

HOW TO ESTIMATE the COST

OF AN OFFICE BUILDING USING THE SEVEN DIVISION
OF THE UNIFORMAT II CLASSIFICATION SYSTEM

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1. INTRODUCTION

The days of rattling off a “cost per square foot” for a project are over. Estimators are handling a great diversity of projects, and are under much scrutiny to provide the client with a conceptual cost that’s consistent with their design ideas, so we must take the time to get the preliminary estimate right from the onset. The purpose of this paper is to provide the reader with an understanding of the basic UNIFORMAT II system, to provide a client with a quick and accurate conceptual estimate.

Main CSI Divisions

Division 03 -- 33 – All CSI divisions (see Appendix A)

Subdivisions

Section 03-00-00.00--33-99-99.00

All CSI subdivisions (see Appendix A)

BRIEF DESCRIPTION

Conceptual estimating is done early in the planning process for new construction to let clients get an idea of what a project could cost. A typical way to organize a conceptual estimate is to utilize the Uniformat II system which was developed by the Construction Specification Institute (CSI). It analyzes the cost between various aspects of a building’s structure. There are seven Level 1 group elements the Uniformat II is built on:

- A. Substructure
- B. Shell
- C. Interiors
- D. Services
- E. Equipment & Furnishings
- F. Special Construction and Demolition
- G. Building Sitework

The second level and third level of the Uniformat II (see appendix A) are broke down even further into group elements & individual elements for pinpoint accuracy. The Uniformat II system was developed primarily for organizing preliminary cost estimates using a building’s elements or systems for cost classification rather than specification CSI sections. This paper will demonstrate one method of taking off a conceptual estimate with general information for a Midwestern state office building, a standard frost wall construction and the exterior finishes will be based on percentages of total wall space. It will utilize RS Means assembly cost data to complete the pricing.

2. TYPES AND METHODS OF MEASUREMENT

This paper will utilize the imperial units of measure for the examples included herein. The equations for the units utilized are as follows:

**Square Feet (SF) = Length (L) in Feet multiplied
by Width (W) in Feet**

Length (L) in Feet Width (W) in Feet Height (H) in Feet

**Square Foot Contact Area (SFCA) =
Length (L) x Height (H)**

The basic components to the project we will be studying:

Floor Plan. A basic floor plan or basic sizes of the building footprint are required to start the estimate. The more information available on a floor plan at the beginning will help greatly in letting the client know what the estimate is based on. (See Sample Sketch)

Cross Sections. The cross sections that will be used are of a basic design and will give the general information for how the estimate is determined. (See Sample Sketch)

Meeting minutes or owner provided notes. This could be any of a number of things, from the client supplying a picture from a magazine they looked at, to an actual sit down meeting with the client to see what their likes or dislikes are.

3. FACTORS THAT MAY EFFECT ACCURATE TAKE-OFF AND PRICING

Lack of Information. This is by far the biggest area that can affect an estimate. When estimating, information is collected, from the owner, architect or from similar projects. The basis of the information should be documented as part of the detailed backup for the estimate. If information is incomplete or inaccurate, the accuracy of the estimate will be impacted.

Geographical Location. The geographical location of the project must be taken into effect due to regulations affecting wages and benefits, sales taxes, and union agreements. Examples of these items include but are not limited to prevailing wages, living wages, workers compensation rates, sales taxes, and journeyman to apprentice ratios. Some areas of the country cost more in general to construct a project. This should be reviewed and determined if additional percentages need to be added to certain materials or labor trades.

Material Shortages. Local, regional or national shortages of construction materials can severely influence material costs as well as cause considerable job delays with an increase to direct project costs. Market conditions affect not only the cost of the project, but also the time required to complete them in a timely matter. In times of high demands for material, the contractor may experience difficulty in obtaining materials. All of these factors can result in a higher project cost that must be taken into account by the estimator and/or utilize contingencies.

4. OVERVIEW OF LABOR, EQUIPMENT, MATERIAL AND INDIRECT COSTS

The first step in any estimate is to understand the general scope and requirements of the project and how the various parts interrelate. Review all the related information and if necessary, ask questions, where there is a lack of information. The Estimator may also need to research the project in regards to construction methods, new material being introduced, etc. The job of the estimator is to construct a model of the project and one must be able to visualize in one’s mind the project, both in terms of costs and possible schedule ramifications.

The local market should be reviewed for the availability of subcontractors and material suppliers to determine if the proper resources will be able to be obtained. If certain subcontractors or material suppliers can’t be obtained locally, additional cost may need to be factored with travel, lodging, per diem or expensive shipping costs. One must also keep in mind the number of other firms bidding on the project; too many could (more than likely) drive the cost down.

One should also review the indirect cost while putting the estimate together. Some items might make the project too costly for the client to even take on, i.e. (bonding, bidding climate, insurances, current lending rates and the general state of the economy).

5. RATIOS AND ANALYSIS – TEST FOR COMPETENCE

Once the sketches and client information is reviewed, the estimator should have a general overall of the project and how the system will relate to the balance of the project. For the basis of our estimate, we will assume the following specifications during our take-off and pricing:

Building Paramters:

- Upper Mid-West States – Lansing Michigan, general region for construction.
- Pad ready site, 125 sf per occupant/per parking space.
- Site utilities, i.e., water, sanitary sewer, storm water and site lighting, by developer and are not to be included in the estimate.
- Single story commercial office building – 85’ x 105’, 8,925 sf.
- Frost foundation & footing, 4” slab on grade, foundation damp proofing & drain tile.
- Flat EPDM roof, steel joist, joist girders and metal deck on columns.
- Exterior enclosure will be 20% EIFS, 55% glass & 25% face brick.
- Interior space will be open office design, with restrooms and kitchen.
- HC restrooms, utility closet, kitchen components and roof drains.
- Carpet tile at space, Quarry tile at entry’s, Ceramic tile at kitchen and restrooms,
- Single-zone unit gas heating, electrical cooling, and exhaust.
- NFPA 13 wet sprinkler system for an office building.
- Standard 400 amp service, panels, boards, light fixtures, wall & pole receptacles, light switches and misc HVAC power.
- Standard residential kitchen equipment; refrigerator and microwave.

Review the attached sketches given by the client (See Sample Sketch). The perimeter lineal foot of the building is 380’ (85+105+85+105). This lineal foot will be used in a variety of the following calculations.

Look at the wall section to notice how the building is to be built. The foundations will typical be about 6” larger on each side of the foundation wall, unless it is noted in the information packet (Appendix B) that the soil conditions are bad. Also, include spread footing for the interior columns.

A spray-on bituminous foundation damp proofing will be used along with some drain tile. Once that is complete you will need to add the slab on grade per the above building parameters. Then, utilize the square foot for the entire building (85’ x 105’, 8,925 sf.) to complete the slab.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
A10	Foundations				
1010 110 2300	24" x 12" strip footing	385	LF	\$ 22.00	\$ 8,470.00
1010 210 7350	6' x 6' x 14" deep footing for columns	16	EA	\$ 530.00	\$ 8,480.00
1010 310 1000	Foundation under drain, outside only, PVC 4" Dia.	385	LF	\$ 9.00	\$ 3,465.00
1010 320 2000	2 coats bituminous, 4' tall	385	LF	\$ 5.80	\$ 2,233.00
1030 120 2240	4" slab on grade w/reinforcing	8925	SF	\$ 4.60	\$ 41,055.00

Now that the first part of the foundation system is complete, the next step is to finish the basement construction.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
A20	Basement Construction				
2010 110 4580	10k sf, 4' dp excavation w/onsite storage	8925	SF	\$ 1.05	\$ 9,371.25
2010 110 1580	4' tall, 14" thick foundation wall	385	LF	\$ 70.00	\$ 26,950.00

The basement construction is figured as a typical excavation with back fill and onsite storage. The foundation wall is a 4’ frost wall that is 14” thick. Now, the first of the seven Level 1 group elements the Unifomat II system is built on; **A. Substructure.**

The building Shell is the second part of the Unifomat II system. The building shell is broken down into three Level 2 group elements (Appendix A). Please note that there is no B1010 – Floor construction since the building is only single story construction. The building roof system per the above building parameters will be steel joist & joist girders on columns. Be aware of what the spacing is between the joists to determine the proper layout for the bay sizes. The bay sizes per the sketch (See Sample Sketch) are 28'-4" x 35'-0". This will be used to determine what roof construction system to use. RS Means doesn't have this actual size, so it's always better to go to the nearest higher one, which is 30' x 35' bay spacing. Be aware of the current snow loads in the Midwest states which are 40 PSF. Also don't forget the interior columns and the sprayed-on cementitious fireproofing, (which most estimators forget, required by code and is a costly item).

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
B10	Shell				
1020 124 2500	30' x 35' steel joist & joist girders on columns	8925	SF	\$ 5.50	\$ 49,087.50
1020 124 2550	Add for columns	8925	SF	\$ 1.25	\$ 11,156.25
07-81-16.10	Cementitious fireproofing, acoustical sprayed, 1" thick, finished	8925	SF	\$ 4.15	\$ 37,038.75

Exterior walls are the next task; the walls are made up of: 20% EIFS, 55% glass & 25% face brick. The estimator needs to know the height of the walls, but since it's not noted per the notes from the client, we will use an exterior wall height of 10'-0" and a finish ceiling height of 9'-0". The following is how to determine the exterior wall square footage based on the percentage given:

- 385' (length of building) x 10' (height of exterior wall) = 3850 SF wall surface;
- EIFS: 3850 SF X 20% = 770 SF wall surface is covered by EIFS.
- Glass: 3850 SF X 55% = 2117.50 SF wall surface is covered by Glass.
- Face Brick: 3850 SF X 25% = 962.50 SF wall surface is covered by Face Brick.
- Additional items to take into account are the entry doors and the exterior steel egress doors.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
B20	Exterior Closure				
2010 152 5240	EIFS, 5/8" Cement Bd, 6" mtl. Studs, 16" O.C. 3" EPS	770	SF	\$ 17.75	\$ 13,667.50
2020 210 1700	Tubular Aluminum Framing, NO glass	2117.50	SF	\$ 24.25	\$ 51,349.38
2020 220 1200	5/8" thick insulated glazing	2117.50	SF	\$ 20.75	\$ 43,938.13
2010 130 5520	Brick Veneer/ Metal Stud back up, 16 Ga., 24" oc.	962.50	SF	\$ 25.75	\$ 24,784.38
2030 110 7450	Alum. & Glass, full vision door w/black finish and door hardware	2	EA	\$ 6,050.00	\$ 12,100.00
2030 220 3950	18Ga. Steel door, "A" Label 3'x7" w/hardware	2	EA	\$ 1,800.00	\$ 3,600.00
07-92-10-10	General exterior caulking allowance	1	LOT	\$ 2,500.00	\$ 2,500.00

The last part of the shell is the roofing system. Begin using an EPDM 60 mils, fully adhered roofing system with 2” Polyisocyanurate roof deck ridged insulation. Add the sheet metal roof edge along with a roof hatch for access to the HVAC equipment on the roof.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
B30	Roofing				
3010 120 3300	Single ply EPDM 60 mils, full adhered	8925	SF	\$ 1.99	\$ 17,760.75
3010 320 1600	2" Polyisocyanurate rigid roof deck insulation	8925	SF	\$ 1.55	\$ 13,833.75
3010 420 1700	Aluminum roof edge, painted 6" face	385	LF	\$ 21.75	\$ 8,373.75

Now, the second of the seven Level 1 group elements the Unifomat II system is built on; **B. Shell** is complete. Next, complete the interior construction that will finish off the office building.

The Interior is the third part of the Unifomat II system. The Interior is broken down into three Level 2 group elements (Appendix A). The interior construction is a semi-difficult area to determine because most clients don’t have any idea to what the space requirements or needs are at this early stage. First, start with the exterior wall finishes. Referencing prior notes, there was approximately 962.50 SF of wall surface covered by face brick. The assembly used for the face brick above already had the interior metal stud back up with insulation. So the only items that need completed now are: drywall installation, drywall taping & finishing. Use the same for the 770 SF wall surfaces that were covered by EIFS. The estimator should look to see if there are any other interior walls that need to be completed. As shown on the floor plan, there are two restrooms, metal stud, water resistant drywall, both sides up to 10’. Typically the plumbing wall will be metal stud, water resistant drywall, one side; the interior space will be utilized as the plumbing chase. Add the additional components to complete the restrooms: doors, partitions, urinal screens and bath accessories. The owner also indicated that they wanted a standard residential kitchen. Take-off the cabinets, base & uppers, and counter tops.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
C10	Interior Construction				
1010 128 0700	Gypsum board, one face only, interior, fire resistant 5/8"	962.50	SF	\$ 0.80	\$ 770.00
1010 128 0960	Taping and finishing of drywall	962.50	SF	\$ 0.52	\$ 500.50
1010 128 0700	Gypsum board, one face only, interior, fire resistant 5/8"	770	SF	\$ 0.80	\$ 616.00
1010 128 0960	Taping and finishing of drywall	770	SF	\$ 0.52	\$ 400.40
1010 126 7050	Gypsum board, 5/8" WR drywall both side, 3-5/8" at 24" O.C., 3-1/2" fiberglass, 10' height.	710	SF	\$ 5.35	\$ 3,798.50
1010 126 7100	Gypsum board, 5/8" WR drywall one side, 3-5/8" at 24" O.C., 10' height.	230	SF	\$ 3.09	\$ 710.70
1010 128 0960	Taping and finishing of drywall	940	SF	\$ 0.52	
1020 122 1620	Hollow core/flush lauan wood door, 2'-8" x 6'-8", butt welded frames	2	EA	\$ 463.00	\$ 926.00
1030 110 0680	Toilet partitions, cubicles, floor mounted painted metal	2	EA	\$ 706.00	\$ 1,412.00
1030 110 0760	Toilet partitions, cubicles, floor mounted painted metal- Handicap addition	2	EA	\$ 982.00	\$ 1,964.00

1030 110 1340	Urinal screens, floor mounted, 24" wide painted metal	1	EA	\$ 342.00	\$ 342.00
1030 710 0120	Bath accessories, dispenser, towel, surface mounted	2	EA	\$ 75.00	\$ 150.00
1030 710 0170	Bath accessories, mirror, framed, 72" x 24"	2	EA	\$ 474.00	\$ 948.00
1030 710 0190	Bath accessories, toilet tissue dispenser, surface mounted, double roll	4	EA	\$ 43.00	\$ 172.00
1030 830 0110	Household, base, hardwood, one top drawer & one door below x 12" wide	16	LF	\$ 261.00	\$ 4,176.00
1030 830 0130	Household, wall, hardwood, 30" high with one door x 12" wide	16	LF	\$ 203.00	\$ 3,248.00
1030 830 0150	Household, counter top-laminated plastic, stock economy	16	LF	\$ 26.00	\$ 416.00

Now that the interior construction is complete, onto interior finishes. Interior paint will included, 962.50 SF of wall surface covered by face brick, 770 SF wall surfaces that was covered by EIFS and the drywall partitions at the restrooms areas; 710 + 230. This equals a total of 2,672.50 SF wall to finish. Floor finishes are difficult to estimate at the conceptual phase of a project. Cost & materials can vary greatly depending on the demand on the building and the owner tastes. Since the client had not noted the general use of the building, I normally pick a product that is middle of the road. Let’s use middle grade carpet at the main area, middle grade 4x4 tile at the restroom floors, middle grade VCT at the kitchen area & general use quarry tile at the entries. Wrap up the interior finishes with a 2’x4’ acoustical grid ceiling.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
C30	Interior Finishes				
3010 230 0080	Painting interior walls drywall walls, primer & two coats of finish paint	2672.50	SF	\$ 1.02	\$ 2,725.95
3020 410 0080	Carpet tile, nylon, fusion bonded, 24"x24", 35oz.	8301	SF	\$ 4.60	\$ 38,184.60
3020 410 1720	Tile, 4"x4", ceramic, natural clay, at restrooms	391	SF	\$ 8.50	\$ 3,323.50
3020 410 1580	Vinyl composition tile at kitchen to side egress door	169	SF	\$ 1.60	\$ 270.40
3020 410 1800	Quarry tile at entries(32 sf. at ea. entry)	64	SF	\$ 10.00	\$ 640.00
3030 210 5900	Acoustical tile, 5/8" fiberglass board, 24" x24" suspended tee grid	8925	SF	\$ 2.95	\$ 26,328.75

Now it should be complete with the interior construction of the building and have now completed the third of the seven Level 1 group elements the Unifomat II system is built on; **C. Interiors.**

Next, tackle the forth Level 1 group element; **D. Services.** Since this is a single story building, it is not necessary to install the first Level 2 group system, Conveying systems.

All buildings need some level of plumbing and it is determined primarily by the local building code for the region the building is in and the level of occupancy and use. Plumbing will be based on the local building code in Michigan and per the drawings. Since the roof is flat, it is necessary to add interior roof drains that can carry the rain off the roof. Again, look to the local code and weather patterns in the general area and determine what the proper water level for that area is. There is approximately 8925 SF of roof and four interior columns. Taking the 8925 SF of roof and dividing it by 4 equal areas, 2,231.25 is the average SF of each area. Now determine what size roof drain will be able to handle the rain fall per hour in that area. For this exercise, use; 4" per hour, a 3" roof drain can only handle about 1600 sf of roof area, a 4" roof drain can easily handle 3400 sf of roof area. So play it safe and use the 4" roof drain. To finalize the plumbing portion, be sure to include the gas piping for the roof top equipment. The single roof top unit will be located in the center of the building.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
D20	Plumbing				
2010 110	Cast iron floor drain & PVC pipe to sanitary lead	2	EA	\$550.00	\$1,100.00
2010 110 1920	Water closet, vitreous china, floor mounted, one piece	4	EA	\$ 630.00	\$ 2,520.00
2010 210 2000	Urinal, vitreous china, wall hung	2	EA	\$ 1,200.00	\$ 2,400.00
2010 310 2200	Lavatory with trim, wall hung, vitreous china, 19"x17"	4	EA	\$ 1,250.00	\$ 5,000.00
2010 410 1760	Kitchen sink with trim, stainless steel, 30"x21", single bowl	1	EA	\$ 1,100.00	\$ 1,100.00
2020 240 1820	Electric water heater, commercial, 50 gallon tank.	1	EA	\$ 5,800.00	\$ 5,800.00
2040 210 2040	Roof drain, PVC, 4" dia. 10' high	3	EA	\$ 1,055.00	\$ 3,165.00
2090 810 4080	Steel pipe, schedule 40, threaded black, 3" dia. Gas pipe	65	LNFT	\$ 24.00	\$ 1,560.00

The Heating, Ventilation and Air Conditioning (HVAC) are the next step of the process. It is very important to have an accurate idea of what the mechanical system is going to be, as this can be in the range of 15-30 percent of the total building costs. Since the client has noted there requirements above under the building parameters, use that in the estimate.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
D30	HVAC				
3050 150 3960	Rooftop unit, single zone air conditioner	8925	SF	\$ 8.53	\$76,130.25

Since the building is under the 10,000 SF, the local and state building code does not require any form of sprinkler system. Be sure to verify this per local & state codes. This item, if missed could, add additional cost of \$3-6 per building square foot.

Electrical is made up of several components. Before determining these components, be sure to determine the building electrical load & total watts required for the occupancy of the building. Many local building and energy codes set the lighting limitations for the building. The wattage for lighting, along with receptacle, wall switches, HVAC loads and misc. other system requirements, determines the total wattage. Per the building parameters above, it was noted that a 400 amp service, panels and boards was requested. Look to local codes to determine what is required for the electrical receptacles; we will use 4 receptacles per 1000 square feet and 2 wall switches per 1000 square feet. If the local code cannot be determined, look to federal energy guidelines for a basis of design. Next, include the power for the roof top unit; we will use an average of 4 watts per square foot. For lighting, we will look to the federal energy code as a guideline, for a standard office building it is recommended that a maximum of 3.2 watts per square foot. And since there is an acoustical grid ceiling, we will utilize a recessed fluorescent fixture for a clean look.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
D50	Electrical				
5010 120 0320	Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 volt, 400 amp service	1	EA	\$ 7,000.00	\$ 7,000.00
5010 240 0200	Switchgear installation, including switchboards, panels and circuit breakers, 400 amp, 120/208 volt	1	EA	\$ 7,500.00	\$ 7,500.00
5020 110 0280	Receptacles including plate, box, conduit & wire, 4 per 1000 SF	8925	SF	\$ 1.70	\$ 15,172.50
5020 130 0280	Wall switches including plate, box, conduit & wire, 2 per 1000 SF	8925	SF	\$.40	\$ 3,570.00
5020 140 0280	HVAC power, 4 watts per SF	8925	SF	\$.50	\$ 4,462.50
5020 210 0560	Fluorescent fixture recess mounted in ceiling, T-8 energy saver 32 watt lamps, 3.2 watt per SF, 80 foot candles, 20 fixtures @ 1000 SF	8925	SF	\$ 9.50	\$ 84,787.50

Now the estimate should be complete with the plumbing, mechanical, and electrical portions of the building, and has also completed the forth of the seven Level 1 group elements the Unifomat II system is built on; **D, Services**.

The fifth of the seven Level 1 group elements the Unifomat II system is built on is **E, Equipment & Furnishings**. Equipment is normally purchased by the owner and installed by the contractor. The owner has stated a refrigerator and microwave are to be added to the kitchen. Furnishing has fixed and movable furniture, including artwork, rugs, mats and interior landscaping. For this estimate, we will not include any of these, but the estimator should know which items will be provided and if the owner wants to put them into the Construction Budget or supply them from another budget.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
E10	Equipment				
1090 410 0210	Residential grade refrigerator, no frost 10 to 12 CF., economy	1	EA	\$ 600.00	\$ 600.00
11-31-13-1250	Residential grade microwave, 600 watt	1	EA	\$ 300.00	\$ 300.00

The sixth of the seven Level 1 group elements the Unifomat II system is built on is **F, Special Construction & Selective Building Demolition**. Special construction and selective building demolition will not be utilized as none general items fit into these group elements.

The seventh and final Level 1 group elements the Unifomat II system is built on is **G, Building Sitework**. Building site work starts with clearing the site and making it ready for the building construction. Since the building parameter above noted this as a pad ready sit, no site clearing, grubbing or tree removal is required for this estimate. The parking lot is next, we will use 125sf of building space per occupant to determine how many parking spaces will be needed. 8925sf divided by 125sf = 71.4 parking spaces. Round the number to 72 and add 10 additional for guest and Handicap parking for a total of 82 spaces. Also, be sure to include a concrete sidewalk from the parking lot to the front of the building.

ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST	
				UNIT	TOTAL
G20	Site Improvements				
2020 201 1520	Parking lot, 90deg angle parking, 3" bituminous paving with 8" gravel base.	82	EA	\$ 1,200.00	\$ 98,400.00
2030 120 1600	Concrete sidewalk, 4" thick, 4" gravel base, 4' wide	150	LF	\$ 20.70	\$ 3,105.00

Since the landlord/developer has installed all the water, sanitary sewer, storm water and site lighting we will not be including this in the estimate.

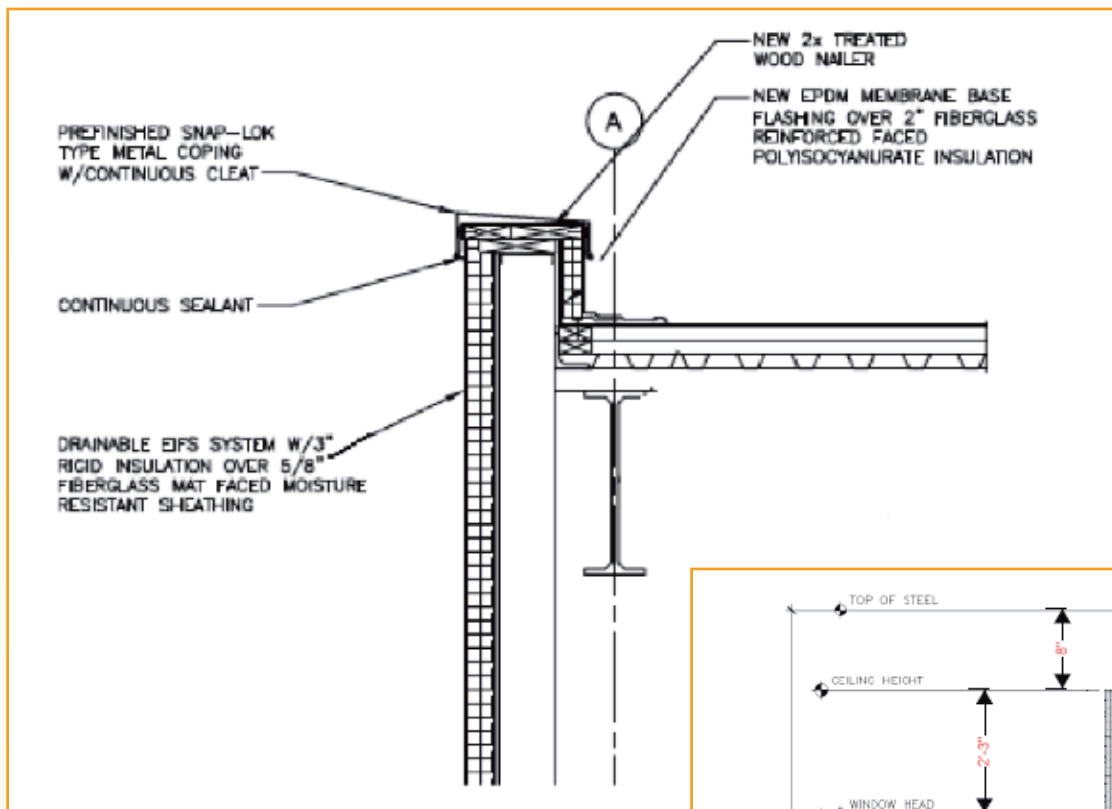
Add the total cost together to get a subtotal of construction costs, add the state sales tax, the other cost: General conditions, overhead and profit. General conditions, overhead and profit varies with the type of contractor and annual volume of business. The cost above are based on the Means Assemblies Cost Data, the cost are based on a national average of major cities. Estimates derived from the Means Data will need to be "Localized" so that the costs reflect, as closely as possible, those in the area where the project is to be built. We will use the Location factor of Lansing Michigan, which is on the average of 95% of the total costs. Next, add allowances for contingencies for unforeseen conditions, design errors, design omissions and estimator's errors.

Now the estimate process is complete, this paper will provide the reader with a basic understanding of the UNIFORMAT II system, and a quick and accurate conceptual estimate to the client.

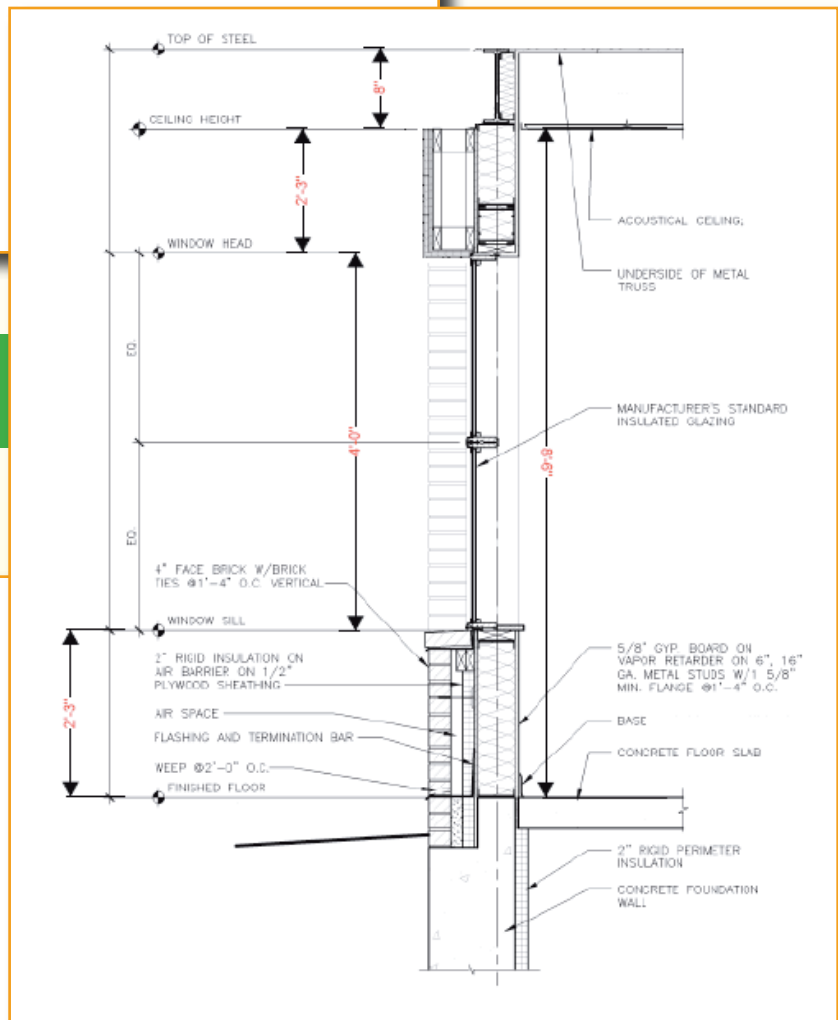
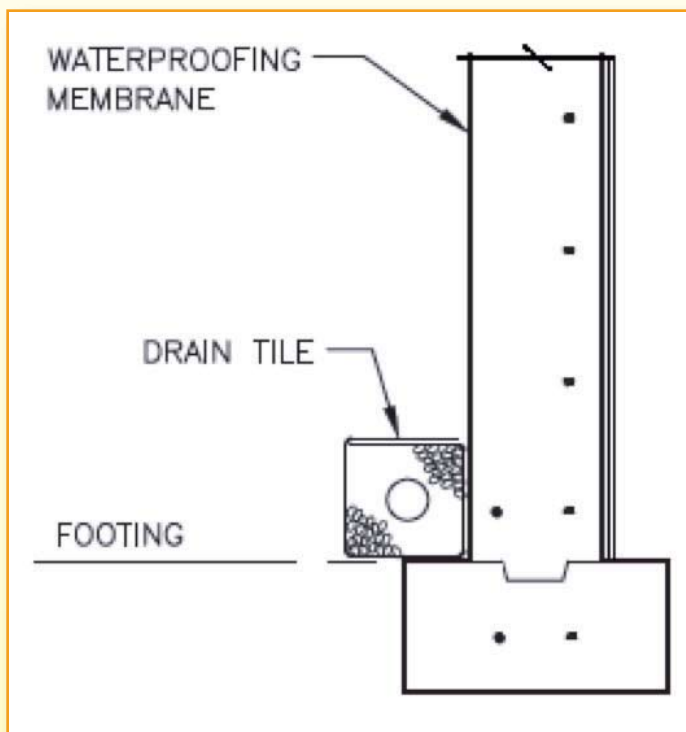
MISCELLANEOUS PERTINENT INFORMATION

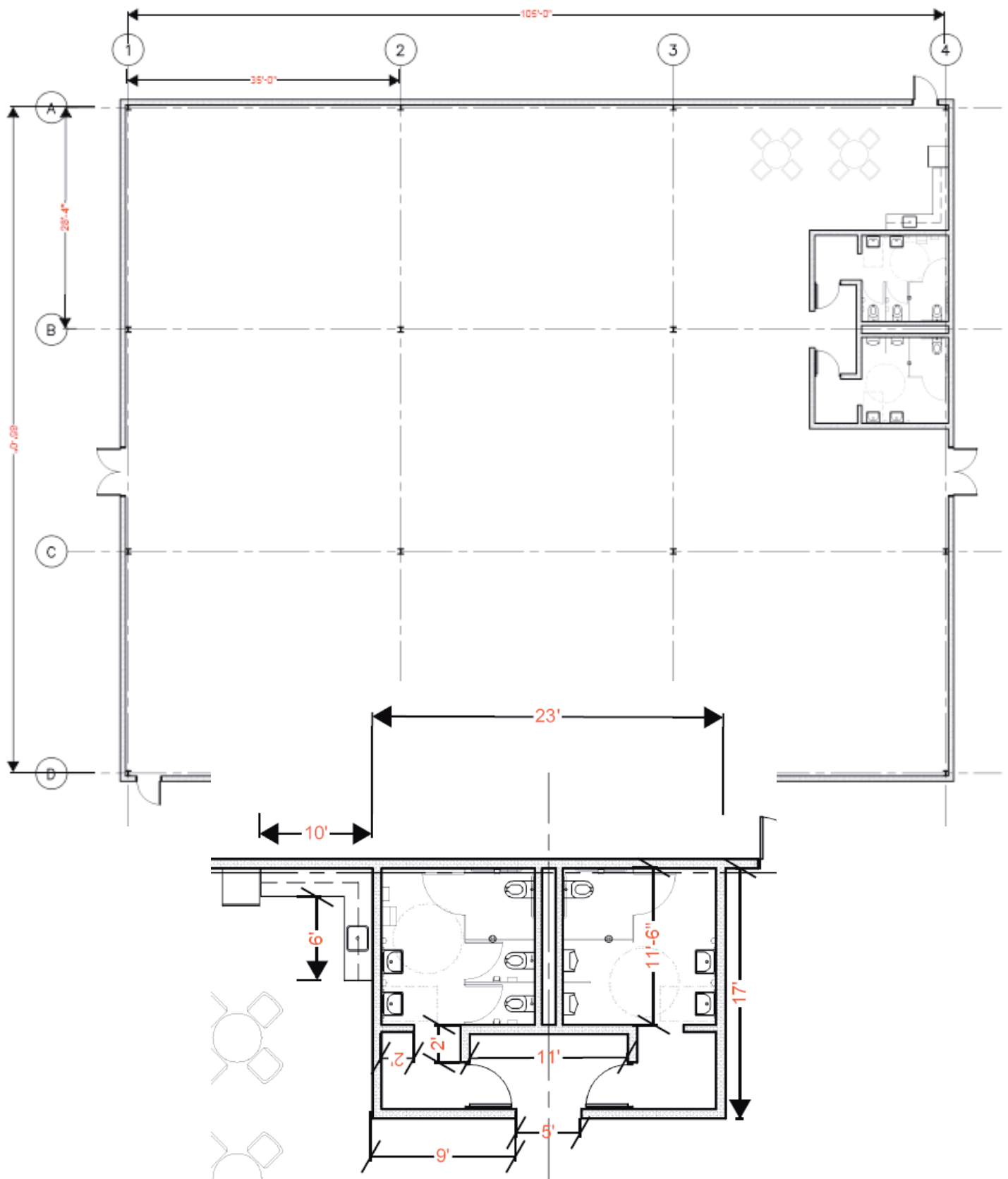
The method of take-off will vary from estimator to estimator; in the example shown above it may vary depending on the experience of the estimator. Hopefully this paper has demonstrated the benefits of having a good base of information from the client, and the proper steps it takes to complete this estimate.

See Sample Sketches on Following Pages...



SAMPLE SKETCHES







ESTIMATE SHEETS

PROJECT NAME: Smith, Inc PROJECT #: G09856SD DUE DATE: 5-15-08

PAGE NO.	ASSEMBLY NUMBER	DESCRIPTION	QTY	UNIT	TOTAL COST		COST PER S.F.
					UNIT	TOTAL	
	A10	Foundations					8925
2	1010 110 230	24" x 12" Footing	385	LF	\$22 ⁻	\$8,470 ⁻	\$1.95
3	1010 210 7350	6' x 6' x 14" Footing	16	EA	\$530 ⁻	\$8,480 ⁻	\$0.95
7	1010 310 1000	Outside Foundation Drain					
		4" PVC Diameter.	385	LF	\$9 ⁻	\$3,465 ⁻	\$0.39
8	1010320 2000	2 Coats bituminous, 4' tall	385	LF	\$580 ⁻	\$2,233 ⁻	\$0.25
24	1030 120 2240	4" Slab on grade w/ reinf.	8925	SF	\$460 ⁻	\$41,055 ⁻	\$4.60
	A20	Basement Construction					
26	2010 110 4580	10K SF, 4' dp EXCAV.	8925	SF	\$1.05	\$9,371.25	\$1.05
28	2020 110 1580	4' tall, 14" Found. wall	385	LF	\$70 ⁻	\$26,950 ⁻	\$3.02
	B10	Superstructure					
119	1020 124 2500	30' x 35' STL Joist/Girders	8925	SF	\$550 ⁻	\$49,087 ⁵⁰	\$5.50
119	1020 124 2550	Add Columns	8925	SF	\$1.25	\$11,156 ²⁵	\$1.25
212	07-81-16.10	1" Cementitious Fire proofing	8925	SF	\$4.15	\$37,038 ⁷⁵	\$4.15
	B20	Exterior Closure					
199	2010 152 5240	EIFS, Cement Bd. 6" mtl.	770	SF	\$17.75	\$13,667 ⁵⁰	\$1.53
205	2020 210 1700	Tubular Alum Framing	2117 ⁵⁰	SF	\$24 ²⁵	\$51,349 ³⁸	\$5.75
206	2020 220 1200	5/8" thick insulated Glazing	2117 ⁵⁰	SF	\$20 ⁷⁵	\$43,938 ¹³	\$4.92
168	2010 130 5120	Brick Veneer w/ mtl Stud back up	962 ⁵⁰	SF	\$25 ⁷⁵	\$24,784 ³⁸	\$2.78
207	2030 110 7450	Alum & Glass Full vision door	2	EA	\$6050 ⁻	\$12,100 ⁻	\$1.36
210	2030 220 3950	1869 STL dr "A" Label 3x7	2	EA	\$1,800 ⁻	\$3,600 ⁻	\$0.40
214	07-92-10-10	General ext. Caulking	1	LS	\$2,500 ⁻	\$2,500 ⁻	\$0.28

DATE: 5-1-08 | ESTIMATOR: MAA #3788 REQUESTED BY: TS #3615

PROJECT NAME: Smith, IncPROJECT #: G0985650DUE DATE: 5-15-08

B30		Roofing					
214	3010120330	Single ply. 60 mils, EPDM	8925	SF	\$1.99	\$17,760 ⁷⁵	\$1.99
218	30103201600	2" POLYISO CYANATE, INS.	8925	SF	\$1.55	\$13,833 ⁷⁵	\$1.55
220	30104201700	ALUM. ROOF EDGE 6" painted	385	LF	\$21 ⁷⁵	\$8373 ⁷⁵	\$1.94
C10		Interior Construction					
233	10101280700	Gyp. Bd. 1 Face, Fire rest. 5/8	962 ⁵⁰	SF	\$.80	\$770.00	\$.09
233	10101280960	Tape & Finish	962 ⁵⁰	SF	\$.52	\$500.50	\$.06
233	10101280700	Gyp. Bd. 1 Face, Fire rest 5/8	770	SF	\$.80	\$616 ⁻	\$.07
233	10101280960	Tape & Finish	770	SF	\$.52	\$400.40	\$.04
231	10101267050	Gyp. Bd. 2 Sides, WR. 5/8	710	SF	\$5.35	\$3,798 ⁵⁰	\$.43
231	10101267100	Gyp. Bd. 1 Side, WR. 5/8	230	SF	\$3.09	\$710.70	\$.08
233	10101280960	Tape & Finish	1650	SF	\$.52	\$858.00	\$.10
246	10101221620	Hollowcore / Flush Lam. door	2	EA	\$463 ⁻	\$926 ⁻	\$.10
249	10301100680	Toilet part, Painted MTL	2	EA	\$706 ⁻	\$1,412 ⁻	\$.16
249	10301100760	Toilet part, HC, Painted MTL	2	EA	\$982 ⁻	\$1,964 ⁻	\$.22
249	10301101340	Urinal Screen, 24" wide	1	EA	\$342 ⁻	\$342 ⁻	\$.04
249	10301100120	Bath Acc. Towel dispenser	2	EA	\$75 ⁻	\$150 ⁻	\$.02
251	10307100170	Bath Acc. Mirror 72x24	2	EA	\$474 ⁻	\$948 ⁻	\$.11
251	10307100190	Bath Acc. Double roll TP	4	EA	\$43 ⁻	\$172 ⁻	\$.02
251	10308300130	Cabinets - base Kitchen	16	LF	\$261 ⁻	\$4,176 ⁻	\$.47
251	10308300130	Cabinets - Uppers Kitchen	16	LF	\$203 ⁻	\$3,248 ⁻	\$.36
251	10308300150	Counter Top - Lam. Kitchen	16	LF	\$26 ⁻	\$416 ⁻	\$.05
C20		Stairs					
		NA - Not Applicable					
C30		Interior Finishes					
254	30102300080	Painting Int. Drywall	2672 ⁵⁰	SF	\$1.02	\$2,725 ⁹⁵	\$.31
256	30204100080	Carpet tile, 24"x24" 3502	8301	SF	\$4.6	\$38,184 ⁶⁰	\$4.28
257	30204101720	Tile 4"x4" CT @ restroom	391	SF	\$8.5	\$3,323 ⁵⁰	\$.37
256	3204101580	Vet tile @ Kitchen	169	SF	\$1.6	\$270.40	\$.03
257	30204101800	quarry tile @ Entry (32sf)	64	SF	\$10	\$640 ⁻	\$.07
260	30302105100	Acov. tile ceiling 2'x2' 5/8 Fb	8925	SF	\$2.95	\$26,328 ⁷⁵	\$2.95

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PROJECT NAME: Smith, IncPROJECT #: G09856SDDUE DATE: 5-15-08

	D10	Conveying Systems					
	NA	NA - Not Applicable					
	D20	Plumbing					
268	2010 110	Cast Iron Floor drain	2	EA	\$550-	\$1,100-	\$.12
269	2010 110 1920	Water closet, Floor mt	4	EA	\$630-	\$2,520-	\$.28
271	2010 210 2000	Urinal - wall hung	2	EA	\$1,200-	\$2,400-	\$.27
272	2010 310 2200	Lav, wall hung	4	EA	\$1,250-	\$5,000-	\$.56
273	2010 410 1760	Kitchen Sink, 1 bowl	1	EA	\$1,100-	\$1,100-	\$.12
287	2020 240 1820	50 gallon. Elec. water htr.	1	EA	\$5,800-	\$5,800-	\$.65
298	2040 210 2040	Roof Drain 4", 10'h	3	EA	\$1,055-	\$3,165-	\$.35
301	2090 810 4080	Steel pipe - 3" dia. gas.	65	LNFL	\$24-	\$1,560-	\$.17
	D30	HVAC					
328	3050 150 3960	Rtu - Single zone AC	8925	SF	\$8.53	\$76,130 ²⁵	\$ 8.53
	D40	Fire Protection					
	NA	NA - Not Applicable					
	D50	Electrical					
356	5010 120 0320	400 Amp, 3ph, 4 wire 120/208	1	EA	\$7,005	\$7,000-	\$.78
358	5010 240 0200	Switch gear, Panel, Breaker	1	EA	\$7,500-	\$7,500-	\$.84
359	5020 110 0280	Receptacles, panel 4/1000sf	8925	SF	\$1.70	\$15,172 ⁵⁰	\$ 1.70
362	5020 130 0280	Wall switch, panel 2/1000	8925	SF	\$.40	\$3,570.00 ⁵⁰	\$.40
364	5020 140 0280	Hvac power 4 w/4t5	8925	SF	\$.50	\$4,462 ⁵⁰	\$.50
375	5020 210 0560	T8 Floor. Fxt. 20/1000sf	8925	SF	\$9.50	\$84,787 ⁵⁰	\$ 9.50

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PROJECT NAME: Smith, Inc. PROJECT #: 609856SD DUE DATE: 5-15-08

E10		Equipment					
404	1090 410 0210	Res. Refrigerator 10/12 CF	1	EA	\$600	\$600	\$.07
346	11-31-13-13-1250	Res. microwave 600 watt	1	EA	\$300	\$300	\$.03
E20		Furnishings					
NA		NA - Not Applicable					
F10		Special Construction					
NA		NA - Not Applicable					
F20		Selective Building Demolition					
NA		NA - Not Applicable					
G10		Site Preparation					
NA		NA - Not Applicable					
G20		Site Improvements					
426	2020 2011520	Parking Lot 90 deg	82	EA	\$1,200	\$98,400	\$11.03
427	2030 120 1600	Side walk 4" thick, 4' wide	150	LF	\$20.7	\$3,105	\$.35
G30		Site Civil/Mech. Utilities					
NA		NA - Not Applicable					
G40		Site Electrical Utilities					
NA		NA - Not Applicable					
G50		Other Site Construction					
NA		NA - Not Applicable					

DATE: 5-1-08 Y

ESTIMATOR: MAA #3788

REQUESTED BY: TS #3615

PROJECT NAME: Smith, Inc. PROJECT #: 609856 SDDUE DATE: 5-15-08

Subtotal		<u>805,768.43</u>
State Sales Tax 6%		<u>24,173.05</u>
(figure half the const. costs will be Mtl)		
Building Subtotal		<u>892,941.48</u>
Other Construction Costs:		
<u>General Contractor Costs:</u>		
General Conditions	<u>8%</u>	<u>66,395.32</u>
Subtotal:		<u>896,336.80</u>
Overhead	<u>4%</u>	<u>35,853.47</u>
Subtotal:		<u>932,190.27</u>
Profit	<u>4%</u>	<u>37,287.61</u>
Subtotal:		<u>969,477.88</u>
Construction Cost Subtotal		<u>969,477.88</u>
Location Factor	<u>95% (-5%)</u>	<u>(-48,473.89)</u>
Location - <u>Lansing, MI</u>		
Adjusted Construction Cost Subtotal		<u>921,003.98</u>
<u>Contingency:</u>		
Estimate	<u>5%</u>	<u>46,050.20</u>
Subtotal:		<u>967,054.18</u>
Design	<u>5%</u>	<u>48,352.71</u>
Subtotal:		<u>1,015,406.89</u>
Estimated Construction Bid Amount		
Construction Contingency	<u>9%</u>	<u>91,386.62</u>
Total Construction Cost		<u>1,106,793.51</u>
<u>Additional Proj Cost/Allowances</u>		
Architectural Fee	<u>7%</u>	<u>77,475.55</u>
GRAND TOTAL PROJECT COST:		<u>1,184,269.06</u>
Cost per Sq.Ft.:		<u>\$ 132.69</u>

DATE: 5-1-08 5ESTIMATOR: MAA #3788 REQUESTED BY: TS #3615

GLOSSARY

Conceptual -- A process of assigning cost parameters to a project during the earliest phase of project design, prior to establishment of a defined scope or plan.

Conceptual Estimating – The skill of forecasting accurate costs without significant graphic design information (most/some-time none at all) about a project.

EPDM – A single ply roofing material manufactured of an elastomeric polymer synthesized from ethylene, propylene and a small amount of diene monomer.

EIFS -- Exterior Insulation and Finish Systems (“EIFS”) are a type of building product that provides exterior walls with an insulated finished surface, and waterproofing in an integrated composite material system.

REFERENCES

Municode.com

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BNi Building News, Public Works Cost Data, 16th, Edition

Manual of Steel Construction Allowable Stress Design, 9th Edition

Construction Dictionary, NAWIC version

Standard Handbook for Civil Engineers, 2nd Edition

Soils and Foundations, 2nd Edition

Fishbeck, Thompson, Carr & Huber, Inc., Mike Lake – Intern Architect

Fishbeck, Thompson, Carr & Huber, Inc., Matt Bramstedt – Intern Architect

Fishbeck, Thompson, Carr & Huber, Inc., Jeff Schumaker, P.E. – Senior Structural Engineer

Fishbeck, Thompson, Carr & Huber, Inc., Mark Zoeteman, P.E. LEED AP – Senior Mechanical Engineer

Fishbeck, Thompson, Carr & Huber, Inc., John Eberly III, P.E. – Senior Electrical Engineer

Unformat II Elements Classification for Building Specifications Cost Estimating, and Cost Analysis Study, U.S. Department of Commerce.

Construction Specification Institute (CSI) – WWW.csinet.org

NEXT MONTH:

The Appendix for

“HOW TO ESTIMATE THE COST OF AN OFFICE BUILDING USING THE SEVEN DIVISION OF THE UNIFORMAT II CLASSIFICATION SYSTEM”

By Mike Alsgaard

