

# Technical Report I



Rendering courtesy of DAVIS

## The Office Building

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Dr. Gannon | Construction

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## Executive Summary

The Office Building is a nine story core and shell project with three levels of underground parking beneath. The first story is devoted to retail space while floors two through nine will be leased for office space. The project team is pursuing LEED Gold for the building. To help with this, a green roof has been designed, along with a fitness center and more.

## Client Information

The Office Building is being developed by a local real estate operating company, Mid-Atlantic Realty Partners. Founded in 2005, MRP Realty strives at working with investors and project teams in vibrant markets. MRP Realty plans on leasing out the space and stands to lose revenue if the project is delivered late.

## Schedule

Construction documents for The Office Building were issued on June 11, 2012 and work began on existing tenant move outs, obtaining permits, and the developing and awarding of the bid package. During the development of the GMP contracts, the notice to proceed came in on September 17, 2012. To start the project, an existing nine story steel building needed to go through an abatement of asbestos and be demolished. With the last of the permits obtained on March 20, 2013 and the demolition of the previous structure being wrapped up, excavation began for the three levels of underground parking. With working going on throughout the building, the enclosure is scheduled to be weather tight by July 31, 2014. With the final finishes, commissioning, and inspections concluded, substantial completion is scheduled for February 10, 2015.

## Project Delivery System

MRP Realty's largest concerns lie with quality at a reasonable cost. For this reason, the project was a design-bid-build to encourage competitive pricing. The main players in the design team have lump sum contracts with the architect, M. Arthur Gensler Jr. & Associates who has a lump sum contract with the owner. Engineering Consulting Services, ECS, is a third party inspector hired by the owner with a lump sum contract to monitor quality and perform testing. Lastly, the specialty contractors have lump sum contracts with James G. Davis Construction Corporation,

the general contractor, who has a cost plus fee with GMP contract with the owner. The system of contracts is shown below in Figure 1.

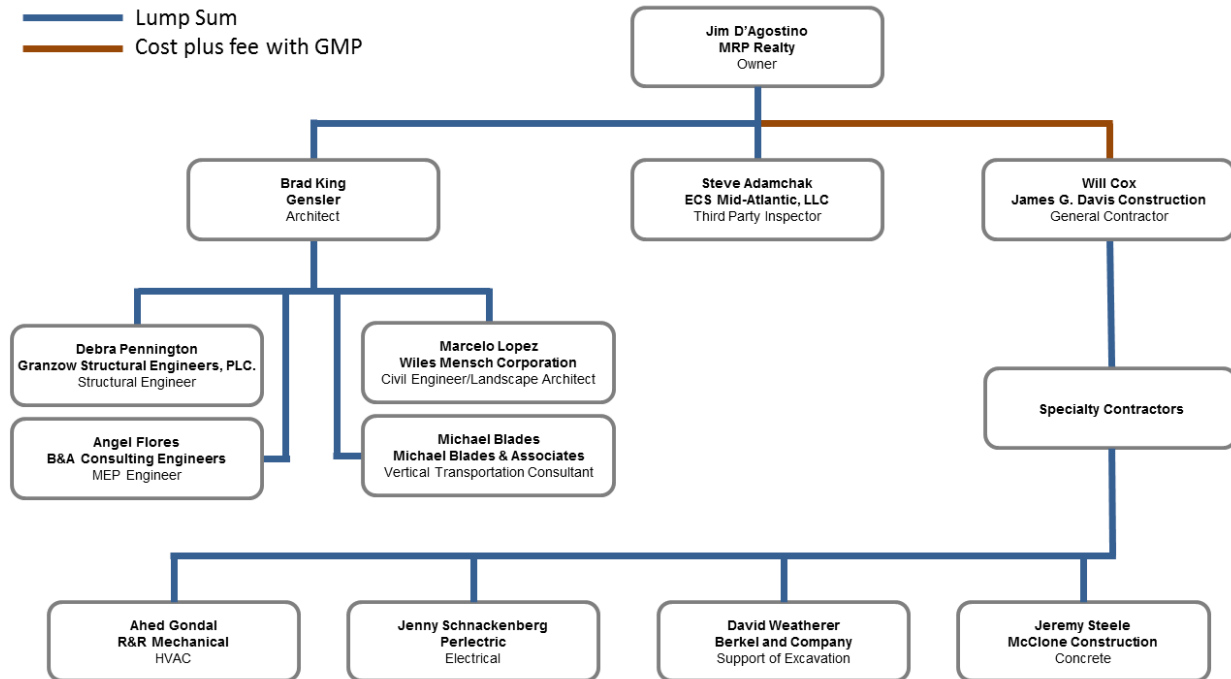


Figure 1. Project Delivery System Contract Diagram

### Project Cost Evaluation

The Office Building has a total project cost of \$30 million with a building construction cost, excluding land costs site work and fees, of about \$23 million which is approximately \$204 per square foot. Because my project is separated into part office and part garage, the total estimate through RS Means was calculated by adding the 9 story office to a 3 story underground garage. The RS Means estimate came in at about \$17 million which is equivalent to \$150 per square foot. The difference in costs stems from the high end quality in the finishes, a glass feature wall in the lobby, and the factors that push this building toward LEED Gold. These factors put large costs on the building that RS Means would not be able to see.

## Existing Conditions

The site that The Office Building sits on is a very congested one in an urban area. Adjacent to the project site are two nine story neighboring buildings as well as a transportation authority tunnel. Due to lack of space, two adjacent roads will have lanes shut down to provide access for any construction need. Along with the lane shut downs, a few street lights will need to be removed.

## Building Systems Summary

The new building will have a concrete structure with thirty by forty foot column spacing throughout. The mechanical system consists of two cooling towers, two chillers, two air handling units, and variable air volume devices throughout the building to produce zone heating. The retail space on the first floor will be controlled by chilled water while the rest of the building has forced air. The fire suppression system is a wet sprinkler system with a siamese fire connection at the street level. The electrical system consists of two separate feeds, both at 120/208 V three phase power. There is also a 400 kilowatt, 500 kilovolt-amp generator on the rooftop level. The building enclosure system consists of a complete glass and metal panel curtain wall system as shown in figure 2.

With the proximity of the transportation tunnel so close to the site, the support of excavation does not have the ability for tiebacks, so cross bracing must be used.

The owner is pursuing LEED Gold for this project. The following have been implemented to obtain this goal:

- Approximately 3,000 square feet of roof has been set aside for a green roof.
- A fitness center and locker rooms have been placed on the first level of parking.
- The floor to ceiling windows allow for a lot of natural light.
- Every level of parking contains a charging station for electronic vehicles.



Figure 2. Rendering courtesy of Gensler

### Staffing Plan

To accomplish all that needs to be done by the general contractor, DAVIS put together a team outlined in figure 3. This team has worked together in the past and has experience with LEED and virtual construction to ensure high quality and coordination.

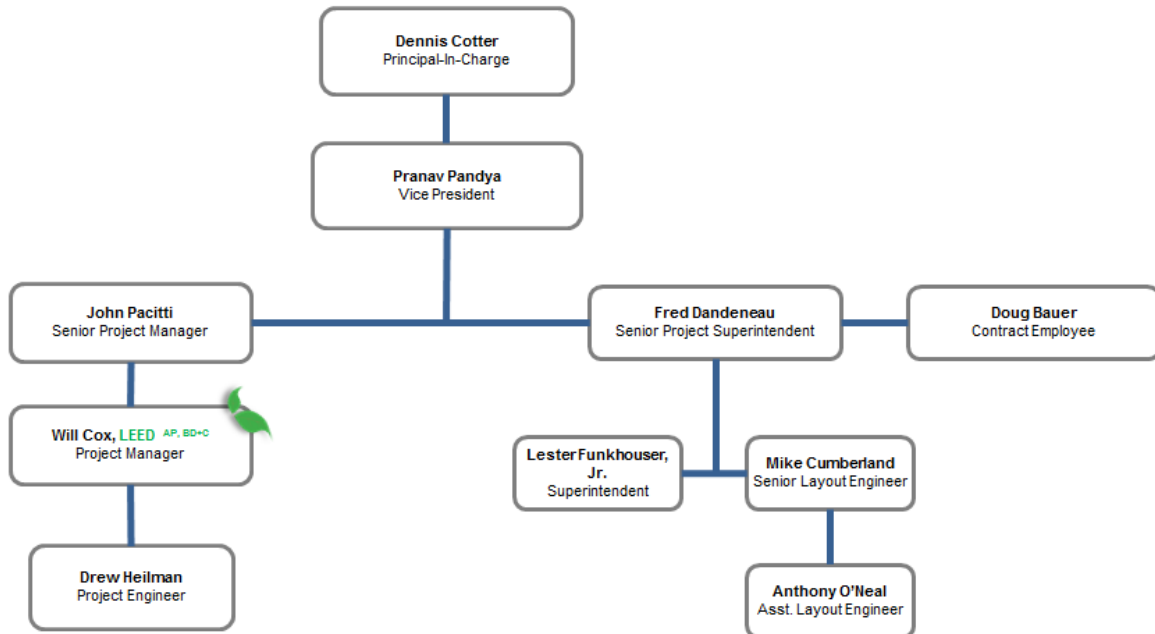
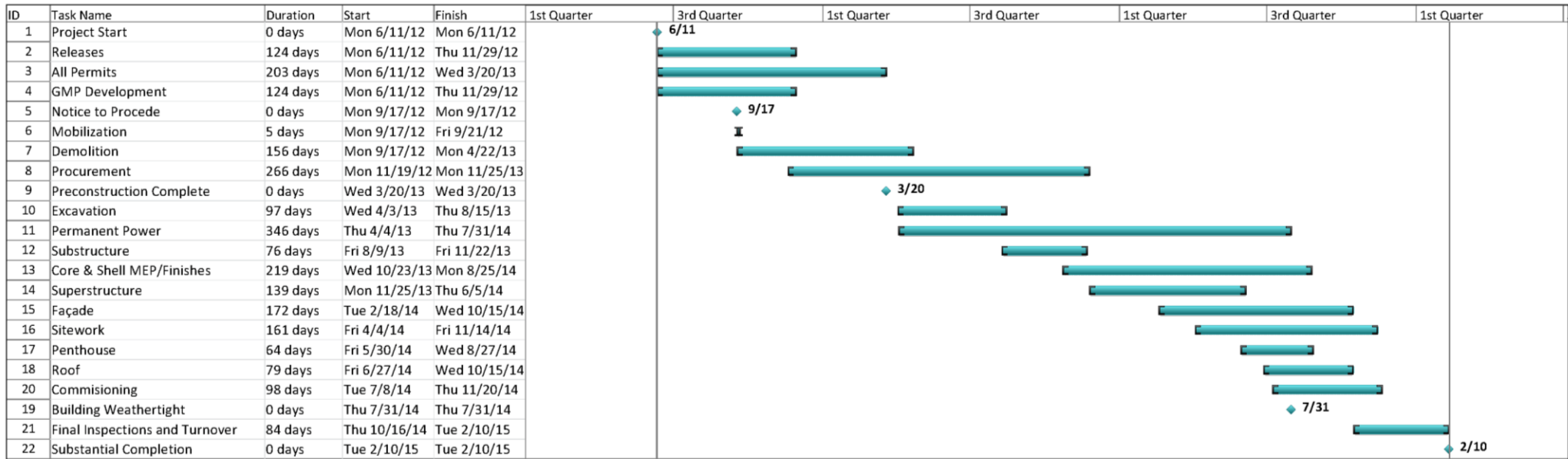


Figure 3. DAVIS Staffing Plan

Appendix A: Schedule




Project: Schedule Date: Mon 9/16/13	Task		Project Summary		Inactive Milestone		Manual Summary Rollup		Deadline	
	Split		External Tasks		Inactive Summary		Manual Summary		Progress	
	Milestone		External Milestone		Manual Task		Start-only			
	Summary		Inactive Task		Duration-only		Finish-only			

Appendix B: Cost Information



## Square Foot Cost Estimate Report

Estimate Name:	<b>Office Building</b>	 <p style="font-size: small; color: #008000;">Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</p>
Building Type:	<b>Office, 5-10 Story with Precast Concrete Panel / R/Conc. Frame</b>	
Location:	<b>WASHINGTON, DC</b>	
Story Count:	<b>9</b>	
Story Height (L.F.):	<b>11.5</b>	
Floor Area (S.F.):	<b>112500</b>	
Labor Type:	<b>STD</b>	
Basement Included:	<b>No</b>	
Data Release:	<b>Year 2013 Quarter 3</b>	
Building Cost:	<b>\$14,598,000.00</b>	

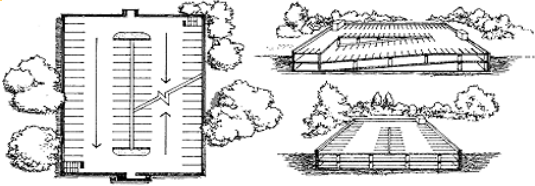
	% of Total	Cost Per S.F.	Cost
<b>A Substructure</b>	<b>2.34%</b>	<b>3.03</b>	<b>341000</b>
<b>A1010</b>		<b>1.98</b>	<b>223000</b>
Standard Foundations bearing capacity 6 KSF, 12" deep x 24" wide capacity 6 KSF, 12' - 0" square x 37" deep			
<b>A1030</b>		<b>0.58</b>	<b>65000</b>
Slab on Grade Slab on grade, 4" thick, non industrial, reinforced			
<b>A2010</b>		<b>0.03</b>	<b>3500</b>
Basement Excavation common earth, on site storage			
<b>A2020</b>		<b>0.44</b>	<b>49500</b>
Basement Walls CY/LF, 7.2 PLF, 12" thick			
<b>B Shell</b>	<b>31.78%</b>	<b>41.24</b>	<b>4639500</b>
<b>B1010</b>		<b>18.37</b>	<b>2066500</b>
Floor Construction load, 12' story height, 394 lbs/LF, 6000PSI load, 12' story height, 394 lbs/LF, 6000PSI reinforcing, 500K load, 10'-14' story height, 375 lbs/LF, PSF superimposed load, 188 PSF total load			
<b>B1020</b>		<b>1.65</b>	<b>185500</b>
Roof Construction superimposed load, 18" deep beam, 8.5" slab, 146 PSF			
<b>B2010</b>		<b>16.95</b>	<b>1907000</b>
Exterior Walls aggregate finish, 2" rigid insulation, high rise			
<b>B2020</b>		<b>3.39</b>	<b>381500</b>
Exterior Windows Windows, aluminum, sliding, insulated glass, 5' x 3'			
<b>B2030</b>		<b>0.24</b>	<b>27500</b>
Exterior Doors double door, hardware, 6'-0" x 10'-0" opening label, 3'-0" x 7'-0" opening			
<b>B3010</b>		<b>0.64</b>	<b>71500</b>
Roof Coverings asphalt felt, mopped perlite			

Roof edges, aluminum, duranodic, .050" thick, 6" face  
Flashing, aluminum, no backing sides, .019"

C Interiors		19.71%	25.57	2877000
C1010	<b>Partitions</b> no base layer, 3-5/8" @ 24" OC framing ,same opposite metal furring		2.72	306500
C1020	<b>Interior Doors</b> quality, flush, 3'-0" x 7'-0" x 1-3/8"		3.11	349500
C1030	<b>Fittings</b> Toilet partitions, cubicles, ceiling hung, plastic laminate		0.7	79000
C2010	<b>Stair Construction</b> risers, with landing		3.1	348500
C3010	<b>Wall Finishes</b> roller work, primer & 2 coats Vinyl wall covering, fabric back, medium weight		0.91	102500
C3020	<b>Floor Finishes</b> Carpet, tufted, nylon, roll goods, 12' wide, 36 oz Carpet, padding, add to above, minimum Vinyl, composition tile, maximum Tile, ceramic natural clay		8.66	974000
C3030	<b>Ceiling Finishes</b> concealed 2" bar & channel grid, suspended support		6.37	717000
D Services		46.17%	59.92	6740500
D1010	<b>Elevators and Lifts</b> height, 2 car group, 200 FPM		15.8	1777000
D2010	<b>Plumbing Fixtures</b> wall hung Urinal, vitreous china, wall hung Lavatory w/trim, vanity top, PE on CI, 20" x 18" 20" Water cooler, electric, wall hung, 8.2 GPH Water cooler, electric, wall hung, wheelchair type, 7.5 GPH		2.76	311000
D2020	<b>Domestic Water Distribution</b> input, 192 GPH		0.58	65500
D2040	<b>Rain Water Drainage</b> Roof drain, CI, soil,single hub, 5" diam, 10' high foot add		0.29	33000
D3050	<b>Terminal &amp; Package Units</b> 79.16 ton		17.54	1973000
D4010	<b>Sprinklers</b> 10,000 SF additional floor, 10,000 SF Standard High Rise Accessory Package 8 story		2.84	319500
D4020	<b>Standpipes</b>		0.93	105000

	pipe, 1 floor			
	pipe, additional floors			
	GPM			
	Fire pump, electric, for jockey pump system, add			
<b>D5010</b>	<b>Electrical Service/Distribution</b>	<b>1.17</b>		<b>132000</b>
	conduit & wire, 3 phase, 4 wire, 120/208 V, 1600 A			
	XHHW wire, 60 A			
	XHHW wire, 200 A			
	XHHW wire, 1600 A			
	breaker, 120/208 V, 1600 A			
<b>D5020</b>	<b>Lighting and Branch Wiring</b>	<b>12.16</b>		<b>1368500</b>
	SF, 2.0 W per SF, with transformer			
	Miscellaneous power, 1.2 watts			
	Central air conditioning power, 4 watts			
	Motor installation, three phase, 460 V, 15 HP motor size			
	230 V 7.5 HP, 460 V 15 HP, 575 V 20 HP			
	to 5 HP			
	to 100 HP			
	per SF, 40 FC, 10 fixtures @32watt per 1000 SF			
<b>D5030</b>	<b>Communications and Security</b>	<b>4.7</b>		<b>529000</b>
	Telephone wiring for offices & laboratories, 8 jacks/MSF			
	addressable, 100 detectors, includes outlets, boxes,			
	wire & conduit			
	Internet wiring, 8 data/voice outlets per 1000 S.F.			
<b>D5090</b>	<b>Other Electrical Systems</b>	<b>1.13</b>		<b>127000</b>
	switch, diesel engine with fuel tank, 100 kW			
	15 kVA/12.75 kW			
<b>E Equipment &amp; Furnishings</b>		<b>0.00%</b>	<b>0</b>	<b>0</b>
<b>E1090</b>	<b>Other Equipment</b>		<b>0</b>	<b>0</b>
<b>F Special Construction</b>		<b>0%</b>	<b>0</b>	<b>0</b>
<b>G Building Sitework</b>		<b>0%</b>	<b>0</b>	<b>0</b>
<b>SubTotal</b>		<b>100%</b>	<b>\$129.76</b>	<b>\$14,598,000.00</b>
<b>Contractor Fees (General Conditions,Overhead,Profit)</b>		<b>0.0 %%</b>	<b>\$0.00</b>	<b>\$0.00</b>
<b>Architectural Fees</b>		<b>0.0 %%</b>	<b>\$0.00</b>	<b>\$0.00</b>
<b>User Fees</b>		<b>0.0 %%</b>	<b>\$0.00</b>	<b>\$0.00</b>
<b>Total Building Cost</b>			<b>\$129.76</b>	<b>\$14,598,000.00</b>

## Square Foot Cost Estimate Report

<b>Estimate Name:</b>	<b>Parking</b>	 <p style="font-size: small; color: #008000;">Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.</p>
<b>Building Type:</b>	<b>Garage, Underground Parking with Reinforced Concrete / R/Conc. Frame</b>	
<b>Location:</b>	<b>WASHINGTON, DC</b>	
<b>Story Count:</b>	<b>3</b>	
<b>Story Height (L.F.):</b>	<b>9</b>	
<b>Floor Area (S.F.):</b>	<b>38265</b>	
<b>Labor Type:</b>	<b>STD</b>	
<b>Basement Included:</b>	<b>No</b>	
<b>Data Release:</b>	<b>Year 2013 Quarter 3</b>	
<b>Building Cost:</b>	<b>\$2,386,500.00</b>	

		% of Total	Cost Per S.F.	Cost
<b>A Substructure</b>		<b>20.01%</b>	<b>12.48</b>	<b>477500</b>
<b>A1010</b>	<b>Standard Foundations</b> capacity 6 KSF, 12" deep x 24" wide capacity 3 KSF, 8' -6" square x 20" deep capacity 3 KSF, 10' - 6" square x 25" deep Foundation dampproofing, asphalt with fibers, 1/8" thick, 8' high		<b>7.03</b>	<b>269000</b>
<b>A1030</b>	<b>Slab on Grade</b> Slab on grade, 5" thick, light industrial, reinforced		<b>2.29</b>	<b>87500</b>
<b>A2010</b>	<b>Basement Excavation</b> earth, off site storage		<b>3.16</b>	<b>121000</b>
<b>B Shell</b>		<b>56.11%</b>	<b>34.99</b>	<b>1339000</b>
<b>B1010</b>	<b>Floor Construction</b> reinforcing, 1000K load, 10'-14' story height, 740 lbs/LF, 4000PSI column, 35'x35' bay, 200 PSF superimposed load, 355 PSF total deep, 125 PSF superimposed load, 165 PSF total load		<b>18.07</b>	<b>691500</b>
<b>B1020</b>	<b>Roof Construction</b> load, 26" deep beam, 9" slab, 209 PSF total load		<b>8.51</b>	<b>325500</b>
<b>B2010</b>	<b>Exterior Walls</b> Concrete wall, reinforced, 8' high, 8" thick, plain finish, 4000 PSI		<b>6.82</b>	<b>261000</b>
<b>B2030</b>	<b>Exterior Doors</b> hardware, 6'-0" x 10'-0" opening 0" x 7'-0" opening		<b>0.17</b>	<b>6500</b>
<b>B3010</b>	<b>Roof Coverings</b> Vinyl and neoprene membrane traffic deck		<b>1.42</b>	<b>54500</b>
<b>C Interiors</b>		<b>4.34%</b>	<b>2.7</b>	<b>103500</b>
<b>C1010</b>	<b>Partitions</b> finish 8" concrete block partition		<b>1.91</b>	<b>73000</b>
<b>C1020</b>	<b>Interior Doors</b> quality, flush, 3'-0" x 7'-0" x 1-3/8"		<b>0.26</b>	<b>10000</b>
<b>C2010</b>	<b>Stair Construction</b> Stairs, CIP concrete, w/landing, 16 risers, with nosing		<b>0.3</b>	<b>11500</b>

<b>C3010</b>	<b>Wall Finishes</b>		<b>0.24</b>	<b>9000</b>
	Painting, masonry or concrete, latex, brushwork, primer & 2 coats			
<b>D Services</b>		<b>18.88%</b>	<b>11.77</b>	<b>450500</b>
<b>D1010</b>	<b>Elevators and Lifts</b>		<b>1.74</b>	<b>66500</b>
	Hydraulic passenger elevator, 2500 lb., 2 floor, 125 FPM			
<b>D2010</b>	<b>Plumbing Fixtures</b>		<b>0.05</b>	<b>2000</b>
	mount			
	Lavatory w/trim, wall hung, PE on CI, 19" x 17"			
<b>D2020</b>	<b>Domestic Water Distribution</b>		<b>0.12</b>	<b>4500</b>
	KW 37 GPH			
<b>D2040</b>	<b>Rain Water Drainage</b>		<b>1.66</b>	<b>63500</b>
	Roof drain, steel galv sch 40 threaded, 3" diam piping, 10' high			
	additional foot add			
<b>D3050</b>	<b>Terminal &amp; Package Units</b>		<b>0.17</b>	<b>6500</b>
	16000 CFM, 5 HP vane axial fan			
<b>D4010</b>	<b>Sprinklers</b>		<b>4.13</b>	<b>158000</b>
	SF			
	floor, 50,000 SF			
<b>D4020</b>	<b>Standpipes</b>		<b>0.14</b>	<b>5500</b>
	floor			
	additional floors			
<b>D5010</b>	<b>Electrical Service/Distribution</b>		<b>0.14</b>	<b>5500</b>
	wire, 3 phase, 4 wire, 120/208 V, 200 A			
	200 A			
	120/208 V, 1 phase, 400 A			
<b>D5020</b>	<b>Lighting and Branch Wiring</b>		<b>3.36</b>	<b>128500</b>
	watts per SF			
	Miscellaneous power, to .5 watts			
	FC, 5 fixtures @32 watt per 1000 SF			
<b>D5030</b>	<b>Communications and Security</b>		<b>0.18</b>	<b>7000</b>
	12 detectors, includes outlets, boxes, conduit and wire			
	& conduit			
<b>D5090</b>	<b>Other Electrical Systems</b>		<b>0.08</b>	<b>3000</b>
	gas/gasoline operated, 3 phase, 4 wire, 277/480 V, 11.5 kW			
<b>E Equipment &amp; Furnishings</b>		<b>0.67%</b>	<b>0.42</b>	<b>16000</b>
<b>E1030</b>	<b>Vehicular Equipment</b>		<b>0.42</b>	<b>16000</b>
	FT arm, 1 way			
	economy			
	printer/dispenser, rate computing			
<b>E1090</b>	<b>Other Equipment</b>		<b>0</b>	<b>0</b>
<b>F Special Construction</b>		<b>0%</b>	<b>0</b>	<b>0</b>
<b>G Building Sitework</b>		<b>0%</b>	<b>0</b>	<b>0</b>
<b>SubTotal</b>		<b>100%</b>	<b>\$62.37</b>	<b>\$2,386,500.00</b>
<b>Contractor Fees (General Conditions,Overhead,Profit)</b>		<b>0.0 %%</b>	<b>\$0.00</b>	<b>\$0.00</b>
<b>Architectural Fees</b>		<b>0.0 %%</b>	<b>\$0.00</b>	<b>\$0.00</b>

User Fees	0.0 %%	\$0.00	\$0.00
<b>Total Building Cost</b>		<b>\$62.37</b>	<b>\$2,386,500.00</b>