



**TECHNICAL ASSIGNMENT #2**  
***COST AND METHODS ANALYSIS***

**TABLE OF CONTENTS**

A.	Executive Summary.....	1
B.	Detailed Project Schedule.....	2 - 3
C.	Site Layout Planning: Steel / Concrete Phase.....	4
D.	Assemblies Estimate.....	5
E.	Detailed Structural Systems Estimate.....	6 - 7
F.	General Conditions Estimate.....	8
G.	Appendix A.....	9 - 18
H.	Appendix B.....	19 - 20
I.	Appendix C.....	21 - 22
J.	Appendix D.....	23 - 28
K.	Appendix E.....	29 - 32



## **A. EXECUTIVE SUMMARY**

This technical assignment provides an introduction to the construction project management techniques for Medlar Field at Lubrano Park which is located in University Park, Pennsylvania. In this assignment, the project is analyzed in terms of a detailed project schedule, site layout planning, assemblies estimating, structural system estimate, and general conditions estimating all which affect the project's execution.

Medlar Field at Lubrano Park is a fast-track traditional project delivery system. The first item analyzed in this assignment is a detailed construction schedule for the project. The schedule shows construction beginning June 1, 2005 and substantial completion reached by May 31, 2006. There are also important milestone dates highlighted throughout the schedule that are important to achieving the project substantial completion on time. Next, the site layout plan is analyzed during the steel / concrete phase of the project. A 100 ton crawler crane will be used to erect steel with multiple mobilizations and a concrete pump is used to place concrete throughout the site. Medlar Field at Lubrano Park contains many added furnishings and equipment which were summarized in an assemblies estimate. Some of the items included are food service equipment, stadium seating, distributed television/sound system and the scoreboard/videoboards. Because Lubrano Park is a very intense structural system, an estimate of one of the more challenging structural bays was performed. This detailed estimate included different length steel columns, steel beams and joists, a full-height cast-in-place concrete retaining wall, and thickened slab areas at non-load bearing walls. Lastly, a detailed general conditions estimate was calculated for the total project length of 16 months. The general conditions estimate included staff costs with an integrated fee value.



## **B. DETAILED PROJECT SCHEDULE**

*Please see Appendix A for Detailed Project Schedule.*

### **Key Project Dates**

Begin On-Site Construction	June 1, 2005
BP #1 Substantial Completion	October 1, 2005
FRP Footings Area D	July 20, 2005
Load Bearing Wall Construction	October 1, 2005
Structural Steel Erection	November 1, 2005
MEP Distribution System	February 1, 2006
Building Enclosure	February 20, 2006
Playing Field Substantial Completion	April 20, 2006
Project Substantial Completion	May 31, 2006
First Minor League Baseball Game	June 2006

### **Foundation Sequence**

Medlar Field at Lubrano Park is constructed on a conventional spread footing foundation system. Foundation construction began in area D and moved to area E and B. Concurrent construction of the field wall and area A foundation also occurred. Before foundation construction could begin, there was eight (8) weeks of mass excavation to the entire project site.

### **Structural/Exterior Phases**

The current steel erection sequence is divided into seven (7) phases by areas of the stadium; the stadium is divided into areas A, B, C, D, and E which are arranged in a counter-clockwise direction around the building. Steel erection will begin in area D, and then move to area B, followed by area C, and then finish with area A and E. Steel erection will finish with the erection of the light towers and scoreboard structure. All of the steel will be erected with a Manitowoc 10000. This crane features a 100 ton lift capacity with a 250' fixed jib on heavy lift boom and a 41,000 pound maximum line pull. The concrete floor slab construction will follow the structural steel erection sequence. Each floor slab will be placed using a concrete pump with the needed hose length. The masonry sequence begins with construction of load bearing walls in areas B and E and then will follow with areas C and D. It is important to note that the electrical also has a vital role in the masonry wall construction, because his conduit must be concealed in the CMU walls. Once all load bearing walls are erected and the slabs-on-grade are poured, the mason will begin to install the CMU non-load bearing walls and brick veneer.



## **B. DETAILED PROJECT SCHEDULE**

### **Finish Sequence**

Finishes were sequenced through the building from area D to C and finishing in area B. The majority of finishes in area D are in the basement level while area B and C are at the suite level.

Currently, the HVAC rough-in will begin at the ends of the suite level and work towards the center (area C); however, since the main air handling units are located in area C, there is a good chance the schedule will be shifted to accommodate the HVAC mains to be run first directly out of the air handling units. After HVAC and other major overhead equipment are in place, the finishes will be phased in the following manner:

- Metal studs
- MEP Rough-In
- Ceiling Grid
- Electrical Fixtures and Diffusers
- Ceiling Tiles
- Insulation
- Gypsum Board
- Electrical/Telecommunications work
- Painting
- Carpeting and Other Floor Installations
- Furniture

### **Landscaping/Playing Field**

Due to the project requirements set forth by the owner, the landscaping contract only allows for six (6) weeks for installation which is highly related to the weather since the start date is March 1, 2006. However, the project schedule allows for some extra time, if preferred by the contractor, to begin screeding and spreading topsoil throughout the site during the fall of 2005. If the weather permits, the schedule also allows for installation of project plantings in the parking lot islands during the fall of 2005. Similarly to the landscaping contractor, the playing field contractor also has a quick contract installation time. The playing field area will be fenced off on October 1, 2005 and no contractors other than the playing field contractor will be able to access the playing field with equipment. This limitation will allow for the playing field drainage system to be installed this fall without any disturbance.



### **C. SITE LAYOUT PLANNING**

*Please see Appendix B for Detailed Site Layout Plan.*

The detailed site plan considers the site conditions that will be visible during the structural steel erection and SOG / SOD phase of the project. Access to the site is available at places along Porter Road: one entrance is just south of the Bryce Jordan Center entrance and another entrance is located east of the Joe Paterno statue outside Beaver Stadium. Both of these entrances will be heavily used during this phase of the project for many steel and concrete material deliveries. The steel staging area is strategically located in the already paved (base-course only) north and south parking lots. This will allow the steel contractor to have a nice, clean laydown and handling area for his material. As describe in the steel sequencing narrative and noted on the site layout drawing, the crane will require several mobilizations around the perimeter of the structure. It is also important to note that the crane will have to remobilize for the erection of the scoreboard structure and each of the light towers. There is also a hazardous area located in the south parking lot for the storage of welding tanks, so they do not disturb travel areas on site. The placing of concrete slab-on-grade and slab-on-deck will mostly require the use of the concrete pump. The drawing notes several locations for the concrete pump which will be easily accessible for the concrete trucks to supply the “hopper” with concrete. Due to site limitations, there is not an area immediately near the structure for formwork laydown and a carpenter tool shed. The concrete contractor is required to keep his tools and materials in the storage/trailer compound on the east end of the site.





**D. ASSEMBLIES ESTIMATE**

*Please see Appendix C for Detailed Assemblies Estimate.*

<b>ASSEMBLIES ESTIMATE</b>		
<b><i>Summary Worksheet</i></b>		
Project Name: Penn State Ballpark		
Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)		
<b>Equipment Summary</b>		<b>Amount</b>
	SECURITY/VAULT	\$ 14,925
	LAUNDRY/DRY CLEANING	\$ 24,612
	THEATER/STAGE EQUIPMENT	\$ 352,300
	LOADING DOCK EQUIPMENT	\$ 19,512
	SOLID WASTE HANDLING EQUIPMENT	\$ 39,350
	FOOD SERVICE EQUIPMENT	\$ 84,500
	ATHLETIC/RECREATIONAL EQUIPMENT	\$ 681,985
<b>SUBTOTAL EQUIPMENT</b>		<b>\$ 1,217,184</b>
<b>Furnishings Summary</b>		<b>Amount</b>
	FIXED MULTIPLE SEATING	\$ 2,856,000
	FURNISHINGS	\$ 13,340
<b>SUBTOTAL FURNISHINGS</b>		<b>\$ 2,869,340</b>
<b>GRAND TOTAL</b>		<b>\$ 4,086,524</b>

Medlar Field at Lubrano Park contains many added furnishings and equipment not usually contained in building. The assembly estimate total of \$4.1 million is 13.3% of the total project cost of \$30.8 million. The estimate is compared to the total project cost because many of the items noted in the assembly estimate take-off are part of the fixture, furnishing, & equipment budget which is not part of the \$23.8 million construction cost. Unfortunately, R.S. Means had a limited selection of associated equipment and furnishings. However, the estimate does contain the security teller windows at the ticket areas, some of the food service equipment, and a stadium seating cost. Also included is a lump sum costs for the distributed television/sound system and scoreboard and videoboard package.



**E. DETAILED STRUCTURAL SYSTEMS ESTIMATE**

*Please see Appendix D for Detailed Structural System Estimate.*

Column Lines 40-44 between C & D

<b>DETAILED STRUCTURAL SYSTEM ESTIMATE</b>		
<i>Summary Worksheet</i>		
Project Name: Penn State Ballpark		
Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)		
Floor Summary		Amount
	SHEET 1.1D	\$ 57,404
	SHEET 1.2D	\$ -
	SHEET 2.2D	\$ 60,302
	SHEET 2.3D	\$ 44,085
	SHEET 2.4D	\$ 28,014
<b>GRAND TOTAL</b>		<b>\$ 189,805</b>

This area contains concrete SOG, SOD, a retaining wall, structural steel columns and joists along with the associated reinforcing materials. Please note that a masonry take-off was not performed because the masonry walls are non-load bearing for this area. This area was picked because it is the most varied area in the stadium. There is a basement level, main concourse level, and a suite level within this area which is not common throughout the structure. In addition, this area contained different length steel columns, steel beams and joists, a full-height cast-in-place concrete retaining wall, and thickened slab areas at non-load bearing walls.

Take-Off Notes

Structural Bay Area = 2067 SF  
 Length = 87' - 0"  
 Width = 23' - 9"

Assumptions

- SOG & SOD concrete is 4000psi.
- All SOG footings are earth formed.
- For the critiqued area, no control joints are needed.
- SOG, SOD, and Retaining Wall area placed using a concrete pump.
- Calculated cost for retaining wall formwork is not accurate. The actual system used was a Siemens climbing system which allows for quick, accurate control joints and vertical accuracy. Once this system is built for one area, it can easily be re-used for the rest of formation.
- Masonry in this area is non-load bearing and is not calculated for the structural system estimate.



## E. DETAILED STRUCTURAL SYSTEMS ESTIMATE

<b>DETAILED STRUCTURAL SYSTEM ESTIMATE</b>			
<i>Division Summary Worksheet</i>			
Project Name: Penn State Ballpark			
Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)			
<b>CONCRETE</b>			
	SHEET 1.1D	Notes	Amount
	SHEET 1.2D		\$ 52,194
	SHEET 2.2D		\$ -
	SHEET 2.3D		\$ 2,226
	SHEET 2.4D		\$ 3,228
	SHEET 2.4D		\$ -
<b>SUB-TOTAL CONCRETE</b>			<b>\$ 57,648</b>
<b>MASONRY</b>			
	SHEET 1.1D	Notes	Amount
	SHEET 1.2D		\$ -
	SHEET 2.2D		\$ -
	SHEET 2.3D		\$ -
	SHEET 2.4D		\$ -
<b>SUB-TOTAL MASONRY</b>			<b>\$ -</b>
<b>STEEL</b>			
	SHEET 1.1D	Notes	Amount
	SHEET 1.2D		\$ -
	SHEET 2.2D		\$ 56,488
	SHEET 2.3D		\$ 39,269
	SHEET 2.4D		\$ 28,014
<b>SUB-TOTAL STEEL</b>			<b>\$ 123,771</b>
<b>THERMAL &amp; MOISTURE PROTECTION</b>			
	SHEET 1.1D		Amount
	SHEET 1.2D		\$ 5,211
	SHEET 2.2D		\$ -
	SHEET 2.3D		\$ 1,588
	SHEET 2.4D		\$ 1,588
	SHEET 2.4D		\$ -
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>			<b>\$ 8,386</b>
<b>GRAND TOTAL</b>			<b>\$ 189,805</b>

The total steel tonnage for this area is 35 tons. The total “tonnage” for the project is 635 tons which means this area accounts for 5.5% of the total “tonnage.” The combined cost of the structural steel and concrete package is approximately \$4.2 million which is significantly more than the \$190,000 cost of the estimated area.





## F. GENERAL CONDITIONS ESTIMATE

*Please see Appendix E for Detailed General Conditions Estimate.*

<b>GENERAL CONDITIONS / REIMBURSABLE ESTIMATE</b>			
<i>Summary Worksheet</i>			
Project Name:		Penn State Ballpark	
Construction Duration:		May 1, 2005 - August 31, 2006 (16 Months)	
	Description		Amount
	PERSONNEL		\$ 747,782
	FIELD OFFICE SUPPORT		\$ 108,460
	RELOCATION, TRAVEL & MEALS		\$ 64,800
	TEMPORARY UTILITIES-TEMPORARY HEAT		\$ -
	TEMPORARY FACILITIES, FENCES AND BARRICADES		\$ 1,050
	WEATHER PROTECTION		\$ -
	SAFETY AND SECURITY		\$ 1,750
	CLEAN-UP		\$ 26,154
	PROTECTION OF FINISHED AND EXISTING WORK		\$ -
	TOOLS AND EQUIPMENT		\$ 5,000
	MATERIAL HANDLING AND HOISTS		\$ -
	CONSULTANT AND PROFESSIONAL SERVICES		\$ 10,000
	PERMITS AND FEES		\$ -
	INSURANCE AND BOND PREMIUMS		\$ 74,448
<b>GRAND TOTAL</b>			<b>\$ 1,039,443</b>

The detailed general conditions estimate was calculated using current industry unit/cost compiled by Barton Malow Company. The total cost for general conditions is \$1,039,443 which is approximately 4.2% of the total construction cost for the project. The staffing costs, which include the CM fee, reflect the staffing plan which was illustrated in Technical Assignment #1. As noted within the detailed general conditions estimate worksheet located in Appendix E, there are several items that might normally be supplied by the construction manager which have been bought through contract with various subcontractors.



## **APPENDIX A**

### *Medlar Field at Lubrano Park* Detailed Project Schedule

Act ID	Description	Orig Dur	Rem Dur	2005												2006											
				ET	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
<b>CONSTRUCTION</b>																											
<b>PERMITS</b>																											
1020320	10 Day D.E.P. Review Period	10	0																								
1020310	Submit for Demolition & Sitework Permits	0	0																								
1020350	Obtain Demo & Site Permit	1	0																								
<b>NEW BUILDING CONSTRUCTION</b>																											
<b>SITE &amp; SUBSURFACE</b>																											
<b>SITE</b>																											
1020085	Start of On Site Construction	0	0																								
1020080	Erosion & Sediment Control Procedures	10	0																								
1020090	Relocate Effluent, Water, & Gas Line	40	0																								
1020285	Storm & Bioretention Facilities	5	0																								
1020120	Excavation & Grading - N Parking Lot	30	0																								
1020170	Mass Excavation & Grading	30	0																								
1020180	Bldg Pad Ready	0	0																								
1020220	Excavation & Grading - S Parking Lot	5	0																								
1020190	Water and Fire Main Service	10	0																								
1020155	Asphalt Paving (Base Only) - N Parking Lot	7	0																								
1020255	Asphalt Paving (Base Only) - S Parking Lot	5	0																								
1020340	BP 1 Substantial Completion	0	0																								
<b>FOUNDATIONS, UNDER SLAB WORK</b>																											
<b>AREA A</b>																											
3030515	FRP Foundations/Column Footings Area A	7	0																								
3020565	UG Plumbing & Electric Area A	3	0																								
3030175	UG PL & EL Beneath Seating Bowl Area A	4	0																								
3030165	Prep & Pour Slab on Grade Area A	10	4																								
<b>AREA B</b>																											
3030510	FRP Foundations/Column Footings Area B	16	0																								
3030140	FRP Dugout Area B	20	2																								
3030170	UG Plumbing Beneath Seating Bowl Area B & D	24	7																								
3020560	UG Utilities Beneath Main Concs Slab Area B	15	12																								
<b>AREA C</b>																											
3030180	UG Plumbing Beneath Seating Bowl Area C	24	7																								

Run date	27OCT05
Data date	06OCT05
Page number	1A
Project name	Penn State Ball...
© Primavera Systems, Inc.	

**The Pennsylvania State University**  
**Penn State Ballpark**  
**Jason McFadden's Interpretation of the Project Construction Schedule**









Act ID	Description	Orig Dur	Rem Dur	2005												2006											
				ET	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
3030030	Prep & Pour Main Concourse Slab Area D	4	4																								
3151510	MEP Finishes Main Concs Lvl D	20	20																								
3040030	Interior Masonry Main Concs Level Area D	20	20																								
3092340	CMU Elec Rough In Main Concs D	20	20																								
3150190	In-Wall Plumbing Rough In Main Concs Lev Area D	25	25																								
3040080	Metal Stud Elec Rough In Main Concs D	15	15																								
3092310	Metal Stud Framing Main Concs Level D	15	15																								
3160070	OH Elec Rough In Main Concs Lev Area D	15	15																								
3150070	OH Plumbing Rough In Main Concs Lev Area D	8	8																								
3150210	MEP Finishes Stadium - Main Concs Lev	25	25																								
3150110	OH Duct Rough In Main Concs Lev Area D	5	5																								
3150150	OH FP Rough In Main Concs Lev Area D	5	5																								
<b>AREA E</b>																											
1150050	Structural Steel/Metal Deck Main Concs Area E	10	10																								
3030040	Prep & Pour Main Concourse Slab Area E	5	5																								
3040040	Masonry Main Concs Level Area E	5	5																								
<b>SUITE LEVEL</b>																											
<b>AREA B</b>																											
4092130	Hang, Tape & Finish Drywall Suite Level Area B	20	20																								
4088020	Suitfront Glazing Area B	7	7																								
4150010	Underslab PL/EL Suite Lev Area B	7	7																								
4030010	Prep & Pour Suite Level Slab & Seating Area B	6	6																								
4150090	OH Duct/Plumbing Rough In Suite Level Area B	6	6																								
4040040	Metal Stud Elec Rough In Suite Level B	23	23																								
4150130	OH FP Rough In Suite Level Area B	5	5																								
4150170	In-Wall Plumbing Rough In Suite Level Area B	7	7																								
4160050	OH/In-Wall Elec Rough In Suite Level Area B	15	15																								
4040010	Exterior Masonry/EIFS Suite Level Area B	15	15																								
4150120	CMU Elect Rough In Suite Level B	15	15																								
4099110	Painting - Interiors - Suite Level Area B	15	15																								
4095110	Ceilings Suite Level Area B	10	10																								
4062310	Casework Suite Level Area B	20	20																								
4150310	MEP Finishes Suite Level Area B	20	20																								
4150620	Plumbing Fixtures Suite Level Area B	20	20																								

Run date 27OCT05  
 Data date 06OCT05  
 Page number 5A  
 Project name Penn State Ball...  
 © Primavera Systems, Inc.

The Pennsylvania State University  
 Penn State Ballpark  
 Jason McFadden's Interpretation of the Project Construction Schedule













## **APPENDIX B**

*Medlar Field at Lubrano Park*  
Detailed Site Layout Plan: Steel / Concrete Phase





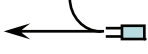


L. Robert Kimball & Assoc.  
 Frick Building  
 437 Grant Street  
 Pittsburgh, PA 15219

DLR Sports Group  
 7290 W. 133rd Street  
 Overland Park, KS 66213

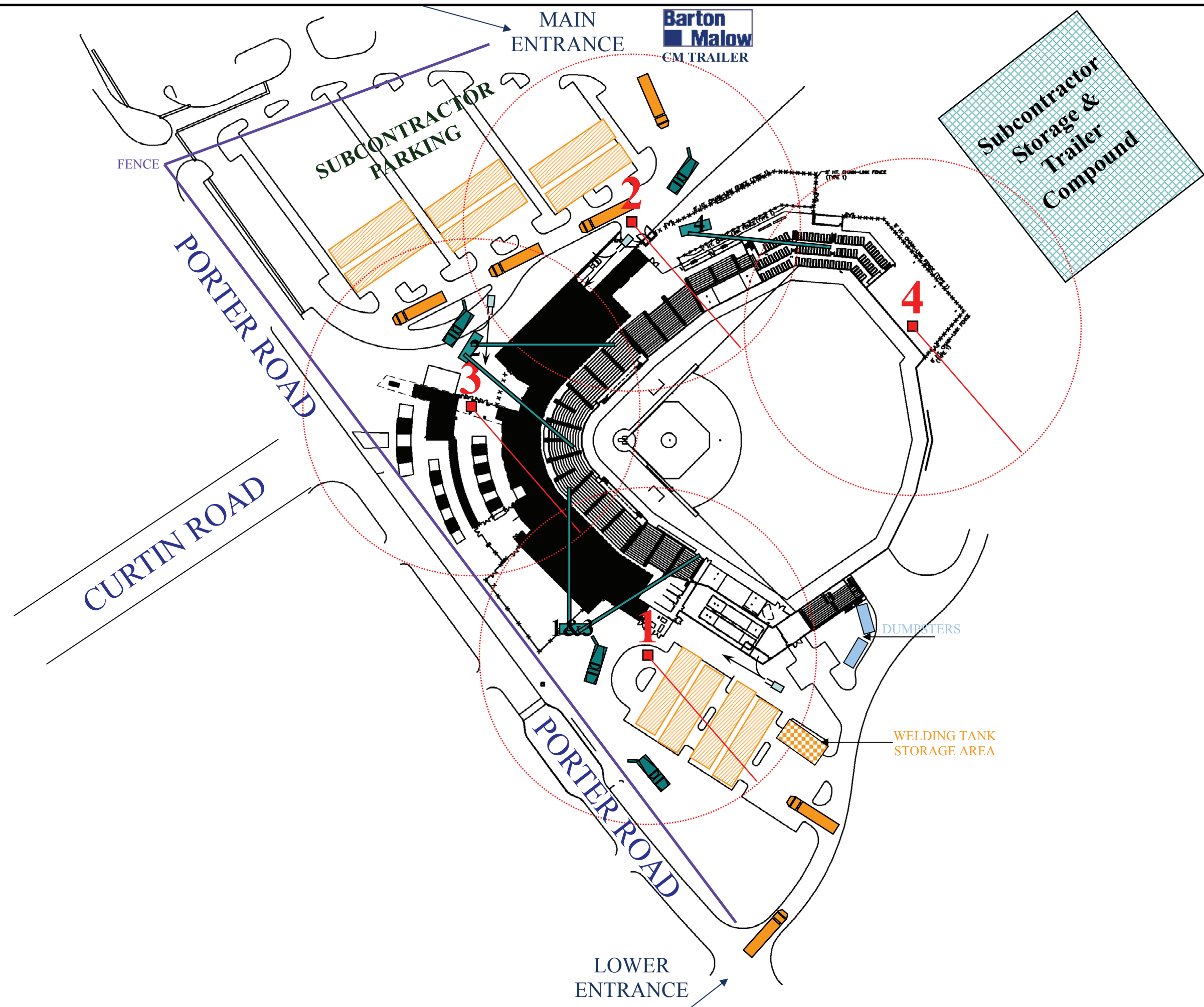
Barton Malow Company  
 200 Mansell Court East  
 Suite 100  
 Roswell, GA 30076

**KEY**

	Steel Delivery Truck
	Steel Staging
	Concrete Pump & Hose
	Concrete Truck
	Forklift

**SITE LAYOUT PLAN**  
 STEEL / CONCRETE  
 SEQUENCE  
 Scale: 3/32" = 1'-0"

**C13.01**



NOTE: This is Jason McFadden's Interpretation of the Site Layout Plan for the Steel/Concrete Sequence.



## APPENDIX C

### *Medlar Field at Lubrano Park* Detailed Assembly Estimate



## ASSEMBLIES ESTIMATE

### Detailed Worksheet

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

EQUIPMENT						
SECURITY / VAULT		Notes	Qty	Unit	Price	Amount
E1010.110	Bullet Proof Teller Window	ticket windows	3	EA	\$4,375.00	\$ 13,125
E1010.110	Office Safe	4 hour rating	1	EA	\$1,800.00	\$ 1,800
<b>SUB-TOTAL SECURITY/VAULT</b>						<b>\$ 14,925</b>
LAUNDRY / DRY CLEANING		Notes	Qty	Unit	Price	Amount
E1010.610	Commercial Dryer	locker room area	4	EA	\$2,989.00	\$ 11,956
E1010.610	Commercial Washer	locker room area	4	EA	\$3,164.00	\$ 12,656
<b>SUB-TOTAL LAUNDRY/DRY CLEANING</b>						<b>\$ 24,612</b>
THEATER AND STAGE EQUIPMENT		Notes	Qty	Unit	Price	Amount
E1020.310	Electric Project Screen	media/all purpose room	1	EA	\$2,300.00	\$ 2,300
E1020.310	Sound System/Distributed TV		1	LS	\$350,000.00	\$ 350,000
<b>SUB-TOTAL THEATER/STAGE EQUIPMENT</b>						<b>\$ 352,300</b>
LOADING DOCK EQUIPMENT		Notes	Qty	Unit	Price	Amount
E1030.310	Dock Bumpers	rubber blocks	4	EA	\$65.50	\$ 262
E1030.310	Dock Levelers		2	EA	\$9,625.00	\$ 19,250
<b>SUB-TOTAL LOADING DOCK EQUIPMENT</b>						<b>\$ 19,512</b>
SOLID WASTE HANDLING EQUIP.		Notes	Qty	Unit	Price	Amount
E1090.210	Heavy Duty Compactor		2	EA	\$19,675.00	\$ 39,350
<b>SUB-TOTAL SOLID WASTE HANDLING EQUIPMENT</b>						<b>\$ 39,350</b>
FOOD SERVICE EQUIPMENT		Notes	Qty	Unit	Price	Amount
E1090.350	Broiler		2	EA	\$3,086.00	\$ 6,172
E1090.350	Semi-Automatic Dishwasher		2	EA	\$7,880.00	\$ 15,760
E1090.350	Food Warmer Counter		4	EA	\$665.00	\$ 2,660
E1090.350	Double Fryer		4	EA	\$1,802.00	\$ 7,208
E1090.350	Range Hood		2	EA	\$3,845.00	\$ 7,690
E1090.360	Walk-In Refrigerator (1)	prefabricated	350	SF	\$128.60	\$ 45,010
<b>SUB-TOTAL FOOD SERVICE EQUIPMENT</b>						<b>\$ 84,500</b>
ATHLETIC / RECREATIONAL EQUIP.		Notes	Qty	Unit	Price	Amount
E1090.810	Delux Weight Lifting Gym	training area	1	EA	\$16,225.00	\$ 16,225
E1090.810	Scoreboard/Videoboard		1	LS	\$650,000.00	\$ 650,000
E1090.350	Semi-Automatic Dishwasher		2	EA	\$7,880.00	\$ 15,760
<b>SUB-TOTAL ATHLETIC/RECREATIONAL EQUIPMENT</b>						<b>\$ 681,985</b>
<b>EQUIPMENT TOTAL</b>						<b>\$ 1,217,184</b>
FURNISHINGS						
FIXED MULTIPLE SEATING		Notes	Qty	Unit	Price	Amount
E2010.510	Deluxe Seating	stadium seating	5250	EA	\$544.00	\$ 2,856,000
<b>SUB-TOTAL FIXED MULTIPLE SEATING</b>						<b>\$ 2,856,000</b>
FURNISHINGS		Notes	Qty	Unit	Price	Amount
E2020.210	Office Furniture Set (std.)	team offices / ticket area	12	EA	\$345.00	\$ 4,140
E2020.210	Office Furniture Set (deluxe)	team offices	4	EA	\$2,300.00	\$ 9,200
<b>SUB-TOTAL FURNISHINGS</b>						<b>\$ 13,340</b>
<b>FURNISHINGS TOTAL</b>						<b>\$ 2,869,340</b>
<b>GRAND TOTAL</b>						<b>\$ 4,086,524</b>





## APPENDIX D

### *Medlar Field at Lubrano Park* Detailed Structural Estimate



**DETAILED STRUCTURAL SYSTEM ESTIMATE**

**Sheet S1.1D**

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

CONCRETE		Notes	Qty	Unit	Price	Amount
03060	3/4" Aggregate for SOG	material & hauling	32.5	CY	\$31.10	\$ 1,011
03150	3/4" Anchor Bolts		32	EA	\$9.60	\$ 307
03210	#5 Reinforcing Steel	footing & wall rebar	553	LB	\$0.94	\$ 520
03210	#6 Reinforcing Steel	footing rebar	7,771	LB	\$0.94	\$ 7,305
03210	#8 Reinforcing Steel	footing rebar	5,014	LB	\$0.74	\$ 3,710
03220	WWF 6x6 W1.4xW1.4		24	CSF	\$70.50	\$ 1,671
03310	CIP Footers	material only	162	CY	\$84.00	\$ 13,608
03310	CIP Footers	labor & equipment	163	CY	\$17.70	\$ 2,885
03310	CIP SOG	material only	32.5	CY	\$72.50	\$ 2,356
03310	CIP SOG	labor & equipment	33.5	CY	\$28.00	\$ 938
03350	CIP SOG	finishing	33.5	CY	\$0.70	\$ 23
03310	CIP Retaining Wall	material only	68	CY	\$73.50	\$ 4,998
03110	CIP Retaining Wall	formwork	1632	SFCA	\$8.50	\$ 13,872
<b>SUB-TOTAL CONCRETE</b>						<b>\$ 52,194</b>
MASONRY		Notes	Qty	Unit	Price	Amount
**NOTE: CMU Walls are non-loading bearing in this area and add no significance to the structural calculation						
<b>SUB-TOTAL MASONRY</b>						<b>\$ -</b>
STEEL		Notes	Qty	Unit	Price	Amount
**NOTE: Steel Columns in this area are noted on sheet S2.2D						
<b>SUB-TOTAL STEEL</b>						<b>\$ -</b>
THERMAL & MOISTURE PROTECTION			Qty	Unit	Price	Amount
07130	Waterproofing	walls only	1632	SF	\$2.04	\$ 3,329
07210	Perimeter Insulation	continuous footing only @ C	144	SF	\$2.04	\$ 294
07260	Vapor Retarder	SOG only	126	SQ	\$12.60	\$ 1,588
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>						<b>\$ 5,211</b>
<b>GRAND TOTAL</b>						<b>\$ 57,404</b>



**DETAILED STRUCTURAL SYSTEM ESTIMATE**

*Sheet S1.2D*

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

CONCRETE		Notes	Qty	Unit	Price	Amount
<b>SUB-TOTAL CONCRETE</b>						\$ -
MASONRY		Notes	Qty	Unit	Price	Amount
<b>SUB-TOTAL MASONRY</b>						\$ -
STEEL		Notes	Qty	Unit	Price	Amount
<b>SUB-TOTAL STEEL</b>						\$ -
THERMAL & MOISTURE PROTECTION			Qty	Unit	Price	Amount
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>						\$ -
<b>GRAND TOTAL</b>						\$ -



## DETAILED STRUCTURAL SYSTEM ESTIMATE

### Sheet S2.2D

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

CONCRETE		Notes	Qty	Unit	Price	Amount
03310	CIP SOD	material only	22	CY	\$72.50	\$ 1,595
03310	CIP SOD	labor & equipment	22	CY	\$28.00	\$ 616
03350	CIP SOD	finishing	22	CY	\$0.70	\$ 15
**NOTE: SOD Forms are included in structural steel bent plate calculation						
<b>SUB-TOTAL CONCRETE</b>						<b>\$ 2,226</b>
MASONRY		Notes	Qty	Unit	Price	Amount
**NOTE: CMU Walls are non-loading bearing in this area and add no significance to the structural calculation						
<b>SUB-TOTAL MASONRY</b>						<b>\$ -</b>
STEEL		Notes	Qty	Unit	Price	Amount
05090	3/16" Fillet Weld	for structural steel joists only	15	LF	\$9.20	\$ 138
05120	W12x22	structural beams	52	LF	\$29.00	\$ 1,508
05120	W16x26	structural beams	22	LF	\$32.50	\$ 715
05120	W21x55	structural beams	22	LF	\$67.75	\$ 1,491
05120	W24x62	structural beams	64	LF	\$71.50	\$ 4,576
05120	W14x43	structural columns	60	LF	\$51.50	\$ 3,090
05120	W14X90	structural columns	172	LF	\$102.00	\$ 17,544
05120	W14X132	structural columns	37	LF	\$145.00	\$ 5,365
05120	L3" x 3" x 1/4"	structural steel angle	85.25	LF	\$34.50	\$ 2,941
05120	L3" x 5" x 3/8"	structural steel bent plate	96	LF	\$42.50	\$ 4,080
05210	18LH04	structural steel joists	523	LF	\$18.80	\$ 9,832
05120	L1/4" x 1/4" x 1/8"	joist bracing (each direction)	146	LF	\$6.60	\$ 964
05310	1-1/2" 22GA Composite Deck	structural steel deck	2067	SF	\$2.12	\$ 4,382
<b>SUB-TOTAL STEEL</b>						<b>\$ 56,488</b>
THERMAL & MOISTURE PROTECTION			Qty	Unit	Price	Amount
07260	Vapor Retarder	SOG only	126	SQ	\$12.60	\$ 1,588
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>						<b>\$ 1,588</b>
<b>GRAND TOTAL</b>						<b>\$ 60,302</b>



## DETAILED STRUCTURAL SYSTEM ESTIMATE

### Sheet S2.3D

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

CONCRETE		Notes	Qty	Unit	Price	Amount
03310	CIP SOD	material only	31.9	CY	\$72.50	\$ 2,313
03310	CIP SOD	labor & equipment	31.9	CY	\$28.00	\$ 893
03350	CIP SOD	finishing	31.9	CY	\$0.70	\$ 22
**NOTE: SOD Forms are included in structural steel bent plate calculation						
<b>SUB-TOTAL CONCRETE</b>						<b>\$ 3,228</b>
MASONRY		Notes	Qty	Unit	Price	Amount
**NOTE: CMU Walls are non-loading bearing in this area and add no significance to the structural calculation						
<b>SUB-TOTAL MASONRY</b>						<b>\$ -</b>
STEEL		Notes	Qty	Unit	Price	Amount
05090	3/4" Anchor Bolts		186	EA	\$24.00	\$ 4,464
05120	W12x16	structural beams	212.5	LF	\$23.00	\$ 4,888
05120	W27x84	structural beams	128.25	LF	\$94.50	\$ 12,120
05120	W30x90	structural beams	42.75	LF	\$100.00	\$ 4,275
05120	W30x108	structural beams	63.75	LF	\$120.00	\$ 7,650
05120	L3" x 5" x 3/8"	structural steel bent plate	73	LF	\$42.50	\$ 3,103
05310	2" 20GA Composite Deck	structural steel deck	2067	SF	\$3.50	\$ 7,235
<b>SUB-TOTAL STEEL</b>						<b>\$ 39,269</b>
THERMAL & MOISTURE PROTECTION			Qty	Unit	Price	Amount
07260	Vapor Retarder	SOG only	126	SQ	\$12.60	\$ 1,588
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>						<b>\$ 1,588</b>
<b>GRAND TOTAL</b>						<b>\$ 44,085</b>





**DETAILED STRUCTURAL SYSTEM ESTIMATE**

*Sheet S2.4D*

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

CONCRETE		Notes	Qty	Unit	Price	Amount
**NOTE: Concrete is not calculated for area because this is the roof area						
<b>SUB-TOTAL CONCRETE</b>						\$ -
MASONRY		Notes	Qty	Unit	Price	Amount
**NOTE: CMU Walls are non-loading bearing in this area and add no significance to the structural calculation						
<b>SUB-TOTAL MASONRY</b>						\$ -
STEEL		Notes	Qty	Unit	Price	Amount
05090	3/4" Anchor Bolts		186	EA	\$24.00	\$ 4,464
05120	W8x31	structural beams	18	LF	\$37.50	\$ 675
05120	W16x31	structural beams	128.25	LF	\$38.50	\$ 4,938
05120	W18X35	structural beams	213.75	LF	\$44.00	\$ 9,405
05120	W24x62	structural beams	63.75	LF	\$71.50	\$ 4,558
05120	HSS 20" x 8" x 1/2"	structural steel bent plate	85.5	LF	\$38.50	\$ 3,292
05310	1-1/2" 20GA Roof Deck	structural steel deck	2067	SF	\$2.49	\$ 5,147
<b>SUB-TOTAL STEEL</b>						\$ 28,014
THERMAL & MOISTURE PROTECTION			Qty	Unit	Price	Amount
**NOTE: Roofing is not calculated for area because roofing is not part of the structural calculation						
<b>SUB-TOTAL THERMAL &amp; MOISTURE PROTECTION</b>						\$ -
<b>GRAND TOTAL</b>						\$ 28,014



## **APPENDIX E**

### *Medlar Field at Lubrano Park* Detailed General Conditions Estimate



Dr. Michael Horman  
October 31, 2005

## GENERAL CONDITIONS / REIMBURSABLE ESTIMATE

### *Detailed Worksheet*

Project Name: Penn State Ballpark

Construction Duration: May 1, 2005 - August 31, 2006 (16 Months)

Code	Description	Notes	Qty		MATERIAL OR SUB	
			Unit		Price	Amount
<b>PERSONNEL</b>			Weeks	Hr/Wk	Hrs.	
1020	Project Director	\$78.00/hr	69	8	554	\$ 43,231
1021	Project Administrator		-	0	-	\$ -
1021	Senior Project Manager		-	0	-	\$ -
1022	Project Manager	\$49.00/hr	69	40	2,771	\$ 135,789
1023	Project Engineer - A/S/C	\$28.00/hr	69	40	2,771	\$ 77,594
1024	Project Superintendent	\$57.25/hr	69	40	2,771	\$ 158,651
1024	Assistant Superintendent	\$47.00/hr	30	40	1,212	\$ 56,983
1043	Field Accountant	\$32.00/hr	69	6	416	\$ 13,302
1042	Secretary/Clerk	\$20.75/hr	69	40	2,771	\$ 57,502
<b>SUB-TOTAL</b>					13,267	\$ 543,051
1601	Payroll Taxes and Insurance (PRTFB)	PTI Factor for PA		37.70%		\$ 204,730
	Fee (100% of W-2)			100%		\$ 543,051
<b>SUB-TOTAL-PERSONNEL</b>						<b>\$ 747,782</b>
<b>FIELD OFFICE SUPPORT</b>			Qty	Unit	Price	Amount
1501	Office Trailer Rental	2 - 12x60 trailers	16	MO	\$800.00	\$ 12,800
1501	Office Space or Trailer Setup	Trailer Setup/removal	1	LS	\$8,000.00	\$ 8,000
1501	Maintain Field Office		16	MO	\$150.00	\$ 2,400
1501	Security System		1	LS	\$500.00	\$ 500
1501	Office Cleaning		16	MO	\$150.00	\$ 2,400
1504	Radios - Nextel	\$70.00 per month*3 persons	16	MO	\$210.00	\$ 3,360
1508	Electric Usage - Trailers and Office		16	MO	\$300.00	\$ 4,800
1509	Water Usage - Trailers and Office		16	MO	\$150.00	\$ 2,400
1524	Telephone/Network Setup		1	LS	\$15,000.00	\$ 15,000
1524	Telephone Monthly Costs		16	MO	\$600.00	\$ 9,600
1602	Office Furniture/Furnishings		16	MO	\$250.00	\$ 4,000
1602	Fax Machines/Supplies		-	LS	\$200.00	\$ -
1603	Office and Miscellaneous Supplies		16	MO	\$250.00	\$ 4,000
1604	Copier/Supplies		16	MO	\$150.00	\$ 2,400
1607	Cameras/Film and Processing	Include aerial	10	MO	\$300.00	\$ 3,000
1608	Drawing Reproduction	For bulletin plans	1	Allow	\$20,000.00	\$ 20,000
1614	Computers/Printers		1	LS	\$5,000	\$ 5,000
1614	Software support (Prolog, Suretrak)		16	MO	\$100.00	\$ 1,600
1636	Postage/Overnight Express		16	MO	\$450.00	\$ 7,200
<b>SUB-TOTAL FIELD OFFICE SUPPORT</b>						<b>\$108,460</b>



RELOCATION, TRAVEL & MEALS		Notes	Qty	Unit	Price	Amount
1615	Local Travel-Field Personnel-Mileage		28	Trip	\$75.00	\$ 2,100
1616	Out-of-Town Travel		32	Trip	\$750.00	\$ 24,000
1616	Field Staff Housing		14	MO	\$2,000.00	\$ 28,000
1617	Staff Relocation Expenses		1	LS	\$10,000.00	\$ 10,000
1719	Business Meals/Working Lunches		14	MO	\$50.00	\$ 700
<b>SUB-TOTAL RELOCATION, TRAVEL &amp; MEALS</b>						<b>\$64,800</b>
<b>TEMPORARY UTILITIES-TEMPORARY HEAT</b>						
**ALL TEMPORARY UTILITIES PURCHASED FROM SUBCONTRACTORS AS PART OF BASE BID						
<b>SUB-TOTAL TEMPORARY UTILITIES-TEMPORARY HEAT</b>						<b>\$0</b>
<b>TEMPORARY FACILITIES, FENCES AND BARRICADES</b>			<b>Qty</b>	<b>Unit</b>	<b>Price</b>	<b>Amount</b>
1632	Drinking Water		14	MO	\$75.00	\$ 1,050
<b>SUB-TOTAL-TEMPORARY FACILITIES, FENCES AND BARRICADES</b>						<b>\$ 1,050</b>
<b>WEATHER PROTECTION</b>						
**ALL WEATHER PROTECTION PURCHASED FROM SUBCONTRACTORS AS PART OF BASE BID						
<b>SUB-TOTAL-WEATHER PROTECTION</b>						<b>\$0</b>
<b>SAFETY AND SECURITY</b>		<b>Notes</b>	<b>Qty</b>	<b>Unit</b>	<b>Price</b>	<b>Amount</b>
1606	Safety Incentives		1	LS	\$500.00	\$ 500
1606	Extinguishers	Bought from Subcontractor	-	EA	\$100.00	\$ -
1606	First Aid Kit		1	LS	\$500.00	\$ 500
1606	Hard Hats and Rain Gear	Including Body Harness	1	LS	\$500.00	\$ 500
1606	Safety Signs		1	LS	\$250.00	\$ 250
<b>SUB-TOTAL-SAFETY AND SECURITY</b>						<b>\$1,750</b>
<b>CLEAN-UP</b>		<b>Notes</b>	<b>Qty</b>	<b>Unit</b>	<b>Price</b>	<b>Amount</b>
1511	Clean-up Supervision	2 lab/16 hours per week	17	wk	\$480.00	\$ 8,314
1511	Periodic Clean-up	Bought from Subcontractor	-	SF	\$0.13	\$ -
1512	Final Clean-up		107,000	SF	\$0.12	\$ 12,840
1512	Final Glass Cleaning	Bought from Subcontractor	-	SF	\$0.50	\$ -
1513	Pick Up Truck / golf cart		1	LS	\$5,000.00	\$ 5,000
1513	Dumpsters	Bought from Subcontractors	-	EA	\$275.00	\$ -
1513	Dump Fees with Dumpsters	Bought from Subcontractors	-	LS	\$0.00	\$ -
1513	Rubbish chutes-install/maintain/remove	Bought from Subcontractor	-	LS	\$4,000.00	\$ -
1513	Dump carts	Bought from Subcontractor	-	LS	\$2,000.00	\$ -
<b>SUB-TOTAL-CLEAN-UP</b>						<b>\$26,154</b>
<b>PROTECTION OF FINISHED AND EXISTING WORK</b>						
**PROTECTION OF WORK AREAS IS RESPONSIBILITY OF EACH SUBCONTRACTOR AS OUTLINED IN CONTRACT						
<b>SUB-TOTAL-PROTECTION OF FINISHED AND EXISTING WORK</b>						<b>\$0</b>
<b>TOOLS AND EQUIPMENT</b>		<b>Notes</b>	<b>Qty</b>	<b>Unit</b>	<b>Price</b>	<b>Amount</b>
1622	Small Tools		1	LS	\$5,000.00	\$ 5,000
<b>SUB-TOTAL-TOOLS AND EQUIPMENT</b>						<b>\$5,000</b>



MATERIAL HANDLING AND HOISTS						
**ALL MATERIAL HANDLING/HOISTS PURCHASED FROM SUBCONTRACTORS AS PART OF BASE BID						
<b>SUB-TOTAL-MATERIAL HANDLING AND HOISTS</b>						<b>\$0</b>
CONSULTANT AND PROFESSIONAL SERVICES			Qty	Unit	Price	Amount
1638	Surveyors	Initial Building Layout	1	LS	\$10,000.00	\$ 10,000
<b>SUB-TOTAL-CONSULTANT AND PROFESSIONAL SERVICES</b>						<b>\$10,000</b>
PERMITS AND FEES						
**ALL PERMITS AND FEES PURCHASED BY OWNER AND/OR SUBCONTRACTORS						
<b>SUB-TOTAL-PERMITS AND FEES</b>						<b>\$0</b>
INSURANCE AND BOND PREMIUMS		Notes	Qty	Unit	Price	Amount
1610	General/Umbrella Liability Ins.	3.96/1000 on \$15.7M	1	LS	\$74,448	\$ 74,448
<b>SUB-TOTAL-INSURANCE AND BOND PREMIUMS</b>						<b>\$74,448</b>
<b>GRAND TOTAL</b>						<b>\$ 1,039,443</b>