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Executive Summary

Some of the main features that have been analyzed and researched on the Harrisburg University of Science and Technology's Academic Center are: construction schedule and budget, construction site plans, local conditions, client standpoint, project delivery methods, and project staffing relative to the construction of the project.

The contractual relationships are based on a CM at risk and joint venture delivery method. The project is also fast tracked so that construction can begin as soon as possible. Time and budget restraints in funding are the only concerns for the owner at this time. The schedule for construction indicates a start date of the beginning of January 2007 and completion date is set for November 25, 2008. Key milestone dates are also noted on the schedule as well. Early delays due to weather and improper placement of the tower crane have caused the schedule to vary, however the work is underway and on time.

Various estimates for the project have been assembled and have been thoroughly reviewed and analyzed to determine whether the Harrisburg University Academic Center is within budget. It was found that the estimates from D4 Cost 2002 estimating software and R.S. Means that the actual budget for the project is realistic and fits well to the project constraints and requirements set forth by the owner. The actual building budget and estimates are listed as followed: \$73M Actual Building Cost; \$68.8M D4 Estimate Building Cost; and \$60.5M R.S. Means Building Cost.

A. Project Schedule Summary

The Harrisburg University of Science and Technology had begun design work for their first building in August of 2005, not yet two years after the University opened its doors for students. It has been using office buildings within three blocks of the construction site of their Academic Center and will be occupying them until the winter semester of 2009. The project completion date is set for November 25, 2008.

The foundation of the Harrisburg University Academic Center consists of nearly 70 caissons. The caissons range in diameter from just under two feet to nearly five feet; most are on the larger side of approximately 4.5 feet in diameter. Overtop of the caissons is a grade beam of 24 inches. This slab and foundation system was chosen due to the height and load requirements of the building to resist wind lateral forces of the area.

The Academic Center has a structural system that consists of steel girders, beams, and columns; precast concrete wall panels; and composite slab on metal deck. The steel will be erected two bays at a time and the steel deck will be placed before the next set of bays will be erected. The concrete slabs for the floors will be poured after required reinforcement is placed on the decking at a rate of five every eight weeks. Two months after the beginning of slab placement on the decks, the precast slabs will be erected. The shaft for the elevator shares part of the tower crane's foundation and at the point in time when the crane is removed from the site, the elevator shaft will be installed. A material lift is to be in place and functionally at the beginning of January 2008.

Finish sequence milestones begin at the end of the first quarter in 2008-the middle of March with the first two floors clean-out scheduled. The next five floors (3-9) will be for a parking garage and therefore finishing of these levels will come near project completion. Floors 10 and 11 have a finish date of the beginning of April and finishes for the last (16th) floor where the HVAC system will be housed is scheduled for late October 2008.

B. Building Systems Summary

Yes	No	Work Scope	Issues Addressed
<input checked="" type="checkbox"/>		Demolition Required	storm sewer piping at Fourth Street, existing sidewalks and curbs
<input checked="" type="checkbox"/>		Structural Steel Frame	composite slab on metal deck for floors 2-16, hat and core frame bracing using moment connections on exterior wall for wind resistance, tower crane is 225' with horizontal jib
<input checked="" type="checkbox"/>		Cast in Place Concrete	stay-in-place and timber formwork, truck and buggy placement
<input checked="" type="checkbox"/>		Precast Concrete	casting from Fourth Street site entrance, connection using pins, crane used is same for steel erection
<input checked="" type="checkbox"/>		Mechanical System	rooftop HVAC unit with (3) AHU on 16th floor servicing building via 96x36 ducts, fire water with booster pump for fire suppression
<input checked="" type="checkbox"/>		Electrical System	main service to switchgear, 3-phase 480/277V, 4-wire with main circuit breaker 2000A
<input checked="" type="checkbox"/>		Masonry	interior masonry will be for partitioning walls with exception of stair and elevator shafts
<input checked="" type="checkbox"/>		Curtain Wall	non-load bearing curtain wall and aluminum window glazing system in precast concrete
	<input checked="" type="checkbox"/>	Support of Excavation	N/A

C. Project Cost Evaluation

Actual Building Costs: \$73,000,000
SF Costs: \$197.30

Total Project Costs (to date): \$100,000,000
SF Project Costs: \$270.27

Parking Garage: \$13,475,531
SF Parking Garage: \$36.42

General Conditions: \$2,499,844
SF General Conditions: \$6.76

Concrete: \$4,099,488
SF Concrete: \$11.08

Steel: \$8,770,250
SF Steel: \$23.70

Aluminum Glass and Glazing: \$3,240,764
SF Aluminum Glass and Glazing: \$8.76

Electrical: \$6,986,981
SF Electrical: \$18.83

HVAC: \$4,800,000
SF HVAC: \$12.97

Plumbing: \$2,600,000
SF Plumbing: \$7.03

Technology Equipment and Furniture: \$4,275,000
SF Technology Equipment and Furniture: \$11.55

The actual costs for construction of the Harrisburg University Academic Center are only current values as the total package has not yet been out to bid. Costs are expected to be in excess of \$100M. D4 Cost 2002 ran a comparison of building the university but comparisons were not as close as needed. The final cost of \$68.8M was for a university in Pennsylvania with the same number of square feet. The parking garage and technology facilities were not able to be run in the estimate, allowing the numbers to be lower than the actual costs. The total added costs of different facilities comparable to the Academic Center totaled \$60.5M, quite lower than the actual costs. This was due to the fact that the parking garage and offices in the building are state-of-the-art and have precast panels and aluminum glazing. In summary, the Harrisburg University Academic Center is a complex facility and costs are added for the buildings use as a technology center. See following sheets and numbers with a golden star.

RSMeans QuickCost Estimator			
Project Title:	HBG Univ Academic Center		
Model:	Auditorium		
Construction:	Face Brick with Concrete Block Back-up / Steel Frame		
Location:	HARRISBURG, PA		
Stories:	1		
Story Height (l.f.):	24		
Floor Area (s.f.):	25,000		
Data Release:	2007		
Wage Rate:	Union		
Basement:	Not included		
			
	<p><i>Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</i></p>		
Cost Ranges	Low	Med	High
Total:	\$2,308,050	\$2,564,500	\$3,205,625
Contractor's Overhead & Profit:	\$577,013	\$641,125	\$801,406
Architectural Fees:	\$175,617	\$195,130	\$243,912
Total Building Cost:	\$3,060,679	\$3,400,755	\$4,250,943 ★

RSMeans QuickCost Estimator			
Project Title:	HBG Univ Academic Center		
Model:	College, Classroom, 2-3 Story		
Construction:	Face Brick with Concrete Block Back-up / Steel Frame		
Location:	HARRISBURG, PA		
Stories:	2		
Story Height (l.f.):	12		
Floor Area (s.f.):	75,000		
Data Release:	2007		
Wage Rate:	Union		
Basement:	Not included		
			
	<p><i>Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</i></p>		
Cost Ranges	Low	Med	High
Total:	\$7,364,700	\$8,183,000	\$10,228,750
Contractor's Overhead & Profit:	\$1,841,175	\$2,045,750	\$2,557,188
Architectural Fees:	\$496,776	\$551,973	\$689,966
Total Building Cost:	\$9,702,651	\$10,780,723	\$13,475,904 ★

RSMeans QuickCost Estimator			
Project Title:	HBG Univ Academic Center		
Model:	College, Student Union		
Construction:	Brick Face with Concrete Block Back-up / Steel Frame		
Location:	HARRISBURG, PA		
Stories:	2		
Story Height (l.f.):	12		
Floor Area (s.f.):	50,000		
Data Release:	2007		
Wage Rate:	Union		
Basement:	Not included		
			
	<p><i>Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</i></p>		
Cost Ranges	Low	Med	High
Total:	\$4,370,850	\$4,856,500	\$6,070,625
Contractor's Overhead & Profit:	\$1,092,713	\$1,214,125	\$1,517,656
Architectural Fees:	\$307,528	\$341,697	\$427,122
Total Building Cost:	\$5,771,090	\$6,412,322	\$8,015,403

RSMeans QuickCost Estimator			
Project Title:	HBG Univ Academic Center		
Model:	Computer Data Center		
Construction:	Brick Veneer / Steel Frame		
Location:	HARRISBURG, PA		
Stories:	1		
Story Height (l.f.):	16.5		
Floor Area (s.f.):	75,000		
Data Release:	2007		
Wage Rate:	Union		
Basement:	Not included		
			
	<p><i>Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</i></p>		
Cost Ranges	Low	Med	High
Total:	\$11,221,200	\$12,468,000	\$15,585,000
Contractor's Overhead & Profit:	\$2,805,300	\$3,117,000	\$3,896,250
Architectural Fees:	\$737,830	\$819,811	\$1,024,764
Total Building Cost:	\$14,764,330	\$16,404,811	\$20,506,014

RSMMeans QuickCost Estimator

Project Title: **HBG Univ Academic Center**
 Model: **Office 1 Story**
 Construction: **Wood Siding / Wood Truss**
 Location: **HARRISBURG, PA**
 Stories: **1**
 Story Height (l.f.): **12**
 Floor Area (s.f.): **25,000**
 Data Release: **2007**
 Wage Rate: **Union**
 Basement: **Not included**



Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

Cost Ranges	Low	Med	High
Total:	\$1,797,750	\$1,997,500	\$2,496,875
Contractor's Overhead & Profit:	\$449,438	\$499,375	\$624,219
Architectural Fees:	\$139,337	\$154,819	\$193,523
Total Building Cost:	\$2,386,524	\$2,651,694	\$3,314,617



RSMMeans QuickCost Estimator

Project Title: **HBG Univ Academic Center**
 Model: **Garage, Parking**
 Construction: **Face Brick with Concrete Block Back-up / Steel Frame**
 Location: **HARRISBURG, PA**
 Stories: **5**
 Story Height (l.f.): **10**
 Floor Area (s.f.): **175,000**
 Data Release: **2007**
 Wage Rate: **Union**
 Basement: **Not included**

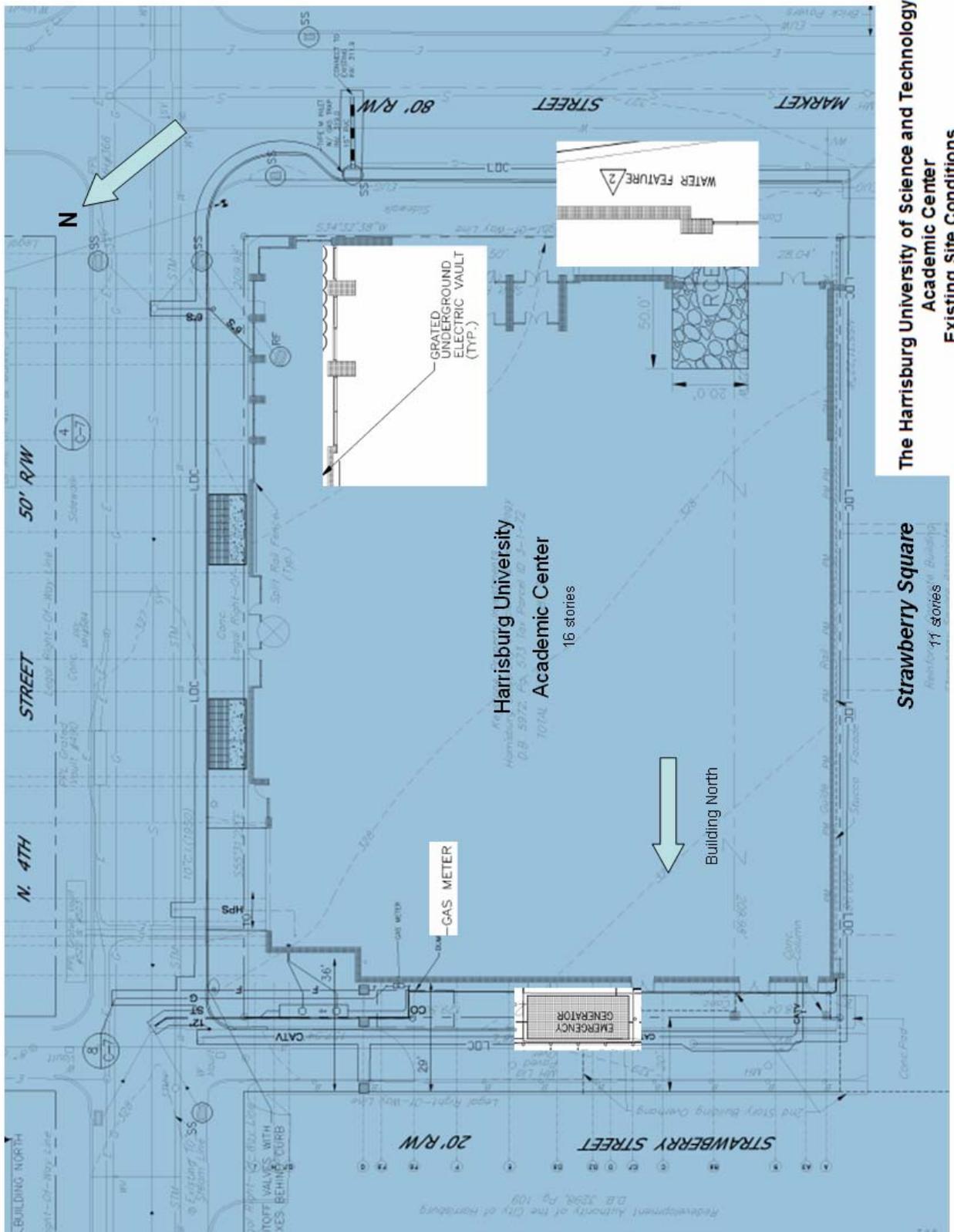


Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

Cost Ranges	Low	Med	High
Total:	\$5,971,950	\$6,635,500	\$8,294,375
Contractor's Overhead & Profit:	\$1,492,988	\$1,658,875	\$2,073,594
Architectural Fees:	\$410,223	\$455,803	\$569,754
Total Building Cost:	\$7,875,160	\$8,750,178	\$10,937,723



D. Site Plan of Existing Conditions



The Harrisburg University of Science and Technology
Academic Center
Existing Site Conditions
Laurel Warner Oct. 01, 2007

E. Local Conditions

In the downtown area of Harrisburg, one sees many tower cranes amongst the rooftops of the skyline. The general area is booming with construction as the city is returning to its splendor many decades ago. In the city, construction projects have little site room as city streets are always congested and changing traffic patterns and closing roads becomes quite a hassle. Limited space for staging, working, and parking are general conditions in the area.

More recently, owners are using construction managers for their building projects and companies are expanding for in-house estimating, scheduling, and constructability reviewing as the needs are changing for owners. However, there is still a large demand for general contracting depending on the type of project. Schools are the ideal candidate owners for using construction management in their construction project.

As the construction industry moves toward a green type of design and construction approach, it becomes more desirable to have waste removal and recycling of materials for a project. There are no new fees for recycling in the area but the \$2 recycling fee was reauthorized within the last decade. This has reduced construction costs by millions over the years.

The city of Harrisburg is divided into two regions by the Susquehanna River by the locals: the East Shore and the West Shore. Since most of the area is surrounded by a body of water, this impacts the soil conditions as construction buildings are concerned. Because of the moisture in the soil, the work for the construction site is affected. Foundations are designed as per the limited strength of the soil within the bounds of the perimeter of the buildings footprint.

F. Client Information

The Harrisburg University of Science and Technology is an infant as far as Pennsylvania higher education is concern. The University became incorporated in the Commonwealth in 2001 and opened its doors for its charter class in 2005. The University is the first of its kind in the Harrisburg region and only plans on expanding by opening the doors of the Academic Center in January 2009. It will be the first building the University owns, in part to very early public and private sector investments.

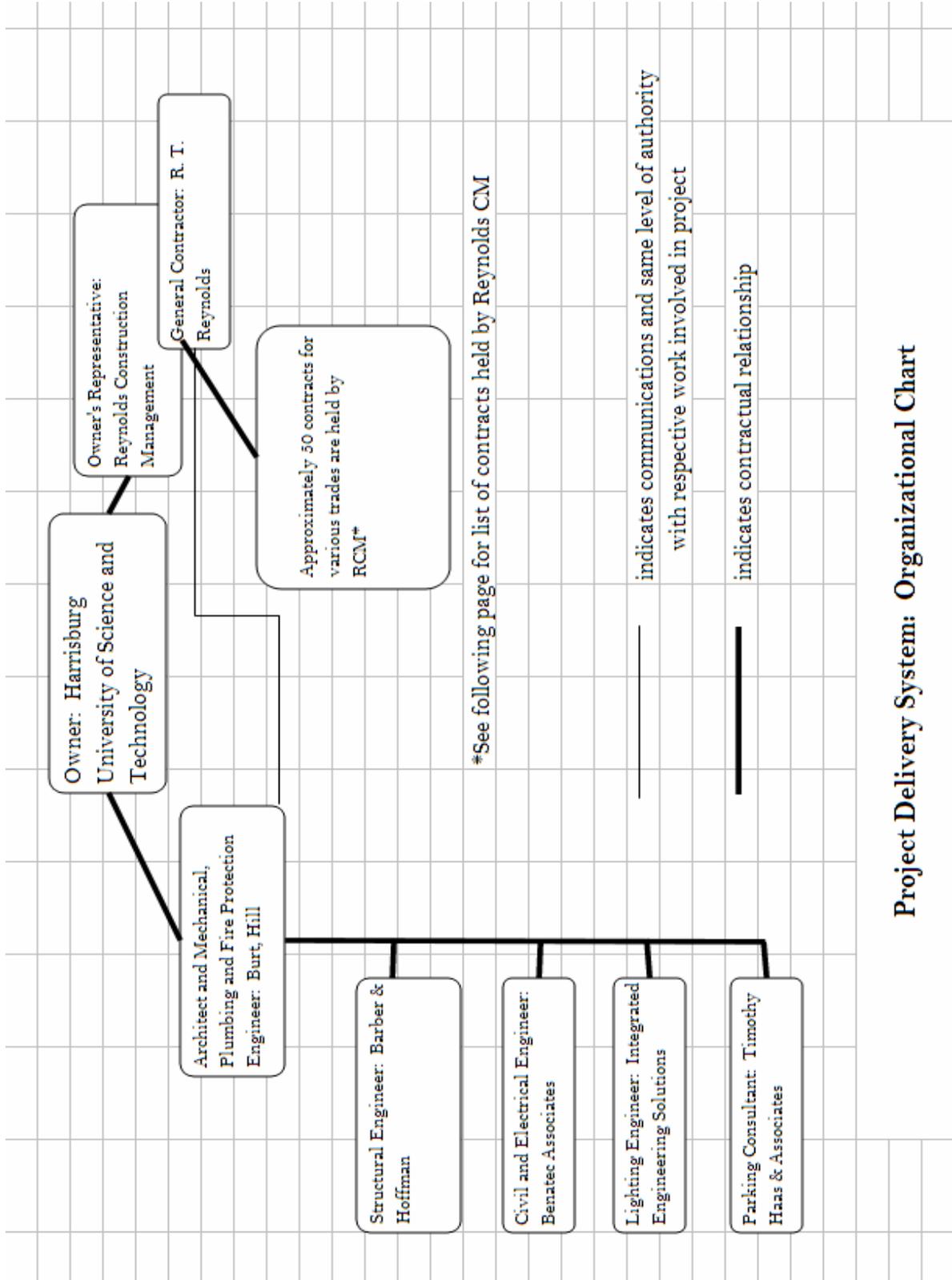
In order to continue its funding, the University has a need to expand as soon as possible. Due to its location, limited space of former office buildings are now used as laboratories and classrooms. By building the Academic Center, the University hopes to bring in new talent interested in the sciences and eager to learn in a new state-of-the-art facility right downtown. For now, it focuses on bringing in local high school graduates and those wanting to further their education. Great attempts have not been made for advertising because of the size of the current temporary facilities.

The owner representative of Reynolds Construction Management stated that the Harrisburg University Academic Center is a risky project but everything seems to be going accordingly. He hopes that the University will expand and direct new talent into the area and revive the city.

The Academic Center will be where the University's offices, classrooms, library, auditoriums, laboratories, and parking garage are located. The design stage was extensive due to the University's funding and anticipates costs just over \$70 million.

The faculty, staff, and students are awaiting their new technology facility to open with hopes to spread out in the Academic Center for spring 2009 semester. Currently, they are the only occupants of the project. Their anticipation can be noted on the University's website as they are documenting the construction progress with live video feeds and milestone pictures.

G. Project Delivery System



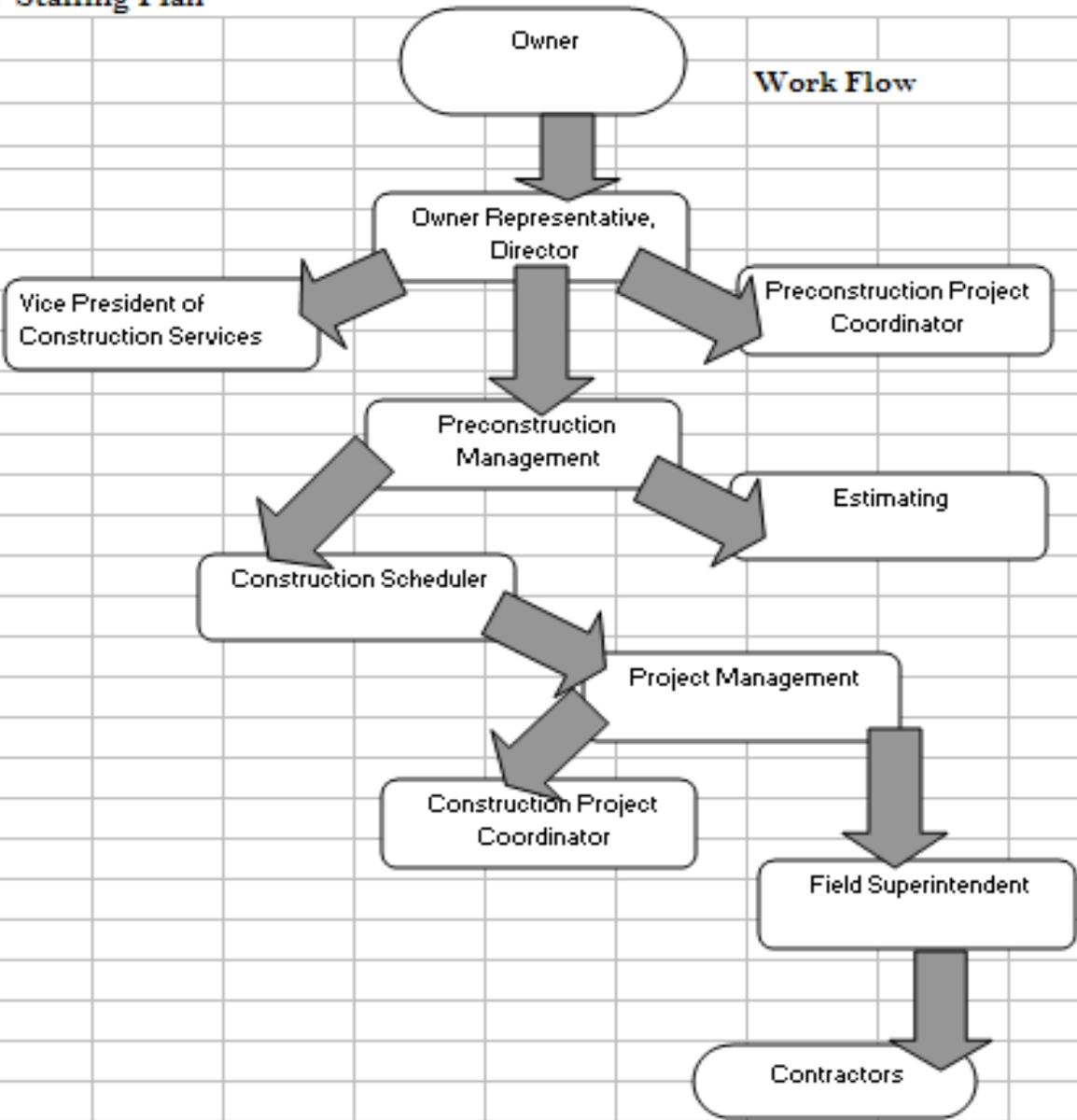
Project Delivery System: Organizational Chart

Harrisburg University of Science and Technology
Harrisburg Academic Center
Contract Values

<u>Contract Number</u>	<u>Description</u>	<u>Subcontractor</u>	<u>Amount</u>
1	General Conditions	RTR	\$2,500,000.00
2	Vibration Monitoring Allowance	ALLOWANCE	\$20,000.00
3	Additional Street Barricades	PSI	\$43,137.00
4	Temp Winter Protection for Fireproofing	RTR	\$25,000.00
5	Scaffolding for Aluminum Panels, Louvers, Soffit	RTR	\$250,000.00
6	Additional Temporary Fencing	Washington & Dowling	\$12,987.00
7	Sitework	Markcrete	\$593,870.00
8	Excavation & Backfill for Cassions	ALLOWANCE	\$6,000.00
9	Cassions	Brayman	\$616,600.00
10	Cassons Bad Earth Conditions	ALLOWANCE	\$48,000.00
11	60" Corrigated Casing	ALLOWANCE	\$6,000.00
12	Concrete	Macri	\$4,099,488.00
13	Ornamental Gate, Foundation, Pier	ALLOWANCE	\$20,000.00
14	Architectural Precast	Architectural Precast	\$1,992,905.00
15	Masonry	Advance	\$2,012,300.00
16	Precast Connection Allowance	ALLOWANCE	\$250,000.00
17	Structural Steel	Strait Steel	\$8,770,250.00
18	Tower Crane/Operator	Dickinson	\$750,000.00
19	Miscellaneous Metals	McGregor	\$1,550,000.00
20	Metal Pan Stairs	Ebingers	\$541,303.00
21	Carpentry	Acri	\$1,700,000.00
22	Fixed Radiused Desk @ Lecture Hall	ALLOWANCE	\$85,000.00
23	Waterproof Elevator Pits	Houck	\$8,680.00
24	Courtyard Water Feature Liner		\$10,000.00
25	Traffic Coating	Houck	\$93,890.00
26	Spray-on Insulation	Novingers	\$100,000.00
27	Temp Damp Coating at Caisson Areas	Houck	\$5,000.00
28	Fireproofing	A1	\$550,000.00
29	Intumescent Fireproofing	Novingers	\$100,000.00
30	Roofing/Sheet Metal	Allied	\$887,822.00
31	Caulking & Sealants	Thesen	\$250,000.00
32	Electronic Door Hardware		\$40,000.00
33	Coiling Doors & Grills	Builders Specialties	\$120,000.00
34	Aluminum/Glass & Glazing	Hershocks	\$3,240,764.00
35	Drywall, Metal Studs & Insulation	Novingers	\$3,568,000.00
36	Upgrade Existing Facade Allowance	ALLOWANCE	\$30,000.00
37	Ceramic & Glazed Tile	Interstate	\$325,000.00
38	Acoustical Ceilings	Novingers	\$936,600.00
39	Acoustical Wall Panel Allowance	ALLOWANCE	\$100,000.00
40	Flooring	DeGol	\$297,073.00

41	Painting	Art I Do	\$400,000.00
42	Access Flooring	Bettinger West	\$9,000.00
43	Folding Partition		\$13,275.00
44	Pay-on-Foot Stations (2) Each - Allowance	ALLOWANCE	\$100,000.00
45	Proximity Reader & Exit Loop for GRG Door	ALLOWANCE	\$5,000.00
46	Lab Casework & Equipment	Northeast	\$264,500.00
47	Roof Anchors	Pro-Bel	\$39,050.00
48	Window Blinds & Shades	Kay	\$55,650.00
49	Technology & Furniture Allowance	ALLOWANCE	\$2,965,000.00
50	Pumping & Filtration - 2 water features	ALLOWANCE	\$40,000.00
51	Elevators	Otis	\$1,755,160.00
52	Elevator Call Station Kiosk Allowance	ALLOWANCE	\$10,000.00
53	Elevator Color Touch Screen Terminals	ALLOWANCE	\$10,000.00
54	Fire Protection	Tomko	\$994,000.00
55	Plumbing	Tomko	\$1,606,000.00
56	HVAC	GR Sponaugle	\$4,800,000.00
57	Electrical	GR Sponaugle	\$6,986,981.00
58	Telecommunications Systems Allowance	ALLOWANCE	\$769,000.00
	Harrisburg Merchantile Tax	RTR	\$69,700.00
	Performance Bond	RTR	\$385,275.00
	Subguard	RTR	\$640,000.00
	Insurances	RTR	\$408,000.00
	Contingency		\$1,775,000.00
	Subtotal		\$60,656,260.00
	RTR CM Fee (3%)		\$1,819,688.00
	Revised GMP Construction Total		\$62,475,948.00

H. Staffing Plan



Owner Representative: Acts as voice of owner

VP of CS: Consultant of company, reports to director

Precon Proj Coordinator: Writes contracts, in charge of bidding

Precon Management: Oversees estimating, attends owner meetings

Estimating: Does architectural and MEP estimating

Construction Scheduler: Schedules project duration

Project Management: Work in office and field (communications)

Const. Proj. Coordinator: Documents submittals, RFIs

Field Superintendent: Oversees construction process