State College Area High School



Technical Report Part 2

Senior Thesis

Bryce Burkentine

Construction Management

Project Location: State College, PA

Advisor: Chimay Anumba

Table Of Contents

Executive Summary		3
Production Plan		4
Production Analysis		5
Cost Analysis		5-6
Logistical Analysis		6-7
Schedule Acceleration So	cenario	7-8
Constructability and Log	istical Challenges	8
Appendix		9
Interview	Questions	10-12
Primavera	a Detailed Façade System Schedule	13-15
Timberlin	e Detailed Façade System Cost Estimat	e16
Site Logist	tic Plans- 3 Phases	17-19
Flow Diag	ram of Facade System	20

Bryce Burkentine | Construction | Dr. Anumba | State College Area High School | State College, PA | October 16th, 2015

Executive Summary

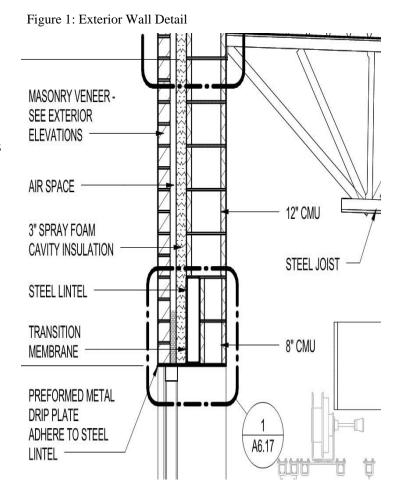
The South Building of State College Area High School is scheduled to start construction October 2015. The system that is going to play a key role in the construction sequence is the façade system or also known as the building wall. The façade system will start being constructed May 2015 and continue through August 2018. The schedule is based off the school calendar and is imperative that milestones are meant. The schedule, cost, and logistical analyses are based off the CMU structural wall, spray-on-insulation, air gap or metal studs, and outer material which could be stone, brick veneer, metal insulated panels, etc.

The cost estimate developed in Timberline totaled \$10,053,502. This is less than what was predicted by Massaro Construction Company. Massaro's estimated for the façade system was \$11,584,000. Massaro's estimate was below \$10 million in the beginning of August and since then has increased more than \$1.5 million. There a number of reasons for the difference between Timberline and Massaro's estimate from out of date information to whether the project is public or private.

The logistical approach for State College Area High School South Building façade system is broken up into three phases. The first phase will consist of Pods A and B being constructed, phase two Pods C and D will be constructed, and the final phase will entail demolition, renovation, and new construction on the existing South Building. The change from phase to phase allows relocation of resources for hardscapes and landscapes to be completed on the project. There are issues with the logistical approach Massaro is implementing with phase three which consists of the South Building and North Building construction. Working on two buildings at once will slow productivity since the students will be occupying the buildings. If temporary trailer facilities could be implemented for classrooms this would allow much more of an efficient construction process for phase three.

Production Plan

The façade system on the South Building of the State College High School will involve coordination between the trades to ensure the work is to the standard and quality of the School. For this system the CMU wall will be structural bearing. Once the CMU walls are up then 3" spray foam cavity insulation will be applied directly to the CMU. In between the Brick and spray foam insulation will be a ½" air gap. To construct the CMU wall there will be scaffolding and hydraulic scaffolding platforms. The spray foam insulation will be applied by a man lift. The brick, insulated metal panel, aluminum curtain wall system, and window will be applied by using a man lift or scissor lift. The equipment that is essential to the completion of this task is a man lift and a scissor lift.



The performance standards will have to meet the specifications and LEED requirements. If a trade wants to use a different material than what was in the specification then that material will have to be approved by the architect and owner. The quality control program Massaro has set up will ensure the standards are meant. The three-phase control system first starts with a preparatory phase. This will entail the whole Massaro field and office team to sit down and discuss what results are expected out in the field. The next step is the initial phase, which will make sure the project is being implemented in the preliminary stage of work. Creating detailed sections for unclear items would happen in this stage. The final stage is the follow-up phase. This phase will consist of daily checks making sure the work is performed to the quality standard set forth in the specifications.

Production Analysis

The start for the façade system on the South Building will be from May 2015 until August 2018. The detailed schedule is effective and will be completed on time as it shows right now. One way this schedule works is the tasks are not treated as independent tasks. The independent tasks are treated as a sequence with flow between the trades. This is very important because it will only accelerate the schedule. An example of how flow is integrated in the schedule is the CMU wall, scaffolding, and spray on fireproofing will be done in sequential sections so all the tasks can be working at the same time just in different areas. Also, while the main tasks of the façade are being completed, the remaining items can be done simultaneously on the façade. Furthermore, the predecessor activity would be the foundation system and the successor activity would be the hardscape system. Having consistent flow with the predecessor and successor activities will come from the independent contractors and general contractors coordinating exactly what timeframes the activities can happen. This way the activities can flow right behind each other.

The site constraints will hinder the productivity of moving material around the site. A way to fix this is to open up the site and have more area around the façade of the building. This will allow equipment to pass through easily. Having an organized flow of materials and work on the project will save time and money for the owner. Creating a wider area around the site would involve moving part of the access road to the existing South Building away from where it is now. This would cost more money and lessen the parking the school has already.

Cost Analysis

The cost estimate developed in Timberline totaled \$10,053,502. This is less than what was predicted by Massaro Construction Company. Massaro's estimated for the building wall or façade system was \$11,584,000. Massaro's estimate was below \$10 million in the beginning of August and since then has increased more than \$1.5 million. This happened because of change in higher quality building materials and adding some LEED features on the building façade.

One reason Timberline's estimate resulted in a lower dollar amount could have been Timberline's data was not up to date. The labor rate, equipment cost, and material cost could have been out of date. This would most likely result in a lower estimate. The word, "most likely" should be used because if the economy would be in a recession then the estimate could turn out to be higher. It is very important to use updated information to ensure the proper estimate is obtained.

Massaro uses historical data from pervious projects. The projects Massaro receives their data from cannot be more than two years completed and has to be within 100 miles or else the data could be skewed. Location is a very important aspect in receiving updated cost information. Using historical information is the most accurate way to develop an estimate. Depending on whether you build in the country or the city will be a large determinate in which historical data the contractor uses. This will allow the contractor to use the most accurate data at the current economy's state.

Another assumption that could be made for why Timberline's estimate was lower than Massaro's could be the project type. Since the State College Area High School is a public project all contracts are low bid. This would entail the lowest cost on a project. The project just went out to bid the beginning of October. Massaro's estimate could match Timberline's estimate once the bids come in. Figure 2 shows how Massaro's façade estimate is broken down.

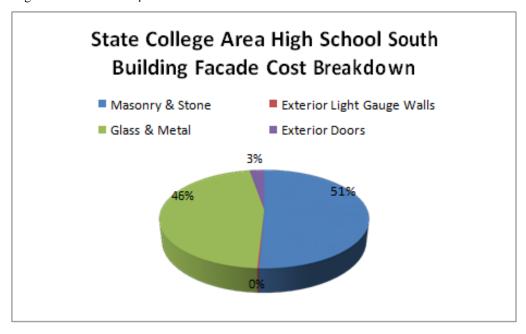


Figure 2: Massaro's Façade Estimate

Logistical Analysis

The logistical approach for State College Area High School South Building façade system is broken up into three phases. The first phase Pods A and B are constructed. Phase two consists of Pods C and D and phase three consists of demolition, renovation, new construction of the existing South Building. Changes from phase one to phase two is relocation of site laydown area, construction entrances, and temporary facilities. Moving these areas and items will allow the pervious phases construction to be landscaped and finalized.

The site logistics plan can be modified by providing more material laydown area. The façade system requires a lot of space for storing materials on site. One way to fix this issue is to provide material laydown areas across Westerly Parkway. This could be on the parking lot or a grass area. There is room to do so now where the test driving area is. Also, phase three consists of moving on to the North Building. One problem is how efficient can the contractor execute phase three while working on two different buildings during the school year. Something that would help the construction process be much more efficient and safer for the students is to have the students away from the construction. This could happen by having temporary trailer facilities in the fields north of the North Building. By having the classroom trailers away from the construction will allow the construction process to go more smoothly and promote a safer environment for the students. This in turn would increase project costs in the short coming, but will save time on the project possibly cutting costs for the School on the end of phase three.

A huge task of the project is to align key project dates with the school year calendar. This is imperative to do so because the students will need a place to learn while other buildings are being constructed. Temporary facilities for the students to take class in will lessen the time having to move logistical issues and more time focusing on completing the project.

Schedule Acceleration Scenarios

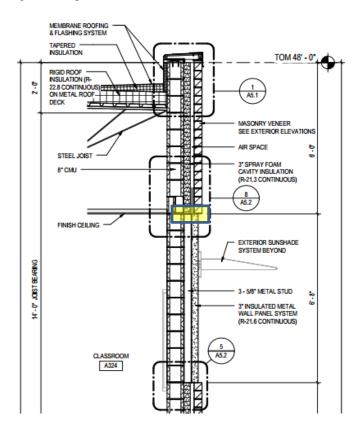
The façade system is a key aspect to the milestone schedule because once it is done with the roof you can start roughing in the MEP systems. A water tight enclosure can be done with the CMUs and installing the windows and doors. All other materials will help insulate and waterproof the exterior of the building. The biggest risk to the completion date is the weather. Creating a scaffolding system with plastic wrapped around it with heaters will maintain a constant temperature on the building wall. Spray-on-insulation cannot be applied unless the surface is 40 Degrees Fahrenheit. Mortar cannot be applied unless the surface is above freezing. It is imperative to keep the scaffolding covered and heated to ensure masonry work can continue. The critical activity for the façade system is the masonry. The masonry work is around 150,000 square feet. While other materials can still be applied to the building wall, the masonry trade will be the one driving the project, since it is the structural system and most of the façade system.

If the schedule was behind and needed to be accelerated, the masonry trade would be the one that could make up the time. Since the masonry work covers more than two thirds of the building wall the hardscapes can be started after this trade is done. The hardscapes will take over one month of the schedule per phase. Making up time on the masonry work will allow the hardscapes to finish early,

allowing the building to be complete. The resources needed for the masonry trade to accelerate their schedule would be more laborers and masons. The sequence will be moving along the building wall with all crews working together. Once one section is complete the scaffolding can be moved down the building wall. The costs will be increased with the extra resources but this could be compensated with a change order if the schedule delay is caused by the general contractor or owner.

Constructability and Logistical Challenges

A challenge the Superintendent foresees is the integration between the brick veneer and insulated wall panels. The gap between the two materials was not clearly defined in the drawings and specifications. The superintendent for Massaro is concerned about this gap because of the spray-on-insulation will be directly open to the elements. This will wear and tear the insulation and lead to leaks through the building wall. As you can see in figure 3, the gap between the brick veneer and insulated wall panel needs to be addressed. An option to fix this issue is to develop a wall panel that has a flange to go behind the brick in the air gap. This will cover the gab and integrate the two independent materials as one system. Since it would go behind the brick veneer, the insulated wall panels will have to be installed first where these two materials are next to each other.



8

Figure 3: Gap between Brick Veneer and Insulated Metal Panel

Appendix

- **A. Interview Questions**
- B. Primavera Detailed Façade System Schedule
- C. Timberline Detailed Façade System Cost Estimate
- D. Site Logistic Plans- 3 Phases
- E. Flow Diagram of Façade System

Interview Questions: Keith Smith-Superintendent

1. How do you expect to construct the façade system on pods 1-4 and what will the sequence be?

Answer: The South Building will start with Pods A-D. A will start then start B concurrently and so forth. Pods A-D have to be finished until the demolition and renovation happens on the existing South Building.

2. Who are the predecessors and successors of this task?

Answer: The predecessors are the foundations and CMU structural bearing wall. The successors are the hardscapes and landscapes.

3. Who will be the most important trade during this construction phase?

Answer: The General Contractor will be the most important part of this system. It will be very important they have all the trades on the same schedule and sequence. In this system the masonry subcontractor will have the most square feet of work to do, so therefore it will be very important they are on schedule.

4. Are you worried about having areas where to different materials come together and leak?

Answer: Between the CMU and brick or metal panel there is spray foam insulation that is an insulator and vapor barrier. It is very important that nobody damages the spray foam insulation. If something were to happen it would cause a leak.

5. As you move from pods A-D and the renovation, how will your site logistics plan change?

Answer: Our strategy is to move three times on the South Building. Once Pods A-B are mostly complete we will move material laydown and some other items down the site. Once Pods C-D are complete then we will have to move all the materials and site logistics items near the demolition and renovation part of the South Building because the PODs will start being occupied.

6. As the plan is right now, are you involved in trying to change something to make the process safer or more efficient?

Answer: Keeping a clean site will be very important in providing a safe environment to the school and workers. This is not a contained site; we have students, traffic, and the community coming in and through all areas of this High School. Most projects have an island with a fence around it but this project is different. Students will still have to cross Westerly Parkway during construction.

7. Could productivity change if the process were in a different order?

Answer: Staying on task and sequence the General Contractor gives will be the most efficient way to construct the system. If someone jumps out of order or sequence; it will act like a domino effect and cause all the other trades to be backed up.

8. Do you expect to have conflict between any trades during construction on this system?

Answer: Yes there will be conflict on the site. Most times it is with the General Contractor and another trade. Masonry and Spray on insulation should hopefully under the same contract. This will limit confusion between two trades and the one trade will be able to control those to sequences the most efficient way. Having a trade's work delayed and their predecessor coming behind them holding that trade up is always a receipt for agreements.

9. Are there any constraints that would slow you down?

Answer: Weather will be a big constraint for the façade system. Masons will have to heat their space in the winter to ensure the CMU and brick are not below freezing. The spray on insulation can only be applied at 40 degrees Fahrenheit and above.

10. Will LEED affect the way you construct this system?

Answer: The windows and sunshades will be part of the LEED certification.

11. Are there any penalties that if you do not complete this task on time you will accrue?

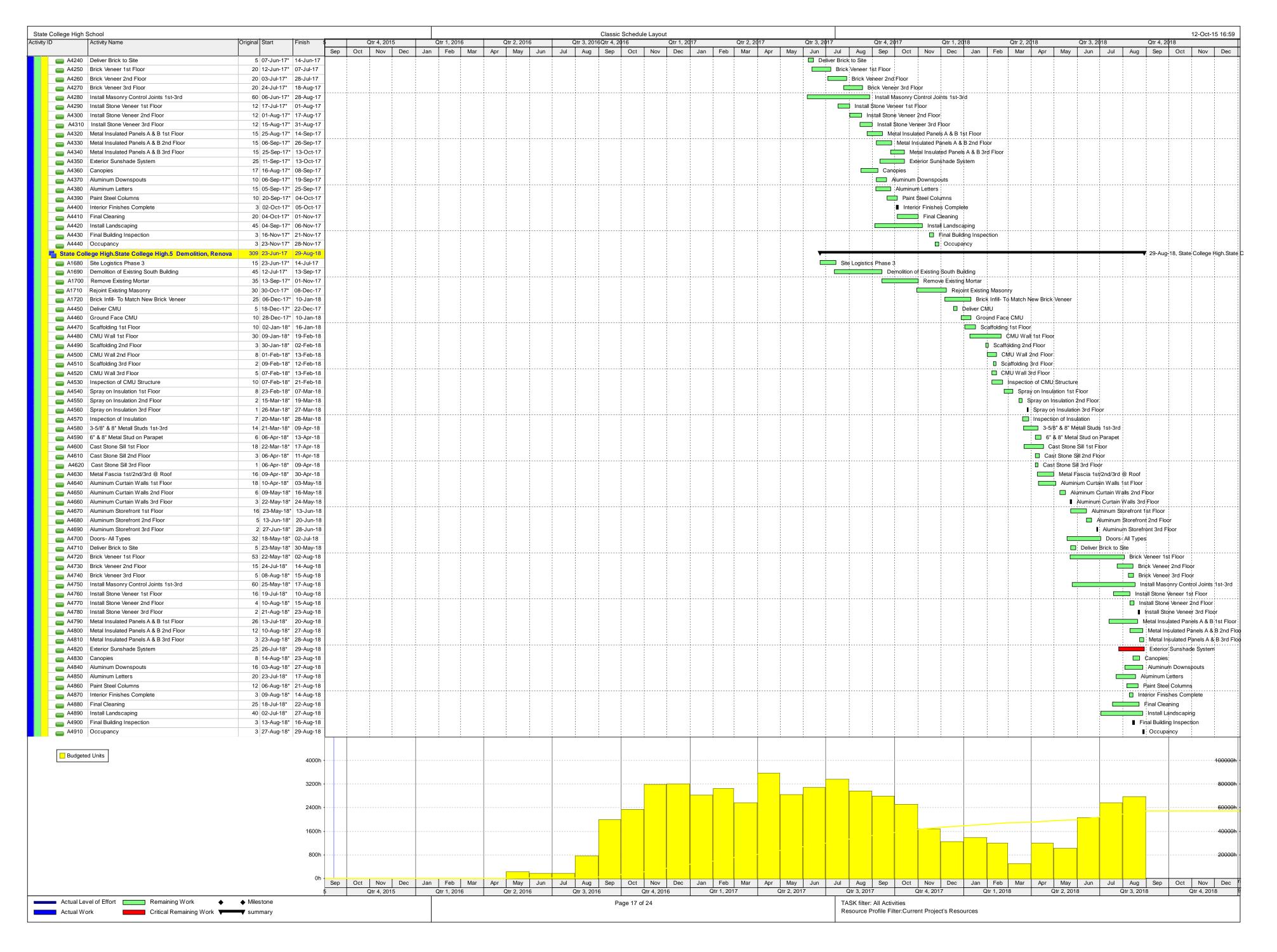
Answer: The General Contractor will accrue a penalty of \$1,500 a day, every day the project is late. There are four dates that have to be meant or the penalty starts accumulating.

12. Who do you believe will need an additional crew to stay with the flow of work?

Answer: We will have to determine who is slipping on their end and have a talk with that particular trade to see how to resolve the problem. Sometimes with the low bid process we do get stuck with inadequate trades who cannot meet the schedule.

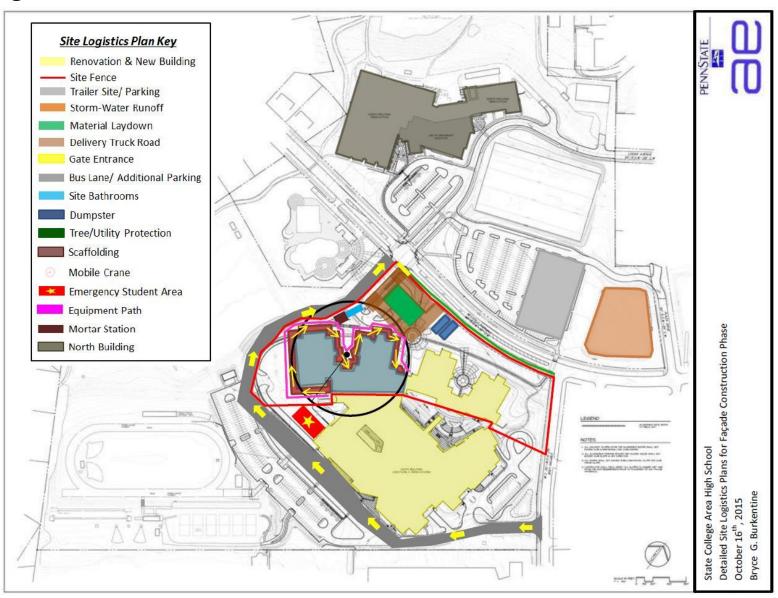
State College High School	Classic Schedule Layout					12-Oct-15 16:59					
Activity ID Activity Name	Original Start Finish 5	Qtr 4, 2015		Qtr 3, 2016Qtr 4, 2016 Qtr 1, 2	<u> </u>		Qtr 3, 20		Qtr 2, 2018	Qtr 3, 2018	Qtr 4, 2018
		Sep Oct Nov Dec	Jan Feb Mar Apr May Jun Jul	Aug Sep Oct Nov Dec	Jan Feb Mar	Apr May	Jun	Jul Aug Sep Oct Nov Dec Jan	Feb Mar	Apr May Jun Jul	Aug Sep Oct Nov Dec ✓ 29-Aug-18, State; College High State
<u></u>	256 14-Sep-15 05-Sep-16			▼ 05-Sep-16, State College High.1	Administration						V 20 / tag 10, State Osmogo Ingili State
State College High.1 Administration and A1380 Design	256 14-Sep-15 05-Sep-16	<u> </u>		Design	Administration						
A1390 Procurement	5 14-Sep-15 18-Sep-15	☐ Procurement		Design							
A1390 Procurement A1400 Bid Project	45 14-Sep-15 13-Nov-15	Bid Project									
State College High.State College High Consti	·								+		29-Aug-18, State College High State
A1440 Construction Begins	2 19-Oct-15* 20-Oct-15	Construction Begins									
A1450 Break Ground	141 19-Oct-15* 02-May-16		Break Ground								
A1460 Foundations	161 07-Dec-15* 18-Jul-16		F	oundations							
State College High.State College High.1 Pod A Constru			-		▼ 21-Feb-1	7, State College Hi	igh.State	College High.1 Pod A Construction			
A1410 Deliver CMU	5 02-May-16* 06-May-16		Deliver CMU								
■ A1420 Ground Face CMU ■ A1430 Scaffolding 1st Floor	6 06-May-16* 13-May-16 7 13-May-16* 23-May-16		☐ Ground Face CMU ☐ Scaffolding 1st Flo	oor							
A1760 CMU Wall 1st Floor	18 19-May-16* 14-Jun-16		CMU Wall								
A1770 Scaffolding 2nd Floor	7 08-Jun-16* 17-Jun-16		Sçaffolding	g 2nd Floor							
A1780 CMU Wall 2nd Floor	18 14-Jun-16* 07-Jul-16			J Wall 2nd Floor							
A1790 Scaffolding 3rd Floor	7 04-Jul-16* 13-Jul-16		The state of the s	affolding 3rd Floor							
A1800 CMU Wall 3rd Floor A1810 Inspection of CMU Structure	18 12-Jul-16* 05-Aug-16 35 20-Jun-16* 05-Aug-16			CMU Wall 3rd Floor Inspection of CMU Structure							
A1820 Spray on Insulation 1st Floor	4 10-Aug-16* 15-Aug-16			Spray on Insulation 1st Floor							
A1830 Spray on Insulation 2nd Floor	4 15-Aug-16* 18-Aug-16			Spray on Insulation 2nd Floor							
A1840 Spray on Insulation 3rd Floor	4 19-Aug-16* 24-Aug-16			Spray on Insulation 3rd Floor							
A1850 Inspection of Insulation	12 15-Aug-16* 30-Aug-16			Inspection of Insulation							
■ A1860 3-5/8" & 8" Metall Studs 1st-3rd ■ A1870 6" & 8" Metal Stud on Parapet	0 18-Aug-16* 18-Aug-16 4 26-Aug-16* 31-Aug-16			3-5/8" & 8" Metall Studs 1st-3rd 6" & 8" Metal Stud on Parapet							
A1870 6 & 8 Metal Stud on Parapet A1880 Cast Stone Sill 1st Floor	8 25-Aug-16* 06-Sep-16			Cast Stone Sill 1st Floor							
A1890 Cast Stone Sill 2nd Floor	8 30-Aug-16* 09-Sep-16			Cast Stone Sill 2nd Floor							
A1900 Cast Stone Sill 3rd Floor A1910	8 01-Sep-16* 12-Sep-16			Cast Stone Sill 3rd Floor							
Metal Fascia 3rd Floor @ Roof	15 23-Aug-16* 13-Sep-16			Metal Fascia 3rd Floor @ Roo	i i i						
Al920 Aluminum Curtain Walls 1st Floor Al930 Aluminum Curtain Walls 2nd Floor	0 13-Sep-16* 13-Sep-16 12 28-Sep-16* 13-Oct-16			Aluminum Curtain Walls 1st Fl			ļ				
A1930 Aluminum Curtain Walls 3rd Floor	0 13-Oct-16* 13-Oct-16			Aluminum Curtain W	1 1						
A1950 Aluminum Storefront 1st Floor	0 28-Oct-16* 28-Oct-16			I Aluminum Storefr	i i i		1				
A1960 Aluminum Storefront 2nd Floor	13 15-Nov-16* 01-Dec-16			i i i 	um Storefront 2nd Floor						
A1970 Aluminum Storefront 3rd Floor	0 01-Dec-16* 01-Dec-16				num Storefront 3rd Floor						
A1980 Doors- All Types A1990 Deliver Brick to Site	30 06-Sep-16* 17-Oct-16 0 05-Oct-16* 05-Oct-16			Doors- All Types Deliver Brick to Site							
A2000 Brick Veneer 1st Floor	20 12-Oct-16* 08-Nov-16			Brick Veneer	1st Floor						
A2010 Brick Veneer 2nd Floor	0 10-Nov-16* 10-Nov-16			l Brick Veneer							
A2020 Brick Veneer 3rd Floor	0 05-Dec-16* 05-Dec-16			I Brick	Veneer 3rd Floor						
A2030 Install Masonry Control Joints 1st-3rd	60 18-Oct-16* 09-Jan-17				Install Masonry Contro	Joints 1st-3rd					
A2040 Install Stone Veneer 1st Floor A2050 Install Stone Veneer 2nd Floor	0 24-Oct-16* 24-Oct-16 0 04-Nov-16* 04-Nov-16			Install Stone Vene							
A2060 Install Stone Veneer 3rd Floor	12 25-Nov-16* 12-Dec-16				tall Stone Veneer 3rd Floor						
A2070 Metal Insulated Panels A & B 1st Floor	0 01-Nov-16* 01-Nov-16			i i i i i i i i i i i i i i i i i i i	Panels A & B 1st Floor						
A2080 Metal Insulated Panels A & B 2nd Floor	15 22-Nov-16* 12-Dec-16			Me	tal Insulated Panels A & B 2r	d Floor					
A2090 Metal Insulated Panels A & B 3rd Floor	0 12-Dec-16* 12-Dec-16				tal Insulated Panels A & B 3	i i					
A2940 Exterior Sunshade System A2950 Canopies	25 20-Dec-16* 24-Jan-17				Exterior Sunshade	System					
A2960 Aluminum Downspouts	17 07-Dec-16* 30-Dec-16 10 21-Dec-16* 03-Jan-17				Canopies Aluminum Downspouts						
A2970 Aluminum Letters	15 29-Dec-16* 19-Jan-17				Aluminum Letters						
A2980 Paint Steel Columns	10 09-Jan-17* 20-Jan-17				Paint Steel Columns						
A2990 Interior Finishes Complete	3 12-Jan-17* 17-Jan-17				☐ Interior Finishes Co	! ' !					
A3000 Final Cleaning A3010 Install Landscaping	20 16-Jan-17* 10-Feb-17 45 12-Dec-16* 13-Feb-17				Final Cleanin	F					
A3020 Final Building Inspection	3 13-Feb-17* 16-Feb-17				Flnal Buildi						
A3030 Occupancy	3 16-Feb-17* 21-Feb-17				☐ Occupan	! - !					
State College High.State College High.2 Pod B Constr	ruction 212 08-Aug-16 30-May-17			▼			₹ 30-May	-17, State College High.State College High.2 Pod B Construction			
a3040 Deliver CMU	0 08-Aug-16* 08-Aug-16			Deliver CMU							
☐ A3050 Ground Face CMU ☐ A3060 Scaffolding 1st Floor	6 11-Aug-16* 18-Aug-16 7 16-Aug-16* 25-Aug-16			☐ Ground Face CMU ☐ Scaffolding 1st Floor							
A3060 Scallolding 1st Floor A3070 CMU Wall 1st Floor	7 16-Aug-16* 25-Aug-16 18 23-Aug-16* 15-Sep-16			CMU Wall 1st Floor							
A3080 Scaffolding 2nd Floor	7 06-Sep-16* 15-Sep-16			Scaffolding 2nd Floor							
A3090 CMU Wall 2nd Floor	18 15-Sep-16* 11-Oct-16			CMU Wall 2nd Floor							
A3100 Scaffolding 3rd Floor	7 04-Oct-16* 13-Oct-16			Scaffolding 3rd Floor	√ Floor		. 				
A3110 CMU Wall 3rd Floor A3120 Inspection of CMU Structure	18 14-Oct-16* 08-Nov-16 35 21-Sep-16* 09-Nov-16			CMU Wall 3r	! ! !						
A3130 Spray on Insulation 1st Floor	4 22-Sep-16* 27-Sep-16			Spray on Insulation 1st Flo							
A3140 Spray on Insulation 2nd Floor	4 29-Sep-16* 04-Oct-16			☐ Spray on Insulation 2nd							
a A3150 Spray on Insulation 3rd Floor	4 04-Oct-16* 10-Oct-16			☐ Spray on Insulation 3r					ļ		
A3160 Inspection of Insulation	12 27-Sep-16* 12-Oct-16			Inspection of Insulation	1 1						
A3170 3-5/8" & 8" Metall Studs 1st-3rd A3180 6" & 8" Metal Stud on Parapet	12 06-Oct-16* 21-Oct-16 4 20-Oct-16* 25-Oct-16			3-5/8" & 8" Metall 3	i i i						
A3190 Cast Stone Sill 1st Floor	8 29-Sep-16* 11-Oct-16			Cast Stone Sill 1st Flo	1 11 1						
A3200 Cast Stone Sill 2nd Floor	8 07-Oct-16* 18-Oct-16			Cast Stone Sill 2nd	1 1 1						
A3210 Cast Stone Sill 3rd Floor A3220	8 18-Oct-16* 27-Oct-16			Cast Stone Sill 3	1 1 1						
Metal Fascia 3rd Floor @ Roof	15 19-Oct-16* 09-Nov-16			Metal Fascia	i i i						
A3230 Aluminum Curtain Walls 1st Floor A3240 Aluminum Curtain Walls 2nd Floor	0 07-Oct-16* 07-Oct-16 12 19-Oct-16* 03-Nov-16			Aluminum Curtain Wall							
A3250 Aluminum Curtain Walls 3rd Floor	0 28-Oct-16* 28-Oct-16			I Aluminum Curtai	t t t						
A3260 Aluminum Storefront 1st Floor	0 17-Nov-16* 17-Nov-16				Storefront 1st Floor						
A3270 Aluminum Storefront 2nd Floor	0 01-Dec-16* 01-Dec-16) Alumir	um Storefront 2nd Floor						
a A3280 Aluminum Storefront 3rd Floor	0 15-Dec-16* 15-Dec-16				uminum Storefront 3rd Floor		1				
A3290 Doors- All Types	30 04-Nov-16* 16-Dec-16				oors- All Types						
A3300 Deliver Brick to Site A3310 Brick Veneer 1st Floor	5 24-Oct-16* 31-Oct-16 20 31-Oct-16* 25-Nov-16			Deliver Brick to					ļ		
A3310 Brick Veneer 1st Floor A3320 Brick Veneer 2nd Floor	20 31-Oct-16" 25-Nov-16 20 17-Nov-16* 14-Dec-16				ck Veneer 2nd Floor						
A3330 Brick Veneer 3rd Floor	20 12-Dec-16* 06-Jan-17			i i i i i	Brick Veneer 3rd Floor						
A3340 Install Masonry Control Joints 1st-3rd	60 21-Oct-16* 13-Jan-17				Install Masonry Contr	ol Joints 1st-3rd					
A3350 Install Stone Veneer 1st Floor	12 17-Nov-16* 05-Dec-16			Insta	Stone Veneer 1st Floor						
Actual Level of Effort Remaining Work	◆ ◆ Milestone			Page 1 of 24				TASK filter: All Activities			
Actual Work Critical Remaining Work	summary			-				Resource Profile Filter:Current Project's Resources			

Activity Name	Original Start	Finish	Qtr 1, 2016 Qtr 2, 2016	Classic Schedule Layo	ut 12-Oct- Qtr 1, 2017 Qtr 2, 2017 Qtr 3, 2017 Qtr 4, 2017 Qtr 1, 2018 Qtr 2, 2018 Qtr 3, 2018 Qtr 4, 2018
		Sep Oct Nov Dec		n Jul Aug Sep Oct Nov	Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov
A3360 Install Stone Veneer 2nd Floor A3370 Install Stone Veneer 3rd Floor	12 02-Dec-16* 12 16-Dec-16*	ļ			Install Stone Veneer 2nd Floor Install Stone Veneer 3rd Floor
A3380 Metal Insulated Panels A & B 1st Floor	15 30-Nov-16*				Metal Insulated Panels A & B'1st Floor
A3390 Metal Insulated Panels A & B 2nd Floor	15 15-Dec-16*	05-Jan-17			Metal Insulated Panels A & B 2nd Floor
A3400 Metal Insulated Panels A & B 3rd Floor	15 04-Jan-17*	25-Jan-17			Metal Insulated Panels A & B 3rd Floor
A3410 Exterior Sunshade System	25 30-Dec-16*				Exterior Sunshade System
A3420 Canopies A3430 Aluminum Downspouts	17 20-Dec-16*				Cariopies Aluminum Downspouts
A3440 Aluminum Letters	10 23-Jan-17* 15 23-Jan-17*	ļ			Aluminum Downspools Aluminum Letters
A3450 Paint Steel Columns	10 25-Jan-17*	 			Paint Steel Columns
A3460 Interior Finishes Complete	3 09-Feb-17*				□ Interior Finishes Complete
A3470 Final Cleaning	20 15-Feb-17*	15-Mar-17			Final Cleaning
A3480 Install Landscaping	45 25-Jan-17*	29-Mar-17			Install Landscaping
A3490 Final Building Inspection	3 20-Apr-17*	 			☐ Final Building Inspection
A3500 Occupancy	3 25-May-17*	 			□ Occupáncy
State College High.State College High.3 Pod C Construction A1530 Site Logistics Phase 2	212 02-Nov-16 20 02-Nov-16*				✓ 24-Aug-17, State College High.State College High.3 Pod C Construction ✓ Site Logistics Phase 2
A3510 Deliver CMU	5 14-Nov-16*				Deliver CMU
A3520 Ground Face CMU	6 22-Nov-16*	+			Ground Face CMU
A3530 Scaffolding 1st Floor	7 29-Nov-16*				☐ Scaffolding 1st Floor
A3540 CMU Wall 1st Floor	18 06-Dec-16*	29-Dec-16			CMU Wall 1st Floor
A3550 Scaffolding 2nd Floor	7 19-Dec-16*	27-Dec-16			□ Scaffolding 2nd Floor
A3560 CMU Wall 2nd Floor	18 27-Dec-16*	+			CMU Walt 2nd Floor
A3570 Scaffolding 3rd Floor	7 17-Jan-17*				Scaffolding 3rd Floor
A3580 CMU Wall 3rd Floor	18 24-Jan-17*				CMU Wall 3rd Floor
A3590 Inspection of CMU Structure A3600 Spray on Insulation 1st Floor	35 04-Jan-17* 4 26-Jan-17*	 			Inspection of CMU Structure Spray on Insulation 1st Floor
A3610 Spray on Insulation 1st Floor A3610 Spray on Insulation 2nd Floor	4 26-Jan-17* 4 02-Feb-17*				☐ Spray on Insulation 2nd Floor
A3620 Spray on Insulation 3rd Floor	4 09-Feb-17*				☐ Spray on Insulation 3rd Floor
A3630 Inspection of Insulation	12 01-Feb-17*				Inspection of Insulation
A3640 3-5/8" & 8" Metall Studs 1st-3rd	12 10-Feb-17*				3-5/8" & 8" Metall Studs 1st-3rd
A3650 6" & 8" Metal Stud on Parapet	4 28-Feb-17*	+			☐ 6" & 8" Metal Stud on Parapet
A3660 Cast Stone Sill 1st Floor	8 26-Jan-17*				Cast Stone Sill 1st Floor
A3670 Cast Stone Sill 2nd Floor	8 03-Feb-17*				Cast Stone Sill 2nd Floor
A3680 Cast Stone Sill 3rd Floor A3690	8 14-Feb-17*	<u> </u>			Cast Stohe Sill 3rd Floor
Metal Fascia 3rd Floor @ Roof A3700 Aluminum Curtain Walls 1st Floor	15 24-Feb-17* 12 07-Feb-17*				Metal Fascia 3rd Floor @ Roof Aluminum Curtain Walls 1st Floor
A3710 Aluminum Curtain Walls 1st Floor A3710 Aluminum Curtain Walls 2nd Floor	12 07-Feb-17 12 15-Feb-17*				Aluminum Curtain Walls 2nd Floor
A3710 Administration Curtain Walls 2nd Floor A3720 Aluminum Curtain Walls 3rd Floor	12 02-Mar-17*				Aluminum Curtain Walls 3rd Floor
A3730 Aluminum Storefront 1st Floor	13 16-Mar-17*				Aluminum Storefront 1st Floor
A3740 Aluminum Storefront 2nd Floor	13 30-Mar-17*	 			Aluminum Storefront 2nd Floor
A3750 Aluminum Storefront 3rd Floor	13 13-Apr-17*	02-May-17			Aluminum Storefront 3rd Floor
A3760 Doors- All Types	30 03-Mar-17*	14-Apr-17			Doors- All Types
A3770 Deliver Brick to Site	5 22-Mar-17*				□ Deliver Brick to Site
A3780 Brick Veneer 1st Floor	20 05-Apr-17*	 			Brick Veneer 1st Floor
A3790 Brick Veneer 2nd Floor	20 01-May-17*	ļ			Brick Veneer 2nd Floor Brick Veneer 3rd Floor
A3800 Brick Veneer 3rd Floor A3810 Install Masonry Control Joints 1st-3rd	20 22-May-17* 60 18-Apr-17*	+			Install Masonry Control Joints 1st-3rd
A3820 Install Stone Veneer 1st Floor	12 01-May-17*	+			Install Masoning Conditional 1st-3rd
A3830 Install Stone Veneer 2nd Floor	12 16-May-17*				Install Stone Veneer 2nd Floor
A3840 Install Stone Veneer 3rd Floor	12 26-May-17*	+			Install Stone Veneer 3rd Floor
A3850 Metal Insulated Panels A & B 1st Floor	15 31-May-17*	21-Jun-17			Metal Insulated Panels A & B 1st Floor
A3860 Metal Insulated Panels A & B 2nd Floor	15 15-Jun-17*	 			Metal Insulated Panels A & B 2nd Floor
A3870 Metal Insulated Panels A & B 3rd Floor	15 03-Jul-17*				Metal Insulated Panels A & B 3rd Floor
A3880 Exterior Sunshade System	25 28-Jun-17*	 			Exterior Sunsha'de System Canopies
A3890 Canopies A3900 Aluminum Downspouts	17 28-Jun-17* 10 19-Jul-17*				Aluminum Downspouts
A3910 Aluminum Letters	15 12-Jul-17*				Aluminum Letters
A3920 Paint Steel Columns	10 19-Jul-17*	 			Paint Steel Columns
A3930 Interior Finishes Complete	3 27-Jul-17*				☐ Interior Finishes Complete
A3940 Final Cleaning	20 12-Jul-17*	09-Aug-17			Final Cleaning
A3950 Install Landscaping	45 16-Jun-17*				Install Landscaping
A3960 Final Building Inspection	3 17-Aug-17*	 			☐ Final Building Inspection
A3970 Occupancy	3 22-Aug-17* 212 06-Feb-17				■ Occupancy ✓ 28-Nov-17, State College High State College High 4 Pod D Construction
State College High.State College High.4 Pod D Construction A3980 Deliver CMU	5 06-Feb-17*				Deliver CMU
A3990 Ground Face CMU	6 14-Feb-17*				☐ Ground Face CMŲ
A4000 Scaffolding 1st Floor	7 21-Feb-17*	+			☐ Scaffolding 1st Floor
A4010 CMU Wall 1st Floor	18 23-Feb-17*	21-Mar-17			CMU Wall 1st Floor
A4020 Scaffolding 2nd Floor	7 20-Mar-17*				☐ Scaffolding 2nd Floor
A4030 CMU Wall 2nd Floor	18 23-Mar-17*				CMU Wall 2nd Floor
A4040 Scaffolding 3rd Floor	7 13-Apr-17* 18 07-Apr-17*				□ Şcaffoldinġ 3rd Floor □□□□ CMU Wall 3rd Floor
A4050 CMU Wall 3rd Floor A4060 Inspection of CMU Structure	35 15-Mar-17*	 			Inspection of CMU Structure
A4000 Inspection of CMO Structure A4070 Spray on Insulation 1st Floor	4 03-Apr-17*	 			Spray on Insulation 1st Floor
A4080 Spray on Insulation 2nd Floor	4 17-Apr-17*	 			Spray on Insulation 2nd Floor
A4090 Spray on Insulation 3rd Floor	4 26-Apr-17*				Spray on Insulation 3rd Floor
A4100 Inspection of Insulation	12 11-Apr-17*	26-Apr-17			Inspection of Insulation
A4110 3-5/8" & 8" Metall Studs 1st-3rd	12 19-Apr-17*				3-5/8" & 8" Metall Studs 1st-3rd
A4120 6" & 8" Metal Stud on Parapet	4 28-Apr-17*				☐ 6" & 8" Metal Stud on Parapet
A4140 Cost Stone Sill 1st Floor	8 11-Apr-17*				Cast Stone Sill 1st Floor
A4140 Cast Stone Sill 2nd Floor	8 25-Apr-17*				Cast Stone Sill 2nd Floor
A4150 Cast Stone Sill 3rd Floor A4160 Metal Fascia 3rd Floor @ Roof	8 04-May-17*	+			Cast Stone Sill 3rd Floor Metal Fascia 3rd Floor @ Roof
A4160 Metal Fascia 3rd Floor @ Roof A4170 Aluminum Curtain Walls 1st Floor	15 17-Apr-17* 12 21-Apr-17*				Metal Fascia 3rd Floor @ Roof Alumínum Curtain Walls 1st Floor
A4170 Aluminum Curtain Walls 1st Floor A4180 Aluminum Curtain Walls 2nd Floor	12 21-Apr-17*	 			Aluminum Curtain Walls 1st Floor Aluminum Curtain Walls 2nd Floor
A4190 Aluminum Curtain Walls 2rd Floor A4190 Aluminum Curtain Walls 3rd Floor	12 03-May-17 12 17-May-17*	 			Aluminium Curtain Walls 3rd Floor
	13 23-May-17*				Aluminum Storefront 1st Floor
A4200 Aluminum Storefront 1st Floor					
A4200 Aluminum Storefront 1st Floor A4210 Aluminum Storefront 2nd Floor	13 01-Jun-17*	20-Jun-17			Aluminum Storefront 2nd Floor
A4210 Aluminum Storefront 2nd Floor A4220 Aluminum Storefront 3rd Floor	13 01-Jun-17* 13 19-Jun-17*				Aluminum Storéfront 3rd Floor
A4210 Aluminum Storefront 2nd Floor		06-Jul-17			

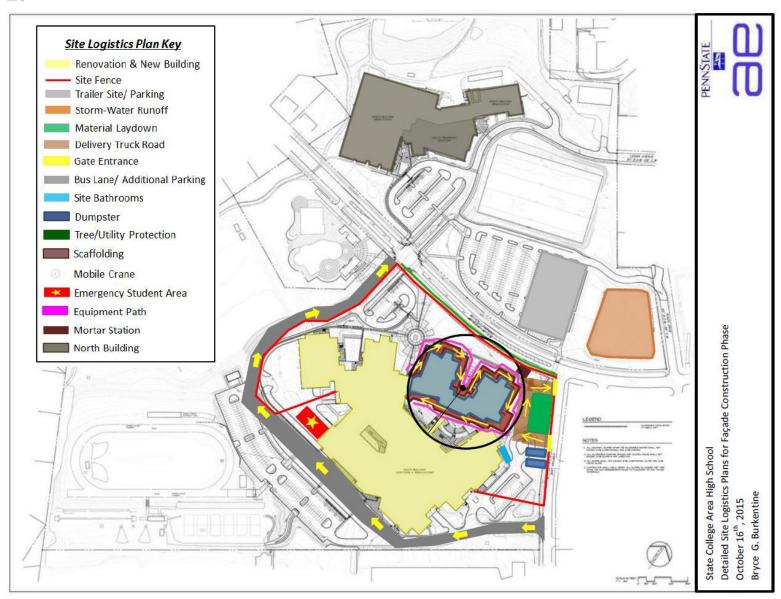


0	W	O mark broad and	Taller # Occasión	1-10	Latin Bring	1 -1 4	Market at Britan	Markardal Amazania	I I south Britis I	F'n Annual	Tarab Carathania	Total Amount
Section 4000 CAVEY	Item	Spreadsheet Level	Takeoff Quantity	Labor Cost/Unit	Labor Price	Labor Amount	Material Price	Material Amount	Equip Price	Equip Amount	Total Cost/Unit	Total Amount
4000.000 MASONRY	4060.100 Mortar: All Types										+ +	
		Std Brk-Mortar Type N-Red	200.00 cy				4.80	/bags 11,61	6 /bags		58.08 /cy	11,616
		Sand Fill CMU (sqft)	75,000.00 sf	0.87 /st	f 46.00 /hr	65,550	/hr 0.13				1.02 /sf	76,440
		Premixed Mortar	1,424.00 ba	g			14.00	/bag 20,93	3 /bag		14.70 /bag	20,933
	4070.100 Mortar: Grout Fill Conc	D. II. 12		10.00	10.00							
		Portland Cement Sand @ Grout	1,000.00 cy 4,300.00 cy	40.00 /c					0 /bags		91.03 /cy 59.56 /cy	91,030 256,114
	4080.100 Reinforce: Horizontl Wall	Sanu & Grout	4,300.00 Cy	40.0070	40.00 /11	172,000	/111 13.80	71011 04,11	4/1011		59.567cy	250,114
		Horiz Wall Reinf 8" Hot Dippd	600.00 mlf	100.00 /m	nlf 40.00 /hr	60,000	/hr 114.00	/mlf 71,82	0 /mlf		219.70 /mlf	131,820
		Horiz Wall Reinf 12" Hot Dippd	230.00 mlf	100.00 /m			/hr 127.20				233.56 /mlf	53,719
		Horiz Wall Reinf 16" Hot Dippd	150.00 mlt	100.00 /m	nlf 40.00 /hr	15,000	/hr 139.20	/mlf 21,92	4 /mlf		246.16 /mlf	36,924
	4080.110 Reinforce: Brick Anchors			2.12	10.00						100 001	10.00
		Metal Insulated Panel Anchors Brick/Stone Anchors Z Ties 6"	350.00 ea 50,000.00 ea		a 40.00 /hr	140	/hr 127.20		0 /ea		133.96 /ea 0.03 /ea	46,886 1,260
	4090.100 Access: Control Joint	DITUNGUITE ATTUTOS 2 TTGS 0	30,000.00 ea				0.02	76a 1,20	o /ea		0.03 /ea	1,200
		Control Joint PEJ - 4"	15,000.00 lf				0.22	/lf 3,40	2 /lf		0.23 /lf	3,402
		Control Joint Sealant	15,000.00 lf	2.00 /lf	40.00 /hr	30,000	/hr 0.12	/lf 1,89	O /lf		2.13 /lf	31,890
	4090.110 Access: Wall Flashing											
		Wall Flashing	120,000.00 sf	0.40 /st	f 40.00 /hr	48,000	/hr 0.04	/sf 4,53	6 /sf		0.44 /sf	52,536
	4090.120 Access: Weep Holes	Weenhales Metal	10,000,00,00	0.80 /e	a 40.00 /hr	8,000	/hr 0.19	/00 1.90	0 /ea		0.99 /ea	9,890
	4210.100 Brick: All Types	Weepholes - Metal	10,000.00 ea	0.60 /e	a 40.00 /nr	8,000	/hr 0.18	/ea 1,69	o /ea		0.99 /ea	9,690
	12.01.00 2.13.11 1,000	Common Brick	110,000.00 sf	2.25 /st	f 40.00 /hr	247,500	/hr 22.00	/sf 2,541,00	0 /sf		25.35 /sf	2,788,500
	4220.100 Conc. Block: 12"										<u> </u>	
		Blk 12" 2 hr Stand Face Lt Wt	62,000.00 sf	5.00 /si	f 40.00 /hr	310,000	/hr 5.50	/sf 358,05	0 /sf		10.78 /sf	668,050
	4220.110 Conc. Block: 8"											
	4000 450 Come Pleate 46" Lintel	Blk 8" 2 hr Stand Face Lt Wt	95,000.00 sf	4.00 /st	f 40.00 /hr	380,000	/hr 3.00	/sf 299,25	0 /sf		7.15 /sf	679,250
	4220.150 Conc. Block: 16" Lintel	Lintel 16" Stand Face Lt Wt	62.00 ea	6.00 /e	ea 40.00 /hr	372	/hr 1.44	/ea Q	4 /ea	+	7.51 /ea	466
	4220.160 Conc. Block: 12" Lintel	Eliter to Stand Face El Wi	02.00 ca	0.00 /c.	40.00 //11	572	1.44	764 3	+/ca		7.01764	400
		Lintel 12" Stand Face Lt Wt	45.00 ea	5.00 /e	a 40.00 /hr	225	/hr 1.44	/ea 6	8 /ea		6.51 /ea	293
	4220.170 Conc. Block: 8" Lintel											
		Lintel 8" Stand Face Lt Wt	60.00 ea	4.00 /e	a 40.00 /hr	240	/hr 1.20	/ea 7	6 /ea		5.26 /ea	316
	4220.190 Conc. Block: Opening Form			10.00	10.00							10.500
	4440.500 Stone Veneer	Block Masonry Opening Forms	300.00 ea	40.00 /e	a 40.00 /hr	12,000	/hr 24.00	/ea 7,56	0 /ea		65.20 /ea	19,560
	4440.300 Stone Veneer	Ashlar Stone Veneer 2"	23,000.00 sf	5.50 /si	f 40.00 /hr	126,500	/hr 24.00	/sf 579,60	0 /sf		30.70 /sf	706,100
	4930.100 Cleaning: Masonry	Administration Control	20,000.00 0	0.00 /0.		120,000	7.11	70. 070,00	5,751		00.707	7.00,100
		Clean Brick - General	150,000.00 sf	0.40 /st	f 40.00 /hr	60,000	/hr 0.02	/sf 3,78	0 /sf		0.43 /sf	63,780
		Clean Stone Veneer	20,000.00 sf	0.40 /st	f 40.00 /hr	8,000	/hr 0.02	/sf 50	4 /sf		0.43 /sf	8,504
5000.000 METALS												
	5500.010 Misc: Lintels	Steel Lintels 3x3x1/4	105.00 ea	20.00 /o	40.00 /hr	2,100	/hr 18.00	/02 1.80	0 /ea		38.00 /ea	3,990
04-43-00.00 Stone Masonry		Steel Liliters 3x3x 1/4	105.00 ea	20.00 /e	a 40.00 /hr	2,100	/111 18.00	/ea 1,09	o /ea		36.00 /ea	3,990
04-43-00.00 Stone masomy	04-43-10.10 Bluestone										+ +	
		Scaffolding	33,000.00 sf	11.45 /st	f 11.45 /sf	377,850	/sf 6.50	/sf 214,50	0 /sf		17.95 /sf	592,350
05-12-23.00 Structural Steel												
	05-12-23.05 Canopy Framing		40 500 00 11									
	05-12-23.40 Lightweight Framing	Canopy framing, structural steel, 6" and 8" members, shop fabricated	10,500.00 lb	0.57 /lb	b 0.57 /lb	5,985	/lb 1.59	/lb 16,69	5 /lb 0.05 /	lb 529	5 2.21 /lb	23,205
	03-12-23.40 Lightweight Familing	Channel framing, structural steel, field fabricated, C3x4.1, incl cutting & welding	575.00 lf	16.00 /lf	16.00 /lf	9,200	/lf 3.26	/lf 1,87	5 /lf 1.82 /	lf 1,04	7 21.08 /lf	12,121
		Channel framing, structural steel, field fabricated, C6x8.2, incl cutting & welding	400.00 lf	23.50 /lf								12,980
		Channel framing, structural steel, field fabricated, C8x11.5, incl cutting & welding	400.00 lf	35.50 /lf	35.50 /lf	14,200	/lf 9.15	/lf 3,66	0 /lf 4.05	lf 1,620	0 48.70 /lf	19,480
07-21-29.00 Sprayed Insula												
	07-21-29.10 Sprayed-On Insulation	to be a second of the second o	450,000,00	0.40/.		04.500	4.50		0.00	54.00	0.07//	055 500
07-42-13.00 Metal Wall		Insulation, polyurethane foam, 2#/CF density, 3" thick, R19.5, sprayed	150,000.00 sf	0.43 /st	f 0.43 /sf	64,500	/sf 1.58	/sf 237,00	0 /sf 0.36 /	sf 54,000	0 2.37 /sf	355,500
U1-42-13.UU WEEAI VVAII	07-42-13.20 Aluminum Siding Panels			+	+	+	 		+ +	+	+	
	<u> </u>	Aluminum siding, sandwich panels, embossed white, insulated, double 4" pattern, .019" thick	46,000.00 sf	1.14 /si	f 1.14 /sf	52,440	/sf 2.67	/sf 122,82	0 /sf	1	3.81 /sf	175,260
07-71-43.00 Drip Edge												
	07-71-43.10 Drip Edge, Rake Edge, Ice Belts											
00 44 55 55 55		Aluminum drip edge, mill finish, .016" thick, 5" wide	30,000.00 If	0.94 /lf	0.94 /lf	28,200	/lf 0.55	/lf 16,50	O /lf		1.49 /lf	44,700
08-11-00.00 Metal Doors An	08-11-16.10 Entrance Doors			+	+		 		+ +	+	+	
	VO-11-10.10 Linearite Duois	Doors & frames, aluminum, entrance, narrow stile, clear finish, 3'-0" x 7"-0" opening, incl. standard	105.00 3	420.00 /3	420.00 /3	44,100	/3 915.00	/3 96,07	5 /3		1,335.00 /3	140,175
		hardware, excl. glass								+		
		Doors & frames, aluminum, entrance, narrow stile, clear finish, 6'-0" x 7'-0" opening, incl. standard hardware, excl. glass	100.00 ea	650.00 /e	650.00 /ea	65,000	/ea 1,200.00	/ea 120,00	u /ea		1,850.00 /ea	185,000
08-13-13.00 Hollow Metal D												
	08-13-13.15 Metal Fire Doors	Described that MONIAL I CONTACT AND A CONTACT AND					/	/ · · · · · ·	5 /		,=====	
		Doors, fire, steel, flush, "B" label, 90 minute, full panel, 20 ga., 3'-0" x 6'-8"	97.00 ea	44.00 /e	a 44.00 /ea	4,268	/ea 435.00	/ea 42,19	o /ea		479.00 /ea	46,463
00 42 42 00 41				+	+		 		+ +	+	+ +	
08-43-13.00 Aluminum-	08-43-13.20 Storefront Systems		44,000.00 sf	9.65 /si	f 9.65 /sf	424,600	/sf 41.00	/sf 1,804,00	0 /sf	1	50.65 /sf	2,228,600
08-43-13.00 Aluminum-	08-43-13.20 Storefront Systems	Storefront systems, aluminum frame, institutional grade, clear 3/8" plate glass, 3' x 7' door with		i	1 1							
	08-43-13.20 Storefront Systems	Storefront systems, aluminum frame, institutional grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max wall, wall height to 12' high		+	1						'	
08-43-13.00 Aluminum- 08-56-00.00 Special Functio		Storefront systems, aluminum frame, institutional grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max wall, wall height to 12' high									+ +	
	08-43-13.20 Storefront Systems 08-56-46.10 Radio-Frequency-Interference Mesh	Storefront systems, aluminum frame, institutional grade, clear 3/8" plate glass, 3' x 7' door with hardware, 400 SF max wall, wall height to 12' high	12,000.00 sf				14.00	/sf 168,00	0 /sf		14.00 /sf	168,000
		hardware, 400 SF max wall, wall height to 12' high	12,000.00 sf				14.00	/sf 168,00	0 /sf		14.00 /sf	168,000
08-56-00.00 Special Functio		hardware, 400 SF max wall, wall height to 12' high Sunshades										
08-56-00.00 Special Functio	08-56-46.10 Radio-Frequency-Interference Mesh	hardware, 400 SF max wall, wall height to 12' high	12,000.00 sf	1.50 /sl	f 1.50 /sf	48,000					14.00 /sf 8.95 /sf	168,000 286,400 \$ 10,053,503.00

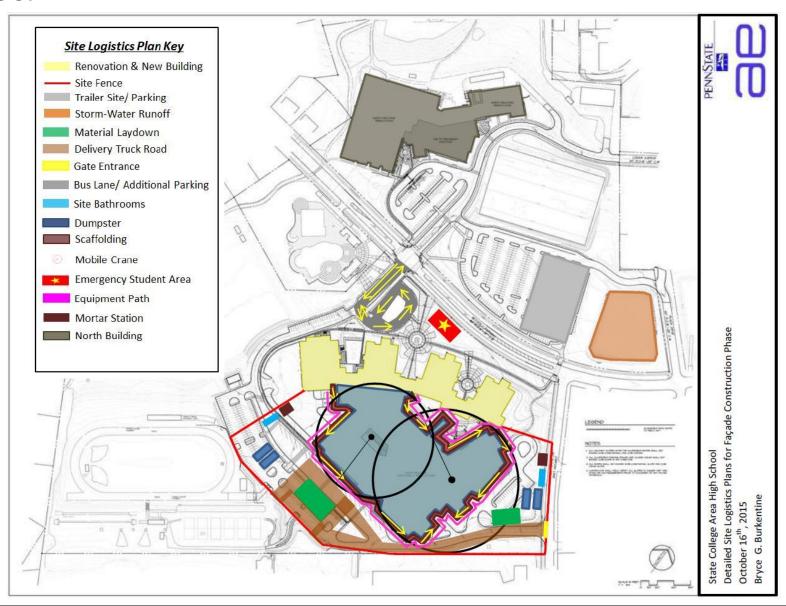
Site Logistics Plans- Phase 1:



Phase 2:



Phase 3:



Flow Diagram of Façade System

