I. Project Overview

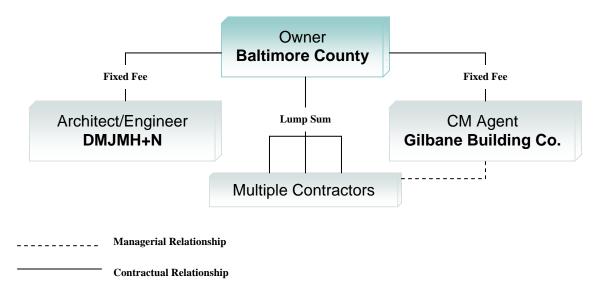
Project Summary

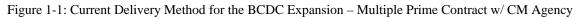
The Baltimore County corrections system currently consists of two buildings: the Baltimore County Detention Center (BCDC) and the Courthouse Correctional Facility (CCF). These facilities which are located in Towson, Maryland were built or expanded in 1860, 1956, 1980, 1990 and 1994. Combined these facilities have a 1,147 inmate capacity. Over the past two years recent inmate counts have been as high as 1,246. The overcrowding of the current facilities and the declining condition of the CCF has lead to the 2002 construction of the Baltimore County Detention Center Expansion.

The BCDC Expansion is a \$69.9 million dollar addition to the BCDC that will accommodate all of Baltimore County's present correctional facility needs. The expanded facility will be comprised of additional inmate housing (a 366 net increase), administration areas and a parking garage. The construction of the BCDC Expansion began in May 2002 and is to be completed in April 2005.

Project Delivery Method

The BCDC Expansion project is being delivered under a multiple prime lump sum contract with a construction management agent. The construction manager, Gilbane Building Co. and Architect/Engineer, DMJMH+N were hired at a fixed fee while all participating contractors competitively bid for lump sum contracts with the County. The diagram below in Figure 1-1 is a visual representation of the current delivery method used for the BCDC Expansion. With the presented delivery method the project is currently 4 months behind the original schedule and over budget due to numerous change orders.





Project Cost

The BCDC Expansion Project was divided into 16 separate bid packages. Pre-qualified bidders competitively bid each of these packages. The table below in Figure 1-2 is the actual cost for each bid package of the BCDC Expansion. The total cost of the BCDC Expansion is \$69,851,535.

BP #	Description	Total Cost	Cost / SF
1	Site Work	\$4,607,570	\$13.49
2	Foundations	\$885,000	\$2.59
3	Concrete Garage	\$2,940,000	\$34.36
4	Elevators	\$1,411,000	\$4.13
5	Pre-Cast Concrete	\$9,990,000	\$39.03
6	Housing C.I.P. Concrete	\$3,739,500	\$14.61
7	Structural Steel/ Metals	\$2,493,000	\$9.74
8	Electrical	\$4,883,000	\$14.30
9	Mechanical & Plumbing	\$9,598,000	\$28.10
10	Security & Detention Equip.	\$9,198,179	\$26.93
11	Glass & Glazing	\$1,136,500	\$4.44
12	Fire Protection	\$1,184,000	\$3.47
13	Building Controls	\$1,485,000	\$4.35
14	Masonry	\$3,064,000	\$11.97
15	Roofing	\$572,253	\$2.24
16	General Trades	\$3,975,970	\$11.64
17	Landscaping	\$131,081	\$0.38
18	Food Services & Laundry Equip.	\$510,518	\$1.99
Subtota	al	\$61,804,571	\$180.95
VE		(\$1,780,000)	(\$5.21)
Actual	Building Construction Cost	<u>\$55,417,001</u>	\$162.25
Design	Cost	\$4,516,779	
Contra	ctor Fee	\$2,718,185	
FF&E		\$2,592,000	
Total P	roject Cost	\$69,851,535	

Figure 1-2: Actual	Cost for the	BCDC Expansion
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Project Schedule

The BCDC Expansion started construction in May 2002 and is to be completed in April 2005. The original schedule showed a completion date of January 2005, however, delays by the owner for a value engineering process have delayed the project four months. The schedule shown below in Figure 1-3 (a-d) is broken down for the schedule of each bid package.

Activity Name	Original Start Duration	Finish	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 28 27 28 29 30 31 32
Detailed BCDC Expasnion	822 08-Mar-02	02-May-05	02-May-05, Detailed BCDC Expassion Project
Preconstruction	252 08-Mar-02	24-Feb-03	24-Feb-03, Preconstruction
Recieve Construction Drawing & Bid	45 11-Mar-02	10-May-02	Recieve Construction Drawing & Bid Job
Complete 100% Drawings	45 13-May-02	12-Jul-02	Complete 100% Drawings
Review 100% Drawings	4 15-Jul-02	18-JuH02	I Review 100% Drawings
Bid BP #1-3	20 13-May-02	07-Jun-02	
Bid BP#4-14 & 16	40 19-JuH02	12-Sep-02	🚃 Bid BP#4-14 & 16
Bid BP#15,17 & 18	40 19-Jul-02	12-Sep-02	🚃 Bả BP# 15,17 & 18
NTP BP#1	10 27-May-02	07-Jun-02	NTP BP#1
NTP BP#283	10 08-Jul-02	19-JuH02	■ NTP BP#283
NTP BP#4-14 & 16	10 11-Feb-03	24-Feb-03	ITP BP#4-14.8.16
NTP BP#15,17 & 18	10 11-Feb-03	24-Feb-03	NTP BP# 15,17 & 18
Project Start	0 08-Mar-02		roject Start
Value Engineering Process	50 03-Dec-02	10-Feb-03	Value Engineering Process
Site Set Up	7 13-May-02	21-May-02	21-May-02, Site Set Up
Mobilization	7 13-May-02	21-May-02	Mobization
BP #1 - Site Utilities/Earth	115 10-Jun-02	15-Nov-02	15-Nov-D2, BP #1 - Site Utilities/Earthwork
Site I sites	35 17- hin-02	02-0110-02	Site Unities
Demolition	5 10-Jun-02	14-Jun-02	- Demolition
Excavation - 1st1 evel	10 05-Aun-02	16-Aun-02	Excavation - 1st Level
Excavtation - 2nd Level	10 19-Aug-02	30-Aug-02	Excavitation - 2nd Level
Excavation - 3rd Level	10 02-Sep-02	13-Sep-02	Excavation - 3rd Level
Drill/Drive Soldier Piles	35 05-Aug-02	20-Sep-02	Drill/Drive Solder Piles
Install Rakers East Side	15 23-Sep-02	11-Oct-02	Install Rakers East Side
Excavate Ramp Out	5 20-Sep-02	26-Sep-02	Excavate Ramp Out
Install Lagging - 1st Level	12 07-Aug-02	22-Aug-02	Install Lagging - 1st Level
Drill & Tension Tiebacks - 1st Level	15 14-Aug-02	03-Sep-02	Drill & Tension Tiebacks - 1st Level
Install Lagging - 2nd Level	12 21-Aug-02	05-Sep-02	Install Lagging - 2nd Level
Drill & Tension Tiebacks - 2nd Level	20 26-Aug-02	20-Sep-02	🗖 Drill & Tension Tiebacks - 2nd Level
Install Lagging - 3rd Level	12 04-Sep-02	19-Sep-02	Install Lagging - 3rd Level
Demo. Retaining Wall	45 16-Sep-02	15-Nov-02	Demo. Retaining Wall
BP #2 & 3 - Garage CIP	78 20-Sep-02	07-Jan-03	07-Jan-03, BP#2 & 3 - Garage CIP
Excavate & Pour Footings	15 20-Sep-02	10-Oct-02	Excavate & Pour Footings
Form & Pour Columns & Walls - Lev	10 11-Oct-02	24-Oct-02	Form & Pour Columns & Walls - Level 1
Prep & Pour SOG	5 23-Oct-02	29-Oct-02	Prep & Pour SOG
Form - Level 2	10 31-Oct-02	13-Nov-02	Form-Level 2
Rough-in - Level 2	7 06-Nov-02	14-Nov-02	Rough-in - Level 2
Install Rebar - Level 2	8 11-Nov-02	20-Nov-02	Install Rebar - Level 2
Pour - Level 2	4 15-Nov-02	20-Nov-02	Pour - Level 2
Actual Work	 Summary 		TASK filter: All Activities
Remaining Work			
Critical Remaining Work			
♦ Milestone			

Figure 1-3a: Schedule for BCDC Expansion (page 1 of 4)

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Figure 1-3b: Schedule for BCDC Expansion (page 2 of 4)

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10-May-04	Level 2M Interior Finishes
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Figure 1-3c: Schedule for BCDC Expansion (page 3 of 4)

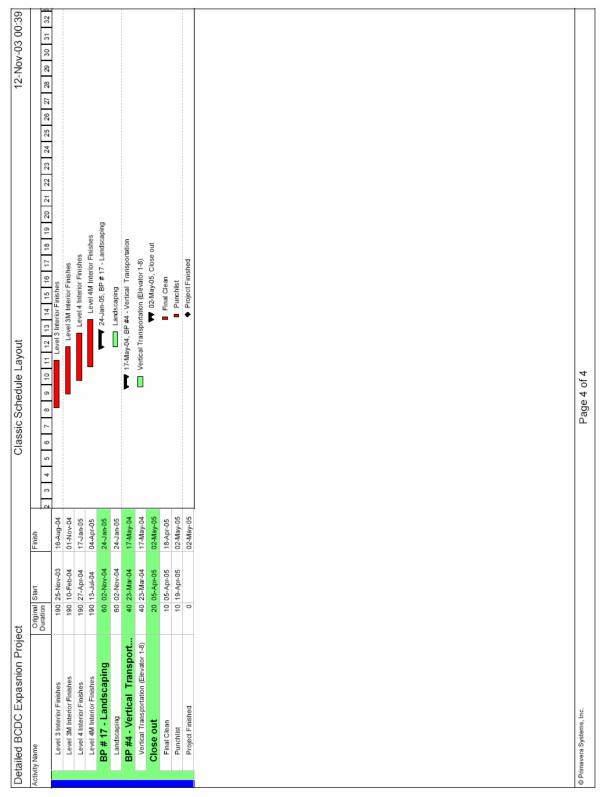


Figure 1-3d: Schedule for BCDC Expansion (page 4 of 4)

Cash Flow

Based on the cost and schedule of each bid package shown above a cash flow curve was compiled. The graph in Figure 1-4a shows the cumulative cost of the project and the cost per month. Figure 1-4b is an enlarged version of the project's monthly cost that will be billed to the owner. The values shown on both of the graphs are based of the cash schedule located in the Appendix A.

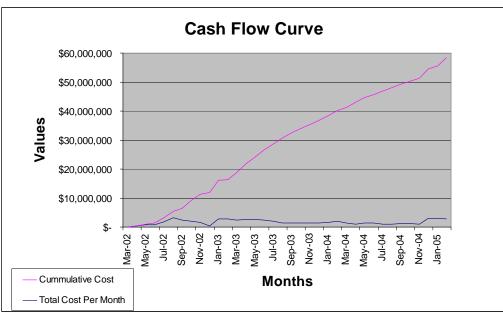


Figure 1-4a: Cash Flow Diagram - Cumulative and Monthly Cost

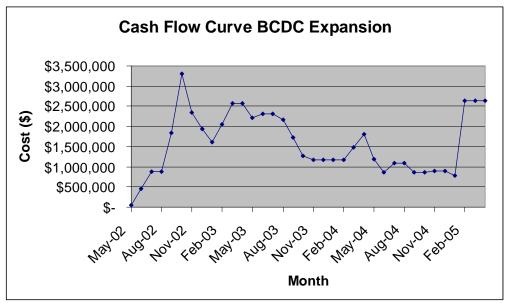


Figure 1-4b: Cash Flow Diagram - Enlarge Monthly Cost

Thesis Proposal

Upon completing the above analysis of the delivery method, cost and schedule of the BCDC Expansion the following alternatives have been proposed and analyzed.

This thesis proposes that if the BCDC Expansion project had selected a design-build delivery; new technologies could have been implemented in the construction process, a more economical and constructible design could have been created and alternative energy sources could have been considered. The design-build delivery would have possibly considered:

- The use of 3D AutoCAD drawings in place of physical mock-ups
- A more economical and constructible foundation design
- Extending the active solar system of the existing BCDC to the expansion

These alternatives have been analyzed and accessed in the following sections of this summary book.