OPPIN STATE UNIVERSITY HEALTH & HUMAN SERVICES BUILDING BALTIMORE, MARYLAND



CORINNE AMBLER • CONSTRUCTION MANAGEMENT • ADVISOR: DR. HORMAN

TECHNICAL ASSIGNMENT #2 COST AND METHOD ANALYSIS

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A. EXECUTIVE SUMMARY

This document is intended to provide information of how the project was executed. A detailed schedule is provided that reflects the phasing and sequencing of major activities. The site layout plan depicts the phases of construction as well as all temporary facilities and objects. A cost estimation of the building envelope, structural system and general conditions is included.

The Health and Human Services Building began Schematic Design in September 2003 and is scheduled to complete in August 2008. The University of Maryland, Baltimore has had some difficulty acquiring townhouses along Whitmore Avenue and this has affected the original site layout and logistics of the project. The impact on the steel erection process is discussed in further detail.

The assembly estimate of the building envelope is broken down into components. These components include masonry, metal panels, glazing, and roofing. The estimated total cost of the building envelope is \$2.4 million. The estimate of the structure of the building is composed of two detailed parts. The foundation and superstructure were taken off by breaking each one into its' different materials. The detailed estimated structural system is ____.



B. DETAILED PROJECT SCHEDULE

The schedule can be found in *Appendix A*.

The building is broken down into four different areas. As shown in the picture below.



Coppin State University Health and Human Services Building's Construction Area

The ECDS is the Early Childhood Development Center. It is a one story building that will house childhood day care. Although it is only one story, careful consideration has been taken in the selection of materials and products because it will be primarily used by children. One of these special features is a heated floor slab because the designers assumed the younger children would be crawling on the floor. The university has gone back and forth on the decision to save money or keep the one-story building included in the scope of work. This has made scheduling for the project difficult at times. Sub-contractors that were awarded with Bid-Package 3 were told not to include the ECDS when ordering materials.

The main building is divided into two areas. - Area A and Area B. Area A is the southern part of the main building. It is the only part of the building that has a sub-grade level. Area B is the northern part of the main building. The main building is 5 stories with mechanical equipment on the roof shielded by a metal screen wall.

The connection bridge is a pedestrian walkway that spans W. North Avenue. It connects the current Coppin State campus to the new part of campus. The walkway allows building occupants to exit the 2nd floor and walk across W. North Avenue without having to worry about traffic. The bridge will be constructed in a parking lot on the north side of W. North Avenue and then be lifted into place by a crane. W. North Avenue will be closed for the weekend to allow the placement of the bridge to occur.

Foundation

The foundation system in the Health and Human Services Building is concrete. The deep foundation system utilized is caissons. Caisson caps and grade beams sit on top of the caissons. The basement walls are cast-in-place concrete. The basement only exists in the south end of the main building (Area A). Construction of the foundation system started in the basement, continued to the north end of the main building and completed in the Early Childhood Development Center (ECDS).

Activity	Duration	Early Start	Early Finish
BASEMENT CAISSONS	5	13-Sep-06	19-Sep-06
FRP Basement Grade Beams & Caisson Caps	20	20-Sep-06	17-Oct-06
INSTALL AREA B CAISSONS	10	27-Sep-06	10-Oct-06
INSTALL AREA A CAISSONS	5	11-Oct-06	17-Oct-06
FRP Area A Grade Beams & Caisson Caps	10	18-Oct-06	31-Oct-06
ECDS INSTALL CAISSONS	5	18-Oct-06	24-Oct-06
FRP Area B Grade Beams & Caisson Caps	20	1-Nov-06	28-Nov-06
FRP ECDS Grade Beams & Caisson Caps	15	29-Nov-06	19-Dec-06

Structural

The steel erection starts in Area A's basement. The floors one thru three in Area B will be erected followed by floors two thru four in Area A. The fourth floor thru the roof in Area B will be erected next followed by the fifth floor and the roof in Area A. The floors will be erected this way due to the column splices. After the main building is erected the ECDS will begin. The bridge erection is dependent on when the city of Baltimore will allow W. North Avenue to be closed for one weekend.

Activity	Duration	Early Start	Early Finish
Erect Basement Struct. Steel	10	26-Jan-07	8-Feb-07
Erect Struct. Steel Area B 1st - 3rd flr.	10	9-Feb-07	22-Feb-07
Erect Struct. Steel Area A 2nd - 4th Flr.	10	23-Feb-07	8-Mar-07
Erect Struct. Steel Area B 4th - Roof	10	9-Mar-07	22-Mar-07
Erect Struct. Steel Area A 5th Flr Roof	10	23-Mar-07	5-Apr-07
Erect ECDS Structural Steel	15	4-May-07	24-May-07
Erect Pedestrian Bridge	10	4-May-07	17-May-07

Finishes

MEP coordination was completed with weekly team meetings using a light table. Once all of the major equipment is put into place finishes will

begin. Finishes will be completed floor by floor starting in Area A and moving to Area B and ending with the ECDS. The contractors will complete the finishes in the following order:

-Metal Studs -MEP Rough-in -Ceiling Grid -Electrical and Lighting Fixtures -Ceiling Tiles -Gypsum Board -Painting -Floor Finishes (Carpet, Tile, etc.) -Furniture



C. SITE LAYOUT PLANNING

The Site Layout Plan can be found in Appendix B.

The layout and logistics of the site have changed from the original plans. The townhouses located on the east side of Whitmore Avenue were to be demolished in April 2006. Unfortunately, the University has not been able to acquire these properties. This has restricted Barton Malow Company's on site storage as well as the lay-down and shake-out area. The crawler crane was originally planned to move up and down Whitmore Avenue erecting steel. The un-demolished houses have forced the crane to erect steel from the opposite side of the building. The crane will now travel along the west side of the building. The Site Layout Plan depicts the steel erection phase.

The three entrances to the site allows all entering trucks to make a loop within the site. This reduces congestion because the trucks to not need to turn around. All trucks enter the site on Whitmore Avenue and must pass the Barton Malow Company trailer. Wheel washes are located at the other two entrances for sediment control. Dumpsters are located near the entrances to allow for easy trash removal.



D. BUILDING ENVELOPE ASSEMBLIES ESTIMATE

The Assemblies Estimate was calculated using *RSMeans Assemblies2006*. The areas for each material were calculated from the building elevations. These areas were then used to estimate the total price for each material including labor.

Assembly Estimate												
	QTY	Unit	Unit Price	Total								
Masonry												
Main Building	32,732	SF	\$28.65	\$937,772								
ECDS	4,312	SF	\$28.65	\$123,539								
Metal Panels												
2" Metal Wall Panels	21,619	SF	\$5.36	\$115,878								
Insulated Screen wall	2,023	SF	\$6.45	\$13,048								
Metal Doors												
3'x8'	10	EA	\$1,425.00	\$14,250								
4'x8'	4	EA	\$1,891.00	\$7,564								
Glazing	·											
Building	25,621	SF	\$31.00	\$794,251								
ECDS	941	SF	\$31.00	\$29,171								
Roof	·											
Single Ply Membrane	147,890	SF	\$2.18	\$322,400								
			Total:	\$2.357.873								

Masonry

All four elevations of the building and the ECDS have brick veneer on their exterior.

Assumptions:

-Standard Common Brick with 6" Backup Thickness and no Backup Core. -6" thick Concrete Block Backup

-Unit Price includes aluminum flashing, shelf angles, control joints, and sealant.

Metal Panels

Two types of metal panels were used for the exterior of the Health and Human Services Building. The panels are only located on the main building. The insulated screen wall is located on the roof to hide all mechanical equipment.

Assumptions:

-Metal Wall Panels: 26 Ga. .0179" thick, galvanized and finished -Insulated Screen Wall: .032" thick, painted

Glazing

Both the ECDS and the main building have glazing on their exteriors.

Assumptions:

-Storefront and Curtain Wall square footage was combined -Tubular Aluminum Framing with two intermediate horizontals

Roof

The roof system in the ECDS and main building are the same.

Assumptions:

-Asphalt Flood Coat with 4-Ply Organic Felt





E. DETAILED STRUCTURAL SYSTEMS ESTIMATE

Structural Estimate Summary										
Structural Component	Cost									
Caissons	\$53,942									
Grade Beams	\$730,099									
W- Shapes	\$76,664									
Skin Connection	\$294,174									
Slabs	\$365,617									
Total:	\$1,520,496									

Foundations - Caissons & Grade Beams

A detailed foundation estimate is provided in Appendix C.

Assumptions:

-A Unit Price Cost for the grade beams was developed by combing formwork costs and concrete placement costs.

-A Unit Price for the caissons was developed by including drilling, placement, testing, and casing costs

-The cost of rebar is included in the unit price calculation.

-Caisson caps are included in the grade beam take-off.

Superstructure - Structural Steel

A detailed foundation estimate is provided in Appendix D.

Assumptions:

-A Unit Price Cost for each W-Shape was developed by averaging the cost of each of each different kind of web length. This was done to include shapes that were not listed in *RSMeans 2006*. -The Unit Price for the column was determined by averaging the unit price for all columns.

- The cost of the labor, crane rental and operator are included in the Unit Price.

-The Unit Price of the Skin Connection Angles were provided by Barton Malow Company

-All slab thicknesses are 3"

-The Unit Price for the slabs includes the metal decking.



F. GENERAL CONDITIONS ESTIMATE

General Conditions Summary

General Conditions Estimate Summary												
PERSONNEL	\$1,166,016											
FIELD OFFICE SUPPORT	\$401,475											
RELOCATION, TRAVEL & MEALS	\$31,600											
TEMPORARY UTILITIES-TEMPORARY HEAT	\$67,950											
TEMPORARY FACILITIES, FENCES AND BARRICADES	\$92,700											
WEATHER PROTECTION	\$73,500											
SAFETY AND SECURITY	\$129,600											
CLEAN-UP	\$356,500											
PROTECTION OF FINISHED AND EXISTING WORK	\$20,000											
TOOLS AND EQUIPMENT	\$15,000											
MATERIAL HANDLING AND HOISTS	\$20,000											
CONSULTANT AND PROFESSIONAL SERVICES	\$53,000											
MISCELLANEOUS	\$10,000											
GRAND TOTAL	\$2,514,454											

The table above, *General Conditions Estimate Summary*, depicts the cost for thirteen different categories. A more detailed estimate can be found in *Appendix E* on page ___. The detailed estimate provides a description for each item in the category. Almost 50% of the General Condition Costs are from personnel. The next section *Staff Reimbursables* details the calculation for the cost of each project team member. All numbers in the General Conditions Estimate were compiled using current industry unit/cost data provided by Barton Malow Company.

Staff Reimbursables

The 94% of the Barton Malow Company Team's Labor is reimbursable and part of General Conditions. The other 6% is part of the project overhead. Throughout the project, project team members change the amount of time they have dedicated to the Coppin State University – Health and Human Services Building Project. The Project Executive only dedicates ten percent of his time per month to the Coppin State Project. A table outlining the percentage of time per month each team member spends on the project for all 29 months of the project can be found in *Appendix F* on page ____. Below is a table (Staff Reimbursables) depicting the monthly rate of man hours and cost of each team member for each fiscal year (July-June). The table also shows which team members are reimbursable and non-reimbursable.

Staff Reimbursables														
Calendar Year			Rate/M	onth			Reimbu	irsable	Non-Reim	Labor				
Month	FY0	6	FY0	7	FY0	8	Lab	oor	Lat	Total				
POSITION	\$	MH	\$	MH	\$	MH	\$	MH	\$	MH	\$			
Project Executive	\$17,233	112	\$30,723	192	\$23,964	144	\$0	0	\$71,920	448	\$71,920			
Project Manager	\$82,391	1,083	\$146,891	1,856	\$114,575	1,392	\$343,857	4,331	\$0	0	\$343,857			
Field Superintendent	\$87,405	1,083	\$155,831	1,856	\$108,043	1,237	\$351,279	4,176	\$0	0	\$351,279			
Project Engineer	\$39,515	1,086	\$70,450	1,861	\$36,634	931	\$146,599	3,877	\$0	0	\$146,599			
Project Engineer	\$27,490	755	\$68,614	1,813	\$31,517	801	\$127,620	3,368	\$0	0	\$127,620			
Document Control	\$22,519	1,083	\$40,149	1,856	\$27,837	1,237	\$90,505	4,176	\$0	0	\$90,505			
Coordinated Dwg. Engineer	\$11,648	320	\$0	0	\$0	0	\$11,648	320	\$0	0	\$11,648			
Field Accountant	\$6,115	168	\$10,903	288	\$9,449	240	\$26,467	696	\$0	0	\$26,467			
Close-Out Engineer	\$227	6	\$943	25	\$23,037	585	\$24,207	616	\$0	0	\$24,207			
Test Engineer	\$3,494	48	\$7,268	96	\$13,858	176	\$24,621	320	\$0	0	\$24,621			
Commissioning Agent	\$0	0	\$0	0	\$19,213	488	\$19,213	488	\$0	0	\$19,213			
Safety	\$1,248	16	\$2,596	32	\$1,350	16	\$0	0	\$5,194	64	\$5,194			
									Non-Reimbu	rsable Total:	\$77,114			

Non-Reimbursable Total:

Reimbursable Total: \$1,166,016

GRAND TOTAL: \$1,243,129





APPENDIX A

Detailed Project Schedule





A	Activity	Oria	2003	20	004		2005		2006		2007		2008
Activity	Activity		ONC	JFMAMJ	JASON	D J F M A	MJJASO	NDJFM	AMJJASOI	NDJFMAM	JJASON	DJFM	AMJJU
1260	EPP North & South Bridge			<mark></mark>				FRP North & S	outh Bridge Abutme	entr W. Z			
1380	FRF Notifi & South Bluge	10									ement Struct S	tool	
1200	Erect Basement Struct. Steel	10	I I I I					1 I I I I I I I I	<u>IIIIIII</u>			B 1et - 3rd (
1590	Lindorground MED Bough inc	10							nderground MEP Ro		uci. Sieel Alea	5 131 - 510 1	
1400	Erect Struct, Steel Area A 2nd	40									Struct Steel Are:	A 2nd - 4t	Eir
1400	Prop & Pour Aroa A 2nd Elr	5	l i i					Pren	& Pour Area A 2nd F				
1540	Prep & Pour Area B 2nd Fir.	5						Prep	& Pour Area B 2nd				
1/60	Area A Underground Plumbing	10									A Underground	Plumbing [Pough-ins
1410	Frect Struct Steel Area B 4th -	10						Erect	Struct. Steel Area B	4th - Roo		- V	
1830	Prep & Pour Area A 3rd Fir	5						Pre	p & Pour Area A 3rd	Fir. SOM			
1840	Prep & Pour Area B 3rd Fir.	5						Pre	ep & Pour Area B 3rc	I Fir. SOM			
1470	Area A Underground Electric	10								▼ ▲ Area	A Underground	l Electric Re	ough-ins
1510	Area B Underground Plumbing	1								🗸 📈 🗸 🗸	B Underground	Plumbing F	Rough-ins
1420	Erect Struct. Steel Area A 5th Flr.	10						Erect St	truct. Steel Area A 51	th Fir Roo <mark>⁄ \</mark>			
1850	Prep & Pour Area A 4th Flr.	5						Pr	ep & Pour Area A 4t	h Fir. SOMI			
1520	Area B Underground Electric	1								<mark>⊽ </mark> Area	B Underground	Electric Ro	ugh-ins
1530	Prep & Pour SOG Area B	1								<mark>▼ </mark>	& Pour SOG Are	a B	
1860	Prep & Pour Area B 4th Flr.	5						· · · · P	rep & Pour Area B 4	th Fir. SOMI			
1480	Prep & Pour SOG Area A	5								🔻 📈 Prej	o & Pour SOG A	rea A	
1430	Erect Area A Screen Wall &	10					Ere	ct Area A Scre	en Wall & Elevator N	lachine Roor			
1920	Spray-on Fireproofing	25							Spray-on	Fireproofing			
1870	Prep & Pour Area A 5th Flr.	5						F	Prep & Pour Area A 5	5th Fir. SOMI		<u>I I I</u> I I I	
1560	Prep & Pour SOG	5							Prep	& Pour SOG			
1930	Install Metal Stud Walls	10								V 🖊 Ins	tall Metal Stud ۱،	Nalls	
1880	Prep & Pour Area B 5th Flr.	5							Prep & Pour Area B	5th Flr. SOMD			
1580	Area A West Exterior Masonry	30							Area A West Ex	terior Masonry	7 1 1 1		
1570	Area A East Exterior Masonry	30							Area A East Ext	terior Masonry	7		
1440	Erect Area B Screen Wall	10							Erect Area	B Screen Wal			
1890	Prep & Pour Area A Roof SOMD	5							Prep & Pour Area				
1940	MEP Rough-ins	20									MEP Rough-ins		
2000	Install Metal Stud Walls	15									VInsta	III Metal Stu	id Walls
4530	Install Metal Stud Walls	15							Install Me	etal Stud Walls			
1900	Prep & Pour Area B Roof SOMD	5							Prep & Pour Area				
1450	Erect ECDS Structural Steel	15							Erect ECDS	Structural Stee			
1730	Erect Pedestrian Bridge	10							Erect Pe	destrian Bridge			
1950	Hang & Finish Drywall Level 1 - 5	40							Hang & Finish D	Prywall Level 1 - 📉			
4550	Install Metal Stud Walls	15							Install	Metal Stud Walls			
4570	Install Metal Stud Walls	15								Metal Stud Walls			
1740	FRP SOMD Pedestrian Bridge	5							FRP SOMD P	edestrian Bridge			
Start Date				Early Bar	CRI2			Sheet 3 of 5	5			Ohavi	A
Data Date	09SEP03			Float Bar		Barton Ma	low Company			Revision		Checked	Approved
Run Date	30OCT06 20:08			Progress Bar	CSC	Health & Hu	man Service Buil	lding					
				Childa Adivity		Classic Sc	hedule Lavout						
~ - -							Layour						
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Activity	Activity	Orig	2003	20	004	20	05		2006		2007			2008	
ID	Description	Dur	SON	D J F M A M J		JFMAMJ	JASOND		MJJJ		JFMAMJJ		JFM	AMJ	JU
4540	MEP Rough-ins	20									ME	P Rough-ins			
2020	MEP Rough-ins	20											₩Е	P Rough	-ins
1910	Prep & Pour SOG	5								Prep	& Pour SOG		1 I I I		-7
1600	Area A West Exterior Masonry	20							Are	a A West Ext	erior Masonry				
1630	Install Curtain Walls & Storefronts	20						Install Curt	ain Wall	s & Storefron	its Area A Eas			7	
1640	Install Curtain Walls & Storefronts	20						Install Curta	ain Walls	& Storefron	ts Area A Wes				i i
1590	Area B East Exterior Masonry	20							Are	ea B East Ext	erior Masonry				1 1
4590	Install Metal Stud Walls	15								Install Me	tal Stud Walls				
4610	Install Metal Stud Walls	15								Install Me	tal Stud Walls				$\mathbf{\nabla}_{i}$
4580	MEP Rough-ins	20										MEP Rough-ii	ns		i i
4560	MEP Rough-ins	20									MEP Rough-ins				1
1700	Install Metal Panels West Elev.	30							Ir	stall Metal P	anels West Elev			-7 ¦	
1650	Install Curtain Walls & Storefronts	20						Install C	urtain W	alls & Storefr	onts Area B Eas	7		-V	
1660	Install Curtain Walls & Storefronts	20						Install Cu	urtain Wa	IIs & Storefro	onts Area B Wes	7			
1620	Area A South Exterior Masonry	20							Á	rea A South E	Exterior Masonr	7			7
1610	Area B North Exterior Masonry	20							A	rea B North E	xterior Masonry	7			▼ ¦
4650	Install Metal Stud Walls	15								Install I	Vetal Stud Walls				▼ ¦
1690	Install Roofing	30									Install Roofing	\mathbf{V}_{1}^{1}			-
4630	Install Metal Stud Walls	15								Install I	Vetal Stud Walls				
1960	Prime & Paint Walls Level 1 - 5	30							i i	Prime & Pair	nt Walls Level 1 - <u>7</u>		▼ii		i
4620	MEP Rough-ins	20										MEP Rougl	n-ins		1
4600	MEP Rough-ins	20									MEP Rough-ins			▼¦ ¦	
4670	Install Metal Stud Walls	20								Insta	ll Metal Stud Walls⁄				
1670	Install Curtain Walls & Storefronts	20						Install	Curtain V	Walls & Store	fronts Area B Nort				1
1680	Install Curtain Walls & Storefronts	10						Install	Curtain V	Valls & Store	fronts Area A Sout <mark>/</mark>	<u>∀¦ i i</u>			r i
1750	West Elevation Masonry	10								West	Elevation Masonry		1 I I I		▼¦
1760	East Elevation Masonry	10								East	Elevation Masonry				-7
1710	Install Metal Panels East & North	30							Insta	ll Metal Pane	Is East & North Eley			$\overline{}$	
4520	Install Curtainwall & Glazing	15	1 1						1 1	Install C	urtainwall & Glazing				
1780	South Elevation Masonry	5							i i	Sout	h Elevation Masonry				-
1770	North Elevation Masonry	10								Nort	h Elevation Masonry		1 I I I		
2050	Hang & Finish Drywall Level 1 - 5	40								Hang & Fini	sh Drywall Level 1 -				1
4660	MEP Rough-ins	20									MEP Rough-ins	s⁄			
4640	MEP Rough-ins	20									MEP Rough-in	\$ <mark>⁄\</mark> \			
1790	Install Roofing	10							i i		Install Roofing	9 <mark>⁄.</mark>			
1970	Install Ceiling Grid Level 1 - 5	30								Install C	eiling Grid Level 1	- 5	▼		1 1
4510	Install Storefronts & Glazing	10								Install	Storefronts & Glazir	ו <u>יל</u> ק			1
1800	Install Storefronts & Glazing	15								Install	Storefronts & Glazi	ng <mark>//</mark> /			
2210	Install Hardscaping &	40								Install Hards	scaping & Landscap	oing <mark>/</mark>			
Start Date					CRI2			Sheet 4 of 5							
inish Date	06AUG08			Early Bar	ONIZ	Barton Malow C	Company		Date		Revision	С	hecked	Approve	ed
Data Date				Progress Bar				-							
tun Date	300010020.08			Critical Activity	CSCF	Health & Human S	Service Building								
						Classic Schedul	e Layout								
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Activity	Activity	Orig	2003		2004				2005				2006	2007 2008	
ID	Description	Dur		JF	JJA		DJF	MAM	J J A		JJF	MAN	<u>N J J</u>	ASONDJFMAMJJASONDJFMAM	JJU
4680	MEP Rough-ins	15					·····			·····				MEP Rough-ins	7
1810	Install Metal Panels & Soffits	20											i li	Install Metal Panels & Soffits	
1720	Install Metal Panels @	30		i i		i i					i i	i i	i i	Install Metal Panels @ Screenwal	
2140	Install Flooring Level 1 - 5	30							1			1		Install Flooring Level 1 - 🖅 🔽 🖓	
4690	Hang & Finish Drywall	10												Hang & Finish Drywal	
2060	Prime & Paint Walls Level 1 - 5	30												Prime & Paint Walls Level 1 -	
4700	Prime & Paint Walls	10										i i		Prime & Paint Walls	
1820	Install Roofing	10										1		Install Roofing	<u>⊹ </u> ▼
4710	Install Ceiling Grid	5												Install Ceiling Grid	<u>+</u> ▼ ¦
2150	Install Metal Stud Walls	1							i i			1		Install Metal Stud Walls	\neg
2160	MEP Rough-ins	1							i			i		MEP Rough-ins	─ ▼
2170	Hang & Finish Drywall	1					1 I I I I I		1			1		Hang & Finish Drywal	<u>-</u>
2190	Prime & Paint Walls	1							1					Prime & Paint Walls	
2180	Install Ceiling Grid	1												Install Ceiling Grio	
4720	Install Flooring	5							i			i		Install Flooring 📿 👘 👘	
2200	MEP Trim-out	1							1			I I		MEP Trim-out	
1980	Install Casework, Millwork &	30							1			1	In	stall Casework, Millwork & Speacialties 1 - 🔨 👘 🖓	
4730	Install Casework, Millwork &	10												Install Casework, Millwork & Speacialtie	<u> </u>
2100	Install Ceiling Grid Level 1 - 5	30											i i	Install Ceiling Grid Level 1 - 🔀	
4740	MEP Trim-out	10		1					1			1		MEP Trim-out	
1990	MEP Trim-out Level 1 - 5	60							1			1		MEP Trim-out Level 1 - 5	
2130	Install Flooring Level 1 - 5	30												Install Flooring Level 1 - 🚺	
2110	Install Casework, Millwork &	30											i li	Install Casework, Millwork & Speacialties 1 -	
2120	MEP Trim-out Level 1 - 5	40		1		i i			i			i i	i i	MEP Trim-out Level 1 - 5	7 i
40000	Substantial Completion	0							1			1		Substantial Completion	
40050	Commissioning	50												Commissioning	
50000	Project Closeout	50												Project Closeout	
40100	Owner & A/E's Punchlist	10							i i			I I	i i	Owner & A/E's Punchlis/	<mark>.∕-</mark> ₹
40500	Complete Punchlist	20		1					1			1		Complete Punchlis	
51000	PROJECT COMPLETE 6-23-08	0										I			-08 🤞

start Date	09SEP03	Early Bar	CRI2 Sheet 5 of 5				
inish Date	06AUG08		Barton Malow Company	Date	Revision	Checked	Approved
ata Date	09SEP03						
un Date	30OCT06 20:08	Progress Bar	CSC Health & Human Service Building				
		Critical Activity					
		_ ·	Oleania Cabadula Laurut				
			Classic Schedule Layout				
Drimeren Custerne las							
⊌ Prima	vera Systems, Inc.						





APPENDIX B

Site Layout Plan - Steel Erection Phase







APPENDIX C

Foundation Detailed Estimate Take-Off

				Caissons				
Caisson Number	Туре	Diameter (feet)	Plan Bottom (feet)	Plan Top (feet)	Depth (feet)	Concrete (CY)	Unit Price (\$/CY)	Cost (\$)
F-6	C40	4	194.00	207.3333	13.33	6.21	\$987	6124.94212
F-7	C40	4	195.00	201	6.00	2.79	\$987	\$2,756.22
F-8	C40	4	196.00	207.3333	11.33	5.27	\$987 \$087	\$5,206.20
F-9 F-6	C40	4	190.00	203.8333	13.83	6.44 6.67	\$987 \$987	\$6,354.03
E-7	C40	4	195.00	204.3333	9.33	4.34	\$987	\$4.287.46
E-8	C40	4	196.00	199	3.00	1.40	\$987	\$1,378.11
E-9	C40	4	190.00	198.5	8.50	3.96	\$987	\$3,904.65
D-9	C40	4	197.00	205	8.00	3.72	\$987	\$3,674.97
C.8-5	TC40	4	185.00	204.3333	19.33	9.00	\$987	\$8,881.17
0.8-6	TC40	4	185.00	204.3333	19.33	9.00	\$987 \$987	\$8,881.17
C-6	TC40	4	185.00	204.3333	19.33	9.00	\$987	\$8,881,17
C-7	C40	4	196.00	203.8333	7.83	3.65	\$987	\$3,598.40
B.9-8	C40	4	198.00	205.5	7.50	3.49	\$987	\$3,445.28
B.5-6	C40	4	193.00	204.3333	11.33	5.27	\$987	\$5,206.20
B.5-7	C40	4	196.00	204.3333	8.33	3.88	\$987	\$3,828.09
A-6	C40	4	193.00	203.3333	10.33	4.81	\$987	\$4,746.83
A-7 F-9.3	C40	4	196.00	203.3333	10.00	2.62	\$987 \$987	\$2,308.72
F-10	TC40	4	193.00	219.6667	26.67	12.41	\$987	\$12.249.88
D.7-10	TC40	4	193.00	219.6667	26.67	12.41	\$987	\$12,249.88
D-10	C30	3	196.00	219.6667	23.67	6.20	\$987	\$6,115.37
B-10	C30	3	205.00	219.6667	14.67	3.84	\$987	\$3,789.81
F-5	C30	3	192.00	219	27.00	7.07	\$987	\$6,976.69
E-5	C30	3	192.00	219	27.00	7.07	\$987	\$6,976.69
B.5-5	C30	3	190.00	215.3333	25.33	6.63 7.16	\$987	\$6,546.03
A-5 B 5-8	C30	3	191.00	210.3333	27.33	7.10 5.41	\$987 \$987	\$5,340,18
A-8	C30	3	199.00	210.0007	20.00	5.24	\$987	\$5,167.92
A-8.3	C30	3	199.00	219	20.00	5.24	\$987	\$5,167.92
AA-8.3	C30	3	202.00	219.6667	17.67	4.63	\$987	\$4,565.00
AA-9	C30	3	202.00	219.6667	17.67	4.63	\$987	\$4,565.00
A'-9	C30	3	202.00	219.6667	17.67	4.63	\$987 \$087	\$4,565.00
A-9 C-9	C30	3	202.00	219.0007	14.33	4.03	\$987 \$987	\$4,000.00 \$3,703.68
F-11	C30	3	201.00	219.667	18.67	4.89	\$987	\$4.823.48
F-12	C30	3	202.00	225.667	23.67	6.20	\$987	\$6,115.46
F-13	C30	3	203.00	225.667	22.67	5.93	\$987	\$5,857.06
F-14	C30	3	204.00	225.667	21.67	5.67	\$987	\$5,598.67
F-15	C30	3	205.00	225.667	20.67	5.41	\$987	\$5,340.27
F-10	C30	े २	206.00	224.333	18.33	4.00	\$907 \$087	\$4,737.17 \$4,737.17
E.3-15.9	TC66	6.5	199.00	224.333	25.33	31.13	\$987	\$30.729.58
E.3-16.7	C30	3	208.00	224.333	16.33	4.28	\$987	\$4,220.38
E.3-17	C30	3	208.00	224.333	16.33	4.28	\$987	\$4,220.38
D.7-11	C30	3	200.00	226.333	26.33	6.89	\$987	\$6,804.34
D.7-12	C30	3	206.00	226.333	20.33	5.32	\$987	\$5,253.97
D.7-13	C30	3	206.00	226.333	20.33	5.32	3987 \$087	\$5,253.97 \$5,252.07
D.7-14	C30	3	208.00	226.333	18.33	4.80	\$987	\$4,737.17
D.7-15.9	TC66	6.5	199.00	224.333	25.33	31.13	\$987	\$30,729.58
D.7-17	C30	3	210.00	224.333	14.33	3.75	\$987	\$3,703.59
D-11	C30	3	200.00	226.333	26.33	6.89	\$987	\$6,804.34
D-12	C30	3	206.00	226.333	20.33	5.32	\$987	\$5,253.97
D-13	C30	3	206.00	226.333	20.33	5.32	\$987 ¢007	\$5,253.97 \$11 177 97
D-13.5 D-14	TC40	4	202.00	220.333	24.33	11.33	φ907 \$987	\$11,177.87 \$11,177.87
D-15	C30	3	208.00	226.333	18.33	4.80	\$987	\$4,737.17
D-16	C30	3	204.00	226.333	22.33	5.85	\$987	\$5,770.76
D-17	C30	3	212.00	224.333	12.33	3.23	\$987	\$3,186.80
C.5-17.3	C30	3	214.00	225.667	11.67	3.05	\$987	\$3,014.71
Elevator-E	C30	3	214.00	222	8.00	2.09	\$987	\$2,067.17
	C30 TC40	3 4	212.00 198.00	222 667	24.67	2.02 11 / R	990/ \$087	⇒∠,⊃ŏJ.9b \$11 331 30
C.3-11.3	TC40	4	202.00	222.667	20.67	9.62	\$987	\$9.493.81

				Caissons									
Caisson	Туре	Diameter	Plan Bottom	Plan Top	Depth	Concrete	Unit Price	Cost					
Number		(feet)	(feet)	(feet)	(feet)	(CY)	(\$/CY)	(\$)					
B.3-17.3	C30	3	216.00	225.667	9.67	2.53	\$987	\$2,497.91					
B-11	C30	3	208.00	218.667	10.67	2.79	\$987	\$2,756.31					
B-12	C30	3	211.00	218.667	7.67	\$987 \$1,981.							
B-13	C30	3	212.00	220	8.00	2.09	\$987	\$2,067.17					
B-14	C30	3	213.00	220	7.00	1.83	\$987	\$1,808.77					
B-15	C30	3	214.00	222	8.00	2.09	\$987	\$2,067.17					
B-16	C30	3	215.00	224.333	9.33	2.44	\$987	\$2,411.61					
B-17	C30	3	216.00	224.333	8.33	2.18	\$987	\$2,153.21					
E.5-1	C30	3	202.00	217	15.00	3.93	\$987	\$3,875.94					
E.5-2	C40	4	202.00	217	15.00	6.98	\$987	\$6,890.56					
E.5-3	C50	5	200.00	216.5	16.50	12.00	\$987	\$11,843.15					
E.5-4	C46	4.5	198.00	215.5	17.50	10.31	\$987	\$10,174.34					
E-1A	C30	3	203.00	217	14.00	3.67	\$987	\$3,617.54					
E-1	C36	3.5	202.00	217	15.00	\$987	\$5,275.58						
D.2-1A	C30	3	204.00	217	13.00	3.40	\$987	\$3,359.15					
C.21A	C40	4	205.00	217	12.00	5.59	\$987	\$5,512.45					
B.8-1	C40	4	204.00	217	13.00	6.05	\$987	\$5,971.82					
B.8-2	C46	4.5	204.00	217	13.00	7.66	\$987	\$7,558.08					
B.8-3	C46	4.5	203.00	217	14.00	8.25	\$987	\$8,139.47					
B.8-4	C60	6	203.00	215.5	12.50	13.09	\$987	\$12,919.80					
B.8-4.4	C26	2.5	207.00	217	10.00	1.82	\$987	\$1,794.42					
B.8-4.6	C26	2.5	207.00	217	10.00	1.82	\$987	\$1,794.42					
B.6-4.4	C26	2.5	207.00	217	10.00	1.82	\$987	\$1,794.42					
B.6-4.6	C26	2.5	207.00	217	10.00	1.82	\$987	\$1,794.42					
A.6-1A	C36	3.5	206.00	217	11.00	3.92	\$987	\$3,868.76					
A.6-1	C40	4	207.00	217	10.00	4.65	\$987	\$4,593.71					
A.6-2	C30	3	207.00	217	10.00	2.62	\$987	\$2,583.96					
A.2-2	C50	5	207.00	217	10.00	7.27	\$987	\$7,177.67					
A.2-3	C50	5	207.00	216.5	9.50	6.91	\$987	\$6,818.78					
A.2-4	C40	4	207.00	216.5	9.50	4.42	\$987	\$4,364.02					
A.1-1	C30	3	207.00	216	9.00	2.36	\$987	\$2,325.56					

Total: \$563,942

		Grad	e Beams	i		
Grade Beam	Width (in)	Depth (in)	Length (feet)	Concrete	Unit Price	Cost
GB-1	24	36	30	40	\$308	(Ψ) \$12.320
GB-1A	24	36	4	5.333333	\$308	\$1.643
GB-1B	24	36	5	6.666667	\$308	\$2,053
GB-2	24	36	30	40	\$308	\$12,320
GB-2A	24	36	4	5.333333	\$308	\$1,643
GB-3	20	42	30	38.88889	\$308	\$11,978
GB-3A	20	42	3	3.888889	\$308	\$1,198
GB-4	30	42	30	58.33333	\$308	\$17,967
GB-4A	30	42	3	5.833333	\$308	\$1,797
GB-5	20	42	30	38.88889	\$308	\$11,978
GB-5R	16	64	3	4 740741	\$308	\$1 460
GB-6	20	64	45	88.88889	\$308	\$27.378
GB-7	20	64	30	59.25926	\$308	\$18,252
GB-7A	20	64	3	5.925926	\$308	\$1,825
GB-8	16	64	10	15.80247	\$308	\$4,867
GB-9	24	64	30	71.11111	\$308	\$21,902
GB-9A	24	64	5	11.85185	\$308	\$3,650
GB-10	30	64	30	88.88889	\$308	\$27,378
GB-11 GB-12	16	64 36	15	23.7037	\$308	\$7,301
GB-12 GB-13	20	36	34	37 77778	\$308	\$11.636
GB-14	20	36	30	33.33333	\$308	\$10.267
GB-15	20	36	44	48.88889	\$308	\$15,058
GB-16	20	36	24.5	27.22222	\$308	\$8,384
GB-17	20	36	120	133.3333	\$308	\$41,067
GB-18	20	36	28	31.11111	\$308	\$9,582
GB-19	20	36	11	12.22222	\$308	\$3,764
GB-20	20	36	30	33.33333	\$308	\$10,267
GB-21	20	36	30	33.33333	\$308	\$10,267
GB-22 GB-23	20	36	30	33 33333	\$308 \$308	\$10,267
GB-24	20	36	30	33.33333	\$308	\$10,267
GB-25	20	36	27	30	\$308	\$9,240
GB-26	20	36	12	13.33333	\$308	\$4,107
GB-27	20	36	19	21.11111	\$308	\$6,502
GB-28	20	36	30	33.33333	\$308	\$10,267
GB-29	20	36	30	33.33333	\$308	\$10,267
GB-30	20	30	30	33.33333	\$308 \$209	\$10,207
GB-31	20	36	30	33 33333	\$308	\$10,207
GB-33	20	36	27	30	\$308	\$9.240
GB-34	20	36	30	33.33333	\$308	\$10,267
GB-35	12	52	40	38.51852	\$308	\$11,864
GB-35A	12	52	8	7.703704	\$308	\$2,373
GB-36	20	36	13	14.44444	\$308	\$4,449
GB-37	20	36	18	20	\$308	\$6,160
GB-38	20	5Z 26	21	43.33333	\$308 \$209	\$13,347 ¢7 197
GB-39	20	36	10	11 11111	\$308	\$3 422
GB-40	24	36	12	16	\$308	\$4.928
GB-41	20	36	19	21.11111	\$308	\$6,502
GB-42	20	36	19	21.11111	\$308	\$6,502
GB-43	16	36	30	26.66667	\$308	\$8,213
GB-44	16	36	21	18.66667	\$308	\$5,749
GB-45	24	36	28	37.33333	\$308	\$11,499
GB-40 CB-47	20	30 26	21.5	23.88889	ბე <u>ი</u> დ გასგ	\$2,761
GR-48	20	36	11	12.22222	\$308	ψ3,704 \$3 764
GB-49	24	36	31	41,33333	\$308	\$12.731
GB-50	32	36	21	37.33333	\$308	\$11,499
GB-51	32	36	42	74.66667	\$308	\$22,997
GB-52	16	36	20	17.77778	\$308	\$5,476
GB-53	20	36	20	22.22222	\$308	\$6,844
GB-54	20	36	20	22.22222	\$308	\$6,844
GB-55	20	36	20	22.22222	\$308	\$6,844

	Grade Beams													
Grade Beam	Width (in)	Depth (in)	Length (feet)	Concrete (CY)	Unit Price (\$/CY)	Cost (\$)								
GB-56	20	36	30	33.33333	\$308	\$10,267								
GB-57	20	36	30	33.33333	\$308	\$10,267								
GB-58	20	36	30	33.33333	\$308	\$10,267								
GB-59	20	36	30	33.33333	\$308	\$10,267								
GB-60	24	36	21	28	\$308	\$8,624								
GB-61	24	36	21	28	\$308	\$8,624								
GB-62	24	36	13	17.33333	\$308	\$5,339								
GB-63	24	36	62	82.66667	\$308	\$25,461								
GB-64	24	36	13	17.33333	\$308	\$5,339								

Total: \$730,099



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CORINNE AMBLER • CONSTRUCTION MANAGEMENT • ADVISOR: DR. HORMAN

APPENDIX D

Superstructure Detailed Estimate Take-Off

First Floor Beams												
Beam	Length	Total	Unit Price	Cost								
Size	(LF)	(TON)	(\$/TON)	(\$)								
W16x 26	330	4.29	\$416	\$1,784.64								
W21x 50	241.5	6.0375	\$984	\$5,940.90								
W8x 10	54	0.27	\$360	\$97.20								
W18x 40	33.5	0.67	\$496	\$332.32								
W21x 44	136	2.992	\$984	\$2,944.13								
W27x 84	180	7.56	\$1,096	\$8,285.76								
W24x 68	30	1.02	\$1,128	\$1,150.56								
W21x 50	30	0.75	\$984	\$738.00								
W30x 99	30	1.485	\$1,264	\$1,877.04								

	ECDS Beams													
Beam	Length	Total	Unit Price	Cost										
Size	(LF)	(TON)	(\$/TON)	(\$)										
W24x 55	263	7.2325	\$1,128	\$8,158.26										
W14x 43	37	0.7955	\$376	\$299.11										
W14x 26	48	0.624	\$376	\$234.62										
W18x 35	138	2.415	\$496	\$1,197.84										
W14x 30	88	1.32	\$376	\$496.32										
W12x 14	76	0.532	\$504	\$268.13										
W8x 18	52	0.468	\$360	\$168.48										
W14x 43	36	0.774	\$376	\$291.02										

Total: \$11,114

Total: \$23,151

	AI	l Columns	;	
Beam	Length	Total	Unit Price	Cost
Size	(LF)	(TON)	(\$/TON)	(\$)
W12x 65	205.31	6.673	\$1,344	\$8,968
W12x 72	344.66	12.408	\$1,344	\$16,676
W10x 54	161.33	4.356	\$1,344	\$5,854
W12x 45	88	1.980	\$1,344	\$2,661
W10x 39	58.66	1.144	\$1,344	\$1,537
W10x 68	146.65	4.986	\$1,344	\$6,701
W10x 49	178	4.361	\$1,344	\$5,861
W10x 33	58.67	0.968	\$1,344	\$1,301
W12x 87	58.67	2.552	\$1,344	\$3,430
W10x 60	29.33	0.880	\$1,344	\$1,183
W12x 50	29.33	0.733	\$1,344	\$985
W10x 77	117.33	4.517	\$1,344	\$6,071
W10x 88	154	6.776	\$1,344	\$9,107
W8x 58	58.67	1.701	\$1,344	\$2,287
W8x 48	117.35	2.816	\$1,344	\$3,785
W12x 79	176	6.952	\$1,344	\$9,343
W10x 60	29.33	0.880	\$1,344	\$1,183
W8x 35	29.33	0.513	\$1,344	\$690
W10x 54	29.33	0.792	\$1,344	\$1,064
W10x 45	14.67	0.330	\$1,344	\$444
W12x 96	95.33	4.576	\$1,344	\$6,150
W12x 53	88	2.332	\$1,344	\$3,134
W12x 152	29.33	2.229	\$1,344	\$2,996
W12x 106	80.67	4.276	\$1,344	\$5,746
W8x 28	14.67	0.205	\$1,344	\$276
W12x 120	36.67	2.200	\$1,344	\$2,957
W14x 176	29.33	2.581	\$1,344	\$3,469

Se	cond thru	ı Fifth Flo	or Beam	s
Beam	Length	Total	Unit Price	Cost
Size	(LF)	(TON)	(\$/TON)	(\$)
W18x 40	598	11.96	\$496	\$5,932
W8X 10	328	1.64	\$360	\$590
W10x 22	37	0.407	\$312	\$205
W12x 16	37	0.296	\$504	\$324
W27x 84	37	1.554	\$1,096	\$783
W12x 19	37	0.3515	\$504	\$146
W16x 26	49	0.637	\$416	\$627
W21x 44	904	19.888	\$984	\$25,138
W30x 99	29	1.4355	\$1,264	\$1,413
W21x 30	24	0.36	\$984	\$395
W27x 84	438	18.396	\$1,096	\$39,735
W36x 135	29	1.9575	\$2,160	\$814
W16x 26	64	0.832	\$416	\$260
W10x 12	27	0.162	\$312	\$80
W18x 40	168	3.36	\$496	\$1,398
W16x 36	13	0.234	\$416	\$118
W12x 19	13	0.1235	\$504	\$62
W12x 14	42	0.294	\$504	\$322
W27x 94	192	9.024	\$1,096	\$11,406
W30x 99	84	4.158	\$1,264	\$4,690
W24x 68	78	2.652	\$1,264	\$2,610
W24x 55	218	5.995	\$1,128	\$2,254
W21x 50	243	6.075	\$984	\$7,679
W14x 22	317	3.487	\$376	\$1,730
W30x 99	116	5.742	\$1,264	\$2,848
W18x 35	124	2.17	\$496	\$2,743
W30x 116	192	11.136	\$1,264	\$14,076
W30x 108	30	1.62	\$1,264	\$2,048
W30x 90	30	1.35	\$1,264	\$1,706
W33X 18	38	0.342	\$1,344	\$460

Total: \$132,593

W- Shape Grand Total:

\$678,496

Skin Connection											
Item	QTY (TON)	Unit Price (\$/TON)	Cost (\$)								
Skin Connector Angles	59	\$4,986	\$294,174								

Slabs												
Item	Area (SQFT)	Total (CY)	Unit Price (\$/CY)	Cost (\$)								
Slab on Grade	147890	1,369.35	\$36	\$49,297								
Slab on Deck	813395	7,531.44	\$42	\$316,320								

Total: \$365,617

Total: \$113,861





APPENDIX E

General Conditions Detailed Estimate

General Conditions	Estimate	Break-D	own	
DESCRIPTION	QTY	UNIT	PRICE	AMOUNT
FIELD OFFICE SUPPORT				
Office Trailer Rental	27	MO	\$850	\$22.950
Office Space or Trailer Setup	1	LS	\$10,000	\$10,000
Maintain Field Office	27	MO	\$300	\$8,100
Security Systems	27	MO	\$200	\$5,400
Office Cleaning	27	MO	\$500	\$13,500
Radios/Nextel's	27	MO	\$400	\$10,800
Electric Usage - Trailers and Office	27	MO	\$2,500	\$67,500
Water Usage - Trailers and Office	27	MO	\$75	\$2,025
Sewer Hookup/Removal - Trailers and Office	1	LS	\$15,000	\$15,000
Telephone/Network Setup	1	LS	\$23,500	\$23,500
Telephone Monthly Costs	27	MO	\$1,000	\$27,000
Office Furniture/Furnishings	1	LS	\$8.000	\$8.000
Fax Machines/Supplies	1	LS	\$5.000	\$5.000
Office and Miscellaneous Supplies	27	MO	\$900	\$24.300
Copier/Supplies	27	MO	\$500	\$13.500
Photocopying Out-sourced	27	MO	\$200	\$5,400
Engineering Supplies	1	LS	\$2.500	\$2,500
Cameras/Film and Processing	1	LS	\$5.000	\$5.000
Drawing Reproduction	1	LS	\$50.000	\$50.000
Computers/Printers	1	15	\$35,000	\$35,000
Software (Company Approved CMS, Sched.)	1	15	\$20,000	\$20,000
Postage/Overnight Express	27	MO	\$1,000	\$27,000
			••,•••	¢404.475
SOB-TOTAL FIELD OFFICE SUPPORT				\$401,475
RELOCATION, TRAVEL & MEALS				
Local Travel-Field Personnel	27	MO	\$150	\$4,050
Out-of-Town Travel	1	LS	\$10,000	\$10,000
On-site work vehicle (Superintendent)	27	MO	\$500	\$13,500
Business Meals/Working Lunches	27	MO	\$150	\$4,050
SUB-TOTAL RELOCATION, TRAVEL & MEALS				\$31,600
TEMPORARY UTILITIES-TEMPORARY HEAT				
Maintenance of Perm. System	1	LS	\$20,000	\$20,000
Temporary Water & Sewer Hookup	1	LS	\$25.000	\$25.000
Temporary Water & Sewer Usage	27	MO	\$250	\$6.750
Temporary Electric Usage	27	MO	\$600	\$16,200
SUB-TOTAL TEMPORARY UTILITIES-TEMPORARY	(HEAT			\$67,950
	DEC			
Temperary Tellete/Dert a jahra	07	MO	¢1.200	¢25 400
Temporary Tollets/Port-a-jonns	21	MO	\$1,300	\$35,100
Temporary Fence	1	LS	\$30,000	\$30,000
Damicades	1	LS	\$∠5,000 \$20,000	\$25,000
Temporary Roada	1		¢25,000	¢25,000
			\$35,000 \$5,000	⊅35,000
JUD SIGNS	1		\$5,000 \$40,000	\$5,000
Temporary Parking/Bus Services	1		\$40,000	\$40,000
Dilliking Water	21		\$100	\$2,700
Puet Control, Bood Mainterance	1		\$5,000 \$5,000	\$5,000
Dusi Control, Koad Maintenance	1	LS	90,000	\$5,000
SUB-TOTAL-TEMPORARY FACILITIES, FENCES A	ND BARRICA	DES		\$92,700

	1	IS	¢10.000	\$10,000
Meether Protection Enclosures	1	IS	\$40.000	\$40.000
Pumping/Dewatering	1	LS	\$10.000	\$10.000
Erosion Control	27	MO	\$500	\$13,500
SUB-TOTAL-WEATHER PROTECTION			· · ·	\$73,500
SAFETY AND SECURITY	27	MO	\$4,000	\$108.000
Walchindh-Security Service	1	I.S.	ም ኅ ,000 \$2 5በበ	\$2 500
Safatu Incentives	112	WK	\$50	\$5,600
Evtinguichare	1	IS	\$5,000	\$5.000
Firet Air Kit	1	1.5	\$2,500	\$2.500
Hard Hats and Rain Gear		LS	\$3.000	\$3.000
Safety Signs	1	LS	\$3,000	\$3,000
SUB-TOTAL-SAFETY AND SECURITY			τ.	\$129,600
		19	¢5.000	¢125.000
Clean-up Foreman Bariadia Clean-up	21 27	1.5	\$0,000 \$2,500	\$67,500
Fellouic Clean-up	1	LS LS	\$2,000 \$20 000	\$30,000
Filiai Ciean-up Dumostore	250	IS	\$350	\$87.500
Rubbish chutes-install/maintain/remove	1	IS	\$35,000	\$35.000
Dump carts		LS	\$1.500	\$1,500
SUB-TOTAL-CLEAN-UP			¥ • ;= = =	\$356,500
PROTECTION OF FINISHED AND EXISTING WORK				
Destant Electrical Monte	4	10	¢45 000	¢15 000
Protect Finished Work	1	LS	\$15,000 \$5,000	\$15,000 \$5,000
Protect Finished Work Elevator Protection-Cabs and Jambs		LS LS	\$15,000 \$5,000	\$15,000 \$5,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS	1 1 STING WORK	LS LS	\$15,000 \$5,000	\$15,000 \$5,000 \$20,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT	1 1 STING WORK	LS LS	\$15,000 \$5,000	\$15,000 \$5,000 \$20,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools	1 1 STING WORK	LS LS LS	\$15,000 \$5,000 \$11,000	\$15,000 \$5,000 \$20,000 \$11,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment	1 1 STING WORK	LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT	1 1 STING WORK 1 1	LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS	1 1 STING WORK 1 1	LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs	1 1 STING WORK 1 1	LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators	1 1 STING WORK 1 1 1 1	LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS	1 1 STING WORK 1 1 1 1	LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000 \$10,000 \$20,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS	1 1 STING WORK	LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000 \$20,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach	1 1 STING WORK	LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000 \$10,000 \$20,000 \$3,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors	1 1 STING WORK	LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$10,000 \$3,000 \$50,000	\$15,000 \$5,000 \$20,000 \$11,000 \$11,000 \$15,000 \$10,000 \$10,000 \$20,000 \$3,000 \$50,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors SUB-TOTAL-CONSULTANT AND PROFESSIONAL	1 1 STING WORK 1 1 1 1 1 SERVICES	LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$10,000 \$50,000	\$15,000 \$5,000 \$20,000 \$11,000 \$11,000 \$10,000 \$10,000 \$20,000 \$3,000 \$50,000 \$53,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors SUB-TOTAL-CONSULTANT AND PROFESSIONAL	1 1 STING WORK 1 1 1 1 1 5ERVICES	LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$3,000 \$50,000	\$15,000 \$5,000 \$20,000 \$11,000 \$10,000 \$10,000 \$10,000 \$20,000 \$3,000 \$50,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors SUB-TOTAL-CONSULTANT AND PROFESSIONAL SERVICES MINORITY FURDERS	1 1 STING WORK 1 1 1 1 SERVICES 1	LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$3,000 \$50,000	\$15,000 \$5,000 \$20,000 \$11,000 \$4,000 \$15,000 \$10,000 \$10,000 \$20,000 \$3,000 \$50,000 \$53,000 \$53,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors SUB-TOTAL-CONSULTANT AND PROFESSIONAL MISCELLANEOUS Ceremony Expenses	1 1 STING WORK 1 1 1 1 SERVICES 1 1	LS LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$3,000 \$50,000 \$10,000	\$15,000 \$5,000 \$20,000 \$11,000 \$11,000 \$10,000 \$10,000 \$20,000 \$3,000 \$53,000 \$53,000
Protect Finished Work Elevator Protection-Cabs and Jambs SUB-TOTAL-PROTECTION OF FINISHED AND EXIS TOOLS AND EQUIPMENT Small Tools Miscellaneous Equipment SUB-TOTAL-TOOLS AND EQUIPMENT MATERIAL HANDLING AND HOISTS Temporary Elevator Cabs Hoist Operators SUB-TOTAL-MATERIAL HANDLING AND HOISTS CONSULTANT AND PROFESSIONAL SERVICES Minority Affairs - MBE Outreach Surveyors SUB-TOTAL-CONSULTANT AND PROFESSIONAL SERVICES MISCELLANEOUS Ceremony Expenses SUB-TOTAL-MISCELLANEOUS	1 1 STING WORK 1 1 1 1 SERVICES 1 1	LS LS LS LS LS LS LS LS LS	\$15,000 \$5,000 \$11,000 \$4,000 \$10,000 \$10,000 \$50,000 \$50,000	\$15,000 \$5,000 \$20,000 \$11,000 \$11,000 \$10,000 \$10,000 \$20,000 \$3,000 \$50,000 \$53,000 \$10,000 \$10,000



CORINNE AMBLER • CONSTRUCTION MANAGEMENT • Advisor: Dr. Horman

APPENDIX F

Staff Reimbursables - Detailed Estimate of the Cost of Man Hours

Staff Reimbursable	S																												
Calendar Year							20	06						2007										20	08				
Month	D	J	F	М	Α	М	J	J	Α	S	0	N	D	J	F	М	Α	М	J	J	Α	S	0	Ν	D	J	F	Μ	Α
POSITION																													
Project Executive	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	5%	5%
Project Manager	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%
Field Superintendent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%
Project Engineer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	50%	50%	50%	50%	0%	0%
Project Engineer	100%	50%	50%	50%	50%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	10%	10%	10%	0%	0%
Document Control	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	0%	0%
Coordinated Dwg. Engineer	0%	50%	50%	50%	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Field Accountant	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Close-Out Engineer	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	5%	0%	0%	0%	5%	0%	0%	0%	10%	0%	10%	0%	20%	20%	20%	100%	100%	100%	100%
Test Engineer	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%	0%	10%	0%	0%	10%	0%	20%	20%	20%	20%	20%	0%	0%
Commissioning Agent	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	35%	90%	90%	90%	0%	0%
Safety	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%

Staff Reimbursable											
Calendar Year		Rate/Month						Reimbursable		Non-Reimbursable	
Month	FY06		FY07		FY08		Labor		Labor		Total
POSITION	\$	MH	\$	MH	\$	MH	\$	MH	\$	MH	\$
Project Executive	\$17,233	112	\$30,723	192	\$23,964	144	\$0	0	\$71,920	448	\$71,920
Project Manager	\$82,391	1,083	\$146,891	1,856	\$114,575	1,392	\$343,857	4,331	\$0	0	\$343,857
Field Superintendent	\$87,405	1,083	\$155,831	1,856	\$108,043	1,237	\$351,279	4,176	\$0	0	\$351,279
Project Engineer	\$39,515	1,086	\$70,450	1,861	\$36,634	931	\$146,599	3,877	\$0	0	\$146,599
Project Engineer	\$27,490	755	\$68,614	1,813	\$31,517	801	\$127,620	3,368	\$0	0	\$127,620
Document Control	\$22,519	1,083	\$40,149	1,856	\$27,837	1,237	\$90,505	4,176	\$0	0	\$90,505
Coordinated Dwg. Engineer	\$11,648	320	\$0	0	\$0	0	\$11,648	320	\$0	0	\$11,648
Field Accountant	\$6,115	168	\$10,903	288	\$9,449	240	\$26,467	696	\$0	0	\$26,467
Close-Out Engineer	\$227	6	\$943	25	\$23,037	585	\$24,207	616	\$0	0	\$24,207
Test Engineer	\$3,494	48	\$7,268	96	\$13,858	176	\$24,621	320	\$0	0	\$24,621
Commissioning Agent	\$0	0	\$0	0	\$19,213	488	\$19,213	488	\$0	0	\$19,213
Safety	\$1,248	16	\$2,596	32	\$1,350	16	\$0	0	\$5,194	64	\$5,194
Non-Poimhursable Total:											¢77 114

Non-Reimbursable Total: \$77,114

Reimbursable Total: \$1,166,016

GRAND TOTAL : \$1,243,129