissioning - Phase 1	15 days	Mon 6/27/11	Fri 7/15/11
193		Fire Alarm Programming & Testing	2 days	Mon 8/8/11	Tue 8/9/11
194		Fire/Smoke Damper Testing	2 days	Thu 8/11/11	Fri 8/12/11
195		Preliminary L & I Inspection	1 day	Thu 8/18/11	Thu 8/18/11
196		Commissioning - Phase 2	10 days	Mon 8/22/11	Fri 9/2/11
197		Final L & I Inspection	7 days	Fri 9/2/11	Sun 9/11/11
198		Building Air Flush-out	2 days	Fri 9/16/11	Mon 9/19/11
199		Final Completion	0 days	Mon 9/19/11	Mon 9/19/11
200		University Move In	5 days	Mon 9/19/11	Fri 9/23/11
201		Construction Work Complete	0 days	Fri 10/14/11	Fri 10/14/11



Project: Chevron Detailed Summa
Date: October 19, 2011

Task | Milestone | Project Summary | External Milestone | Inactive Milestone | Manual Task | Manual Summary Rollup | Start-only | Deadline
Split | Summary | External Tasks | Inactive Task | Inactive Summary | Duration-only | Manual Summary | Finish-only | Progress

Robert Mroskey

APPENDIX B – DETAILED STRUCTURAL SYSTEMS ESTIMATE

(These values are for a typical bay only)

MICROPILE ESTIMATE TAKE-OFF CHARTS										
PILES	310660									
LOCATION		TYPE	LF	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment
		P-1	720.00	LF		$ -	$ 10.05	$ 7,236.00	$ 13.80	$ 9,936.00
		pre-augering up to 30' deep								
		P-2	900.00	LF		$ -	$ 10.05	$ 9,045.00	$ 13.80	$ 12,420.00
		pre-augering up to 30' deep								
						$ -		$ 16,281.00		$ 22,356.00
								$ 38,637.00		
PILES -PLACING	310660									
LOCATION		TYPE	LF	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment
		P-1	26.67	cy		$ -	$ 9.80	$ 261.33	$ 13.08	$ 348.80
		pre-augering up to 30' deep								
		P-2	33.33	cy		$ -	$ 9.80	$ 326.67	$ 13.08	$ 436.00
		pre-augering up to 30' deep								
						$ -		$ 588.00		$ 784.80
								$ 1,372.80		
Total						$ -		$ 16,869.00		$ 23,140.80
								$ 40,009.80		

CONCRETE ESTIMATE TAKE-OFF CHARTS													
ELEVATED SLAB	33053	(incl'd finish)											
LOCATION		TYPE	THICKNESS	CONCRETE TYPE	AREA	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment	
LEVEL 2													
		S-6	4 1/2"	NORMAL WT	1218.00	SF	$ 1.32	$ 1,607.76	$ 0.82	$ 998.76	$ 0.28	$ 341.04	
LEVEL 3													
		S-6	4 1/2"	NORMAL WT	1218.00	SF	$ 1.32	$ 1,607.76	$ 0.82	$ 998.76	$ 0.28	$ 341.04	
LEVEL 4													
		S-8	6"	NORMAL WT	1218.00	SF	$ 1.96	$ 2,387.28	$ 0.82	$ 998.76	$ 0.29	$ 353.22	
LEVEL 5/ROOF													
		RD-1.5											
								$ 5,602.80		$ 2,996.28		$ 1,035.30	
										$ 9,634.38			
DECK	0.53000												
LOCATION		TYPE			AREA	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment	
LEVEL 2													
		1 1/2" - 18GA GALV COMPOSITE			1412.88	SF	$ 1.92	$ 2,712.73	$ 0.43	$ 607.54	$ 0.03	$ 42.39	
LEVEL 3													
		1 1/2" - 18GA GALV COMPOSITE			1412.88	SF	$ 1.92	$ 2,712.73	$ 0.43	$ 607.54	$ 0.03	$ 42.39	
LEVEL 4													
		2" - 18GA GALV COMPOSITE			1412.88	SF	$ 1.88	$ 2,656.21	$ 0.46	$ 649.92	$ 0.03	$ 42.39	
LEVEL 5/ROOF													
		1 1/2" WIDE RIB 20GA GALV			1412.88	SF	$ 1.42	$ 2,006.29	$ 0.35	$ 494.51	$ 0.02	$ 28.26	
								$ 10,087.96		$ 2,359.51		$ 155.42	
										$ 12,602.89			
WELDED WIRE FABRIC	32205												
LOCATION		TYPE		AREA		COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment	
LEVEL 2													
		4X4-W4.5XW4.5		1638.94	16.39	CSF	$ 45.00	$ 737.52	$ 31.00	$ 508.07			
LEVEL 3													
		4X4-W4.5XW4.5		1638.94	16.39	CSF	$ 45.00	$ 737.52	$ 31.00	$ 508.07			
LEVEL 4													
		4X4-W4.5XW4.5		1638.94	16.39	CSF	$ 45.00	$ 737.52	$ 31.00	$ 508.07			
LEVEL 5/ROOF													
		4X4-W4.5XW4.5		1638.94	16.39	CSF	$ 45.00	$ 737.52	$ 31.00	$ 508.07			
								$ 2,950.09		$ 2,032.29			
										$ 4,982.38			
PILE CAPS	33053												
LOCATION		TYPE			AREA	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment	

		P-12			32.46	CY	$ 154.00	$ 4,998.84	$ 85.50	$ 2,775.33	$ 0.43	$ 13.96
		3000 PSI (incl'd forms and reinf)										
		P-15			55.00	CY	$ 154.00	$ 8,470.00	$ 85.50	$ 4,702.50	$ 0.43	$ 23.65
		3000 PSI (incl'd forms and reinf)										
								$ 13,468.84		$ 7,477.83		$ 37.61
										$ 20,984.28		
PILE CAPS - PLACING	33053											
LOCATION		TYPE			AREA	COST UNIT	**Unit**	**Material**	**Unit**	**Labor**	**Unit**	**Equipment**
		P-12			32.46	CY	$ 154.00	$ 4,998.84	$ 9.80	$ 318.11	$ 13.08	$ 424.58
		3000 PSI (incl'd forms and reinf)										
		P-15			55.00	CY	$ 154.00	$ 8,470.00	$ 9.80	$ 539.00	$ 13.08	$ 719.40
		3000 PSI (incl'd forms and reinf)										
								$ 13,468.84		$ 857.11		$ 1,143.98
										$ 15,469.92		
Total								$ 45,578.54		$ 15,723.01		$ 2,372.30
										$ 63,673.85		

STRUCTURAL STEEL ESTIMATE TAKE-OFF CHARTS													
COLUMNS	0.51223												
LOCATION		TYPE	WEIGHT	UNIT	TOTAL LF	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment
C.3-6.1	1	W14X233	233	LB/LF	63.16	LF	375.00	$ 23,686.13	3.70	$ 233.70	1.67	$ 105.48
C.3-5.9	18	W10X60	60	LB/LF	49.00	LF	84.00	$ 4,116.00	2.70	$ 132.30	1.65	$ 80.85
E.8-6.1	4	W14X233	233	LB/LF	63.16	LF	375.00	$ 23,686.13	3.70	$ 233.70	1.67	$ 105.48
E.8-5.9	19	W10X60	60	LB/LF	35.17	LF	84.00	$ 2,954.03	2.70	$ 94.95	1.65	$ 58.03
E.8-5.9	19	W10X39	39	LB/LF	13.83	LF	55.50	$ 767.73	2.57	$ 35.55	1.57	$ 21.72
E.8-7.2	19	W10X60	60	LB/LF	35.17	LF	84.00	$ 2,954.03	2.70	$ 94.95	1.65	$ 58.03
E.8-7.2	19	W10X39	39	LB/LF	13.83	LF	55.50	$ 767.73	2.57	$ 35.55	1.57	$ 21.72
C.3-8.9	2	W14X233	233	LB/LF	67.16	LF	375.00	$ 25,186.13	3.70	$ 248.50	1.67	$ 112.16
C.3-8.9	2	W14X68	68	LB/LF	45.00	LF	91.50	$ 4,117.50	2.70	$ 121.50	1.65	$ 74.25
E.8-8.9	5	W14X233 (BF)	233	LB/LF	68.16	LF	375.00	$ 25,561.13	3.70	$ 252.20	1.67	$ 113.83
E.8-8.9	5	W14X159 (BF)	159	LB/LF	31.17	LF	218.00	$ 6,795.06	2.91	$ 90.70	1.78	$ 55.48
E.8-8.9	5	W14X90 (BF)	90	LB/LF	13.83	LF	111.00	$ 1,535.46	3.58	$ 49.52	2.19	$ 30.29
								$ 122,127.04		$ 1,623.14		$ 837.32
										$ 124,587.51		
HANGERS												
LOCATION		TYPE	WEIGHT	UNIT	TOTAL LF	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment
LEVEL 2												
		W8X46	46	LB/LF	46.50	LF	59.50	$ 2,766.75	4.82	$ 224.13	2.95	$ 137.18
								$ 2,766.75		$ 224.13		$ 137.18
										$ 3,128.06		
BEAMS	51223											
FLOOR		TYPE	WEIGHT	UNIT	TOTAL LF	COST UNIT	Unit	Material	Unit	Labor	Unit	Equipment
LEVEL 2												
		W40X324	324	LB/LF	42.00	LF	375.00	$ 15,750.00	3.70	$ 155.40	1.67	$ 70.14
		W40X362	362	LB/LF	42.00	LF	375.00	$ 15,750.00	3.70	$ 155.40	1.67	$ 70.14
		W18X35	35	LB/LF	230.00	LF	43.50	$ 10,005.00	3.99	$ 917.70	1.80	$ 414.00
LEVEL 3												
		W21X44	44	LB/LF	49.00	LF	54.50	$ 2,670.50	3.60	$ 176.40	1.63	$ 79.87
		W21X62	62	LB/LF	40.00	LF	76.50	$ 3,060.00	3.60	$ 144.00	1.67	$ 66.80
		W18X35	35	LB/LF	230.00	LF	43.50	$ 10,005.00	3.99	$ 917.70	1.80	$ 414.00
LEVEL 4												
		W21X44	44	LB/LF	250.00	LF	54.50	$ 13,625.00	3.60	$ 900.00	1.63	$ 407.50
		W21X101	101	LB/LF	24.50	LF	125.00	$ 3,062.50	3.83	$ 93.84	1.73	$ 42.39
		W21X50	50	LB/LF	20.00	LF	62.00	$ 1,240.00	3.60	$ 72.00	1.63	$ 32.60
		W24X76	76	LB/LF	24.50	LF	94.00	$ 2,303.00	3.45	$ 84.53	1.56	$ 38.22
LEVEL 5/ROOF												
		W18X35	35	LB/LF	64.50	LF	43.50	$ 2,805.75	3.99	$ 257.36	1.80	$ 116.10
		W18X46	46	LB/LF	24.50	LF	57.00	$ 1,396.50	3.99	$ 97.76	1.80	$ 44.10
		W16X31	31	LB/LF	230.00	LF	38.50	$ 8,855.00	2.95	$ 678.50	1.80	$ 414.00
								$ 90,528.25		$ 4,650.57		$ 2,209.86
										$ 97,388.68		
Total								$ 215,422.04		$ 6,497.84		$ 3,184.35
										$ 225,104.24		

APPENDIX C – GENERAL CONDITIONS ESTIMATE SUMMARY

General Conditions Estimate											
Item	Description	Quantity	Units	Unit	Material	Unit	Labor	Unit	Equipment		Total
Project Manager		95	wks		-	2,075.00	197,125.00		-		197,125.00
Superintendent		95	wks	250.00	23,750.00	1,312.80	124,716.00		-		148,466.00
Carpenter Foreman	4 total	380	wks		-	975.00	370,500.00		-		370,500.00
Labor Foreman	1 total	95	wks		-	975.00	92,625.00		-		92,625.00
Engineering	precon & final survey	24	mh		-		-	150.00	3,600.00		3,600.00
Layout for Subs	project layout	160	mh		-	27.82	4,451.20		-		4,451.20
Performance Bond		10,500,000	$		-		-	0.0074	77,700.00		77,700.00
Builders Risk	by GC	10,500,000	$		-		-	0.0011	11,550.00		11,550.00
Building Permit		35000	sf		-		-	0.41	14,350.00		14,350.00
Business Privlege Tax	BPT + payroll empl. Tax	10,500,000	$		-		-	0.0010	10,500.00		10,500.00
Concrete Testing	by Owner				-		-		-		-
Soil Testing	by Owner				-		-		-		-
Move In/Move Out		1	ls	150.00	150.00	750.00	750.00		-		900.00
Field Office		23	mo	350.00	8,050.00	150.00	3,450.00	75.00	1,725.00		13,225.00
Job Office Supplies		23	mo	100.00	2,300.00		-		-		2,300.00
Telephone		23	mo	250.00	5,750.00		-		-		5,750.00
Temporary Sheds		23	mo	125.00	2,875.00		-		-		2,875.00
Temporary Toilets		23	mo	100.00	2,300.00		-		-		2,300.00
Small Tools & Hardware		1	ls	3,000.00	3,000.00		-		-		3,000.00
Cost of Drawings		10	ea	300.00	3,000.00		-		-		3,000.00
Project Sign	6' x 8'	1	ea	400.00	400.00	350.00	350.00	800.00	800.00		1,550.00
Temporary Power	by EC package		csf flr		-		-		-		-
Temporary Heat	by HVAC after enclosure		csf flr		-		-		-		-
Temporary Water	by Plumbing contract		csf flr		-		-		-		-
Snow Removal	2 winters	2	ls	200.00	400.00	750.00	1,500.00	500.00	1,000.00		2,900.00
Winter Protection		2	ls	1,200.00	2,400.00	2,500.00	5,000.00		-		7,400.00
Barricades & Fences	6' cl w/ 2 gates	750	lf	1.25	937.50	0.75	562.50	7.00	5,250.00		6,750.00
Temporary Enclosures	toeboards/barricades	2075	lf	1.50	3,112.50	2.00	4,150.00		-		7,262.50
Fire Protection		25	ea	50.00	1,250.00		-		-		1,250.00
Safety Program	all safety	30	mn	50.00	1,500.00		-		-		1,500.00
General Clean-Up		35000	sf	0.01	350.00	0.25	8,750.00		-		9,100.00
Final Clean-Up	final clean site	80	mh	5.00	400.00	20.92	1,673.60	5.00	400.00		2,473.60
Rubbish Chutes		50	lf	53.00	2,650.00	21.00	1,050.00		-		3,700.00
Dumpsters	95 wks @ 1 per week	95	pl	475.00	45,125.00		-		-		45,125.00
Trucking	4 hrs/wk	380	hrs		-	20.92	7,949.60	15.00	5,700.00		13,649.60
Temporary Partitions		1600	sf	1.75	2,800.00	2.00	3,200.00		-		6,000.00
Floor Protection		5000	sf	0.38	1,900.00	0.46	2,300.00		-		4,200.00
Cranes		1	ls		-		-	5,000.00	5,000.00		5,000.00
Temporary Covered Walk		600	sf	3.50	2,100.00	4.50	2,700.00	5.00	3,000.00		7,800.00
Jersey Barriers		456	lf	17.00	7,752.00	6.50	2,964.00	5.00	2,280.00		12,996.00
Temporary Direction Signs		66	ea	75.00	4,950.00	20.00	1,320.00		-		6,270.00
					129,202.00		837,086.90		142,855.00		1,109,143.90
							1,109,143.90				

APPENDIX D – LEED SCORECARD

LEED-NC Version 2.2 Registered Project Checklist

University of Pittsburgh - Chevron Annex

Pittsburgh, PA

Yes	?	No					
7		**7**		**Sustainable Sites**		**14** Points	**Status**
Y			C	Prereq 1	**Construction Activity Pollution Prevention**	Required	Attemped
1			D	Credit 1	**Site Selection**	1	Anticipated
1			D	Credit 2	**Development Density & Community Connectivity**	1	Anticipated
		1	D	Credit 3	**Brownfield Redevelopment**	1	NOT ATTEMPTED
1			D	Credit 4.1	**Alternative Transportation**, Public Transportation Access	1	Anticipated
1			D	Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	Anticipated
		1	D	Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	1	NOT ATTEMPTED
1			D	Credit 4.4	**Alternative Transportation**, Parking Capacity	1	Anticipated
		1	C	Credit 5.1	**Site Development,** Protect of Restore Habitat	1	NOT ATTEMPTED
		1	D	Credit 5.2	**Site Development,** Maximize Open Space	1	NOT ATTEMPTED
		1	D	Credit 6.1	**Stormwater Design,** Quantity Control	1	NOT ATTEMPTED
		1	D	Credit 6.2	**Stormwater Design,** Quality Control	1	NOT ATTEMPTED
1			C	Credit 7.1	**Heat Island Effect,** Non-Roof	1	Attemped
1			D	Credit 7.2	**Heat Island Effect,** Roof	1	Anticipated
		1	D	Credit 8	**Light Pollution Reduction**	1	Under Review
Yes	?	No					
4		**1**		**Water Efficiency**		**5** Points	
1			D	Credit 1.1	**Water Efficient Landscaping**, Reduce by 50%	1	
1			D	Credit 1.2	**Water Efficient Landscaping**, No Potable Use or No Irrigation	1	Anticipated
		1	D	Credit 2	**Innovative Wastewater Technologies**	1	NOT ATTEMPTED
1			D	Credit 3.1	**Water Use Reduction**, 20% Reduction	1	
1			D	Credit 3.2	**Water Use Reduction**, 30% Reduction	1	Anticipated
Yes	?	No					
3	**4**	**10**		**Energy & Atmosphere**		**17** Points	
Y			C	Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required	Attempted
Y			D	Prereq 2	**Minimum Energy Performance**	Required	Under Review
Y			D	Prereq 3	**Fundamental Refrigerant Management**	Required	Anticipated
	4	6	D	Credit 1	**Optimize Energy Performance**	1 to 10	Under Review
		3	D	Credit 2	**On-Site Renewable Energy**	1 to 3	NOT ATTEMPTED
1			C	Credit 3	**Enhanced Commissioning**	1	Attempted
1			D	Credit 4	**Enhanced Refrigerant Management**	1	Attempted
		1	C	Credit 5	**Measurement & Verification**	1	NOT ATTEMPTED
1			C	Credit 6	**Green Power**	1	Attempted
						continued...	

Yes	?	No					
4	1	**8**		**Materials & Resources**		**13** Points	
Y			D	Prereq 1	**Storage & Collection of Recyclables**	Required	Anticipated
		1	C	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1	NOT ATTEMPTED
		1	C	Credit 1.2	**Building Reuse**, Maintain 100% of Existing Walls, Floors & Roof	1	NOT ATTEMPTED
		1	C	Credit 1.3	**Building Reuse**, Maintain 50% of Interior Non-Structural Elements	1	NOT ATTEMPTED
1			C	Credit 2.1	**Construction Waste Management**, Divert 50% from Disposal	1	Attempted
1			C	Credit 2.2	**Construction Waste Management**, Divert 75% from Disposal	1	Attempted
		1	C	Credit 3.1	**Materials Reuse**, 5%	1	NOT ATTEMPTED
		1	C	Credit 3.2	**Materials Reuse**,10%	1	NOT ATTEMPTED
1			C	Credit 4.1	**Recycled Content**, 10% (post-consumer + ½ pre-consumer)	1	Attempted
		1	C	Credit 4.2	**Recycled Content**, 20% (post-consumer + ½ pre-consumer)	1	Attempted
	1		C	Credit 5.1	**Regional Materials**, 10% Extracted, Processed & Manufactured Regionally	1	Attempted
		1	C	Credit 5.2	**Regional Materials**, 20% Extracted, Processed & Manufactured Regionally	1	Attempted
		1	C	Credit 6	**Rapidly Renewable Materials**	1	NOT ATTEMPTED
1			C	Credit 7	**Certified Wood**	1	Attempted
Yes	?	No					
14		**1**		**Indoor Environmental Quality**		**15** Points	
Y			D	Prereq 1	**Minimum IAQ Performance**	Required	Anticipated
Y			D	Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required	Anticipated
1			D	Credit 1	**Outdoor Air Delivery Monitoring**	1	Anticipated
1			D	Credit 2	**Increased Ventilation**	1	Anticipated
1			C	Credit 3.1	**Construction IAQ Management Plan**, During Construction	1	Attempted
1			C	Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1	Attempted
1			C	Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	Attempted
1			C	Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1	Attempted
1			C	Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1	Attempted
1			C	Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1	Attempted
1			D	Credit 5	**Indoor Chemical & Pollutant Source Control**	1	Anticipated
1			D	Credit 6.1	**Controllability of Systems**, Lighting	1	Anticipated
		1	D	Credit 6.2	**Controllability of Systems**, Thermal Comfort	1	NOT ATTEMPTED
1			D	Credit 7.1	**Thermal Comfort**, Design	1	Anticipated
1			D	Credit 7.2	**Thermal Comfort**, Verification	1	Attempted
1			D	Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1	Anticipated
1			D	Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1	Anticipated
Yes	?	No					
4		**1**		**Innovation & Design Process**		**5** Points	
		1	D	Credit 1.1	**Innovation in Design**: ASHRAE 110 Testing of Fumehoods	1	NOT ATTEMPTED
1			D	Credit 1.2	**Innovation in Design**: Educational Signage	1	Attempted
1			D	Credit 1.3	**Innovation in Design**: Construction Waste Mgmt - Exemplary Performance	1	Attempted
1			D	Credit 1.4	**Innovation in Design**: WE credit 3 Exemplary Performance	1	Anticipated
1			C	Credit 2	**LEED® Accredited Professional**	1	Attempted
Yes	?	No					
36	5	**28**		**Project Totals (pre-certification estimates)**		**69** Points	
				Certified 26-32 points **Silver** 33-38 points **Gold** 39-51 points **Platinum** 52-69 points			

APPENDIX E – BIM USE EVALUATION & LEVEL 1 PROCESS MAP

SECTION D: PROJECT GOALS / BIM USES

Describe how the BIM Model and Facility Data are leveraged to maximize project value (e.g. design alternatives, life-cycle analysis, scheduling, estimating, material selection, pre-fabrication opportunities, site placement, etc.) Reference www.engr.psu.edu/bim/download for BIM Goal & Use Analysis Worksheet.

1. MAJOR BIM GOALS / OBJECTIVES:

State Major BIM Goals and Objectives

PRIORITY (HIGH/ MED/ LOW)	GOAL DESCRIPTION	POTENTIAL BIM USES
2	Increase Field Productivity	Design Reviews, 3D Coordination
2	Track Progress During Construction	4D Modeling
1	Identify Phasing Concerns	4D Modeling
2	Eliminate Field Conflicts	3D Coordination
1	Reduce Schedule Duration	3D Coordination, Digital Fabrication, 4D Modeling
3	Accurate 3D Record Model for FM Team	Record Modeling, 3D Coordination

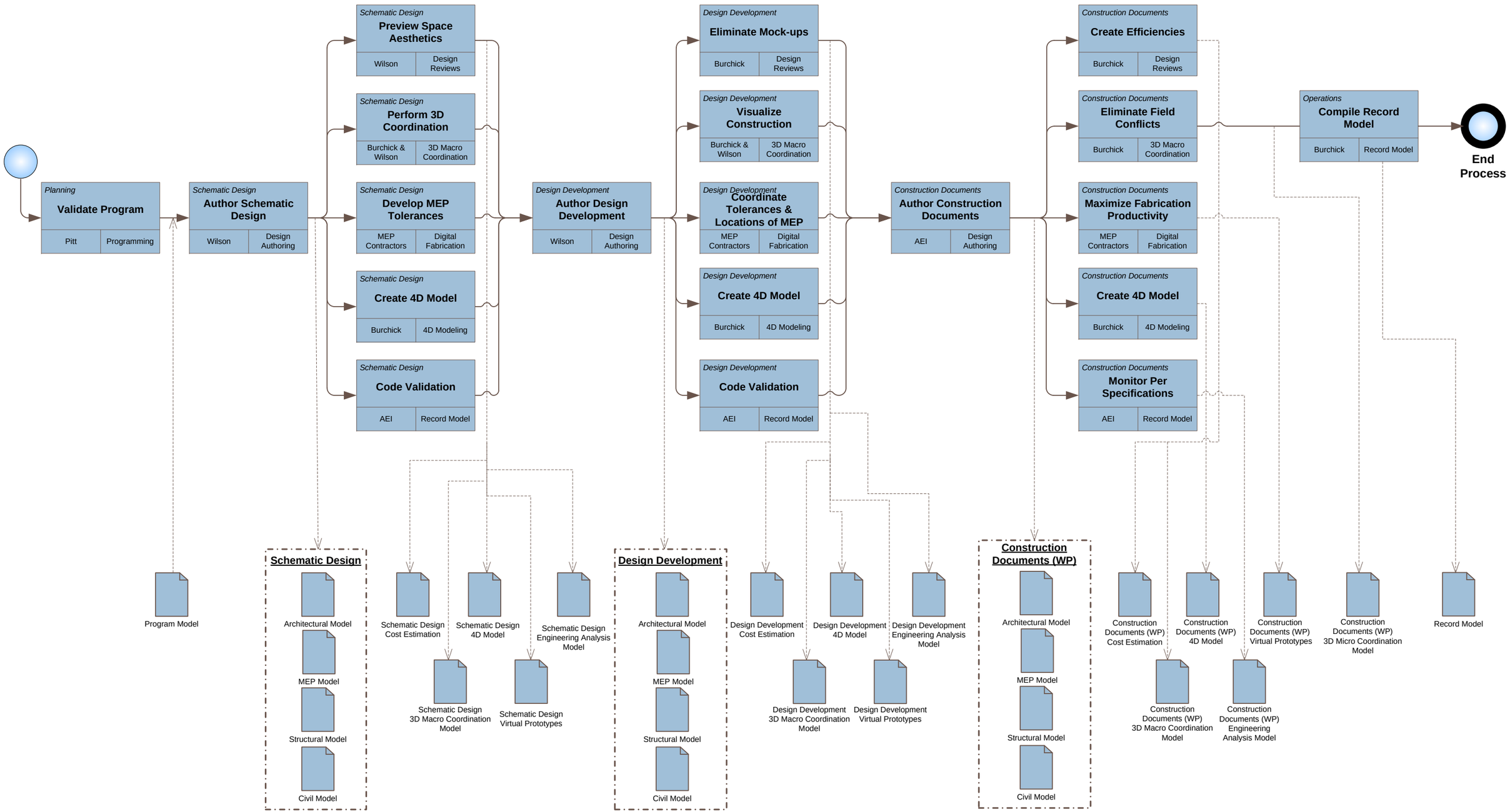
2. BIM USE ANALYSIS WORKSHEET: ATTACHMENT 1

Reference www.engr.psu.edu/bim/download for BIM Goal & Use Analysis Worksheet. Attach BIM Use analysis Worksheet as Attachment 1.

3. BIM USES:

Highlight and place an X next to the additional BIM Uses to be developed by the use of the BIM model as selected by the project team using the BIM Goal & Use Analysis Worksheet. See BIM Project Execution Planning Guide at www.engr.psu.edu/BIM/BIM_Uses for Use descriptions. Include additional BIM Uses as applicable in empty cells.

X	PLAN	X	DESIGN	X	CONSTRUCT	X	OPERATE
X	PROGRAMMING		DESIGN AUTHORING	X	SITE UTILIZATION PLANNING	X	BUILDING MAINTENANCE SCHEDULING
X	SITE ANALYSIS	X	DESIGN REVIEWS		CONSTRUCTION SYSTEM DESIGN		BUILDING SYSTEM ANALYSIS
		X	3D COORDINATION	X	3D COORDINATION		ASSET MANAGEMENT
			STRUCTURAL ANALYSIS	X	DIGITAL FABRICATION		SPACE MANAGEMENT / TRACKING
			LIGHTING ANALYSIS		3D CONTROL AND PLANNING		DISASTER PLANNING
			ENERGY ANALYSIS	X	RECORD MODELING	X	RECORD MODELING
			MECHANICAL ANALYSIS				
			OTHER ENG. ANALYSIS				
			SUSTAINABLITY (LEED) EVALUATION				
			CODE VALIDATION				
	PHASE PLANNING (4D MODELING)	X	PHASE PLANNING (4D MODELING)	X	PHASE PLANNING (4D MODELING)		PHASE PLANNING (4D MODELING)
	COST ESTIMATION		COST ESTIMATION		COST ESTIMATION		COST ESTIMATION
	EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING		EXISTING CONDITIONS MODELING


Planning
Validate Program
Pitt
Programming
Schematic Design
Author Schematic Design
Wilson
Design Authoring
Schematic Design
Preview Space Aesthetics
Wilson
Design Reviews
Schematic Design
Perform 3D Coordination
Burchick & Wilson
3D Macro Coordination
Schematic Design
Develop MEP Tolerances
MEP Contractors
Digital Fabrication
Schematic Design
Create 4D Model
Burchick
4D Modeling
Schematic Design
Code Validation
AEI
Record Model
Design Development
Author Design Development
Wilson
Design Authoring
Design Development
Eliminate Mock-ups
Burchick
Design Reviews
Design Development
Visualize Construction
Burchick & Wilson
3D Macro Coordination
Design Development
Coordinate Tolerances & Locations of MEP
MEP Contractors
Digital Fabrication
Design Development
Create 4D Model
Burchick
4D Modeling
Design Development
Code Validation
AEI
Record Model
Construction Documents
Author Construction Documents
AEI
Design Authoring
Construction Documents
Create Efficiencies
Burchick
Design Reviews
Construction Documents
Eliminate Field Conflicts
Burchick
3D Macro Coordination
Construction Documents
Maximize Fabrication Productivity
MEP Contractors
Digital Fabrication
Construction Documents
Create 4D Model
Burchick
4D Modeling
Construction Documents
Monitor Per Specifications
AEI
Record Model
Operations
Compile Record Model
Burchick
Record Model
End Process
Program Model
Schematic Design
Architectural Model
MEP Model
Structural Model
Civil Model
Schematic Design Cost Estimation
Schematic Design 4D Model
Schematic Design Engineering Analysis Model
Schematic Design 3D Macro Coordination Model
Schematic Design Virtual Prototypes
Design Development
Architectural Model
MEP Model
Structural Model
Civil Model
Design Development Cost Estimation
Design Development 4D Model
Design Development Engineering Analysis Model
Design Development 3D Macro Coordination Model
Design Development Virtual Prototypes
Construction Documents (WP)
Architectural Model
MEP Model
Structural Model
Civil Model
Construction Documents (WP) Cost Estimation
Construction Documents (WP) 4D Model
Construction Documents (WP) Virtual Prototypes
Construction Documents (WP) 3D Macro Coordination Model
Construction Documents (WP) Engineering Analysis Model
Construction Documents (WP) 3D Micro Coordination Model
Record Model