



TECHNICAL ASSIGNMENT II

Cost and Methods Analysis

Steve J. Horna

Construction Management

Faculty: Dr. Messner

SHAARE TEFILA CONGREGATION

Olney, Montgomery County, Maryland

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EXECUTIVE SUMMARY

Technical assignment 2 is a cost and methods analysis of Shaare Tefila Congregation in Olney Maryland. The following pages discuss an in-depth **Detailed Project Schedule**, a **Site Layout Plan**, an **Assemblies Estimate**, a **Detailed Structural Systems Estimate**, and finally a **General Conditions Estimate**. The report also includes an appendix of estimate break-downs, large scale site layout plan, and a project schedule print-out.

The **Detailed Project Schedule** consists of 123 activities and is broken down into 5 different phase divisions. These are : preconstruction, sitework, structural, architectural, mechanical/electrical.

A **Site Layout Plan** is developed from the previous technical assignment 1 site layout. The drawing contains critical information including material layout, crane placement and temporary fencing.

The **Assemblies Estimate** is a take off and estimate for the curtain wall system. The costs associated for each material and component of the curtain wall system is accumulated based on technical data and reference.

In the **Detailed Structural Systems Estimate** the structural system for the building floors and roof are taken-off and estimated. Assumptions based on category and grouping we made in order to simplify numbers. These costs add up to \$1,185,081.

The **General Conditions Estimate** discusses the soft and indirect costs associated with Shaare Tefila Congregation. This estimate consists of staff, temporary utilities, office supplies, bonds and insurance, as well as additional costs. These costs add up to

DETAILED PROJECT SCHEDULE

The detailed schedule lists 123 activities in 5 phase divisions. These divisions include preconstruction, sitework, structural, architectural, and mechanical/electrical. For the purposes of this technical report the construction start date and end date have been assumed as November 26th 2007 and June 25th 2009. In reality site problems and site permits have postponed the demolition and construction for the foreseeable future. The schedule is represented with Primavera software, rather than Microsoft Project as in the last technical report. In later incarnations the schedule will be cost-loaded to reflect the real-time project costs and budget associated with construction.

SITE LAYOUT PLANNING

In technical assignment 1, the site of construction for Shaare Tefila Congregation was established with the combination of a vicinity map as well as a traffic and layout site plan (See Fig 1, 2)

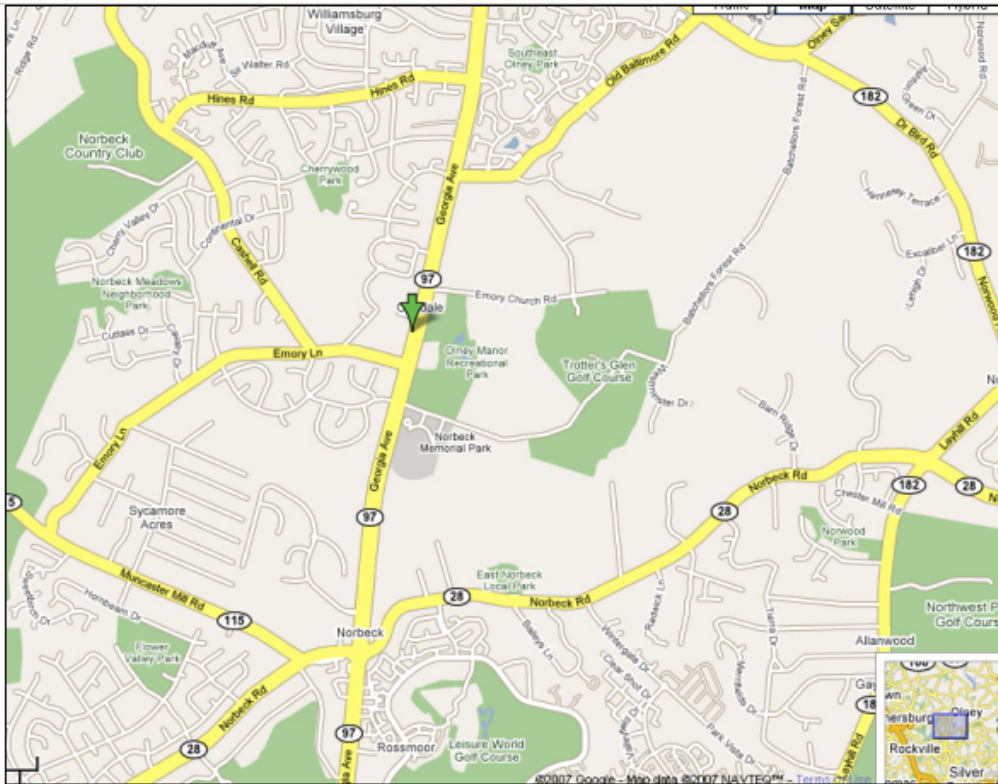


Figure 1. Vicinity Map

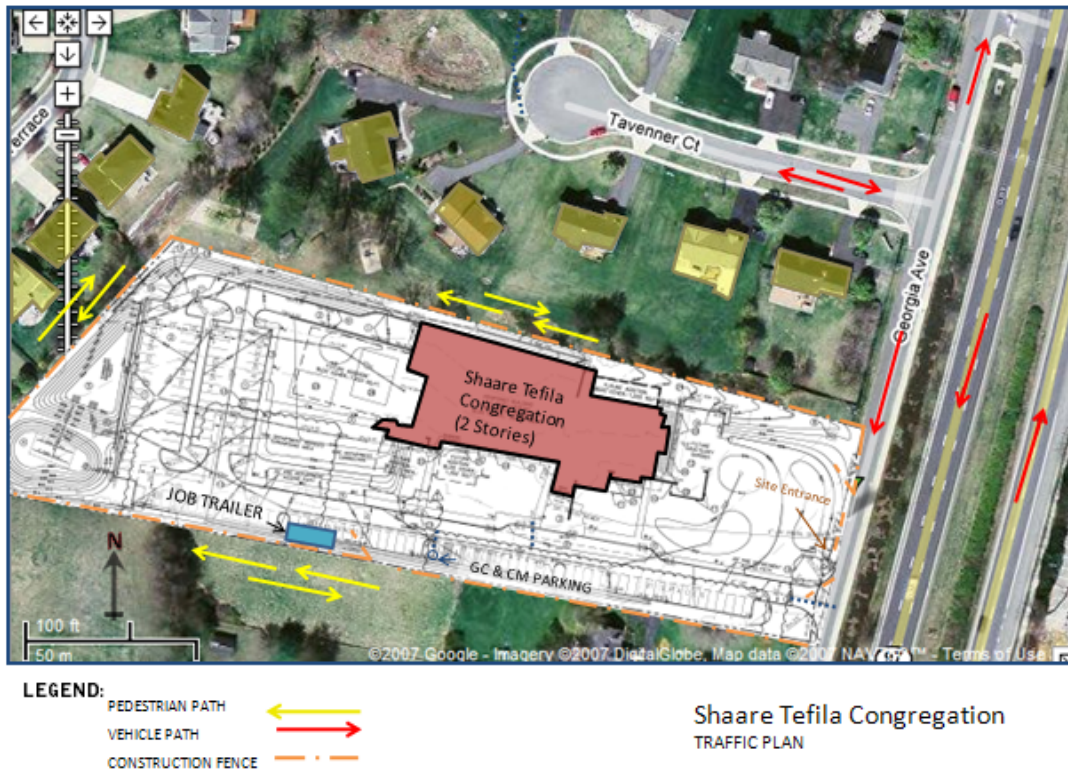


Figure 2. Site Layout plan

For the sitelayout plan I used Google Sketch-up 3-D rendering software to create an accurate model for Shaare Tefila Congregation. There is included an installed rough-grade temporary road connecting to the only Vehicle entrance at Georgia Ave. Material layout and mobile crane is on the east facing façade. The temporary fence is also up and labeled very clearly.

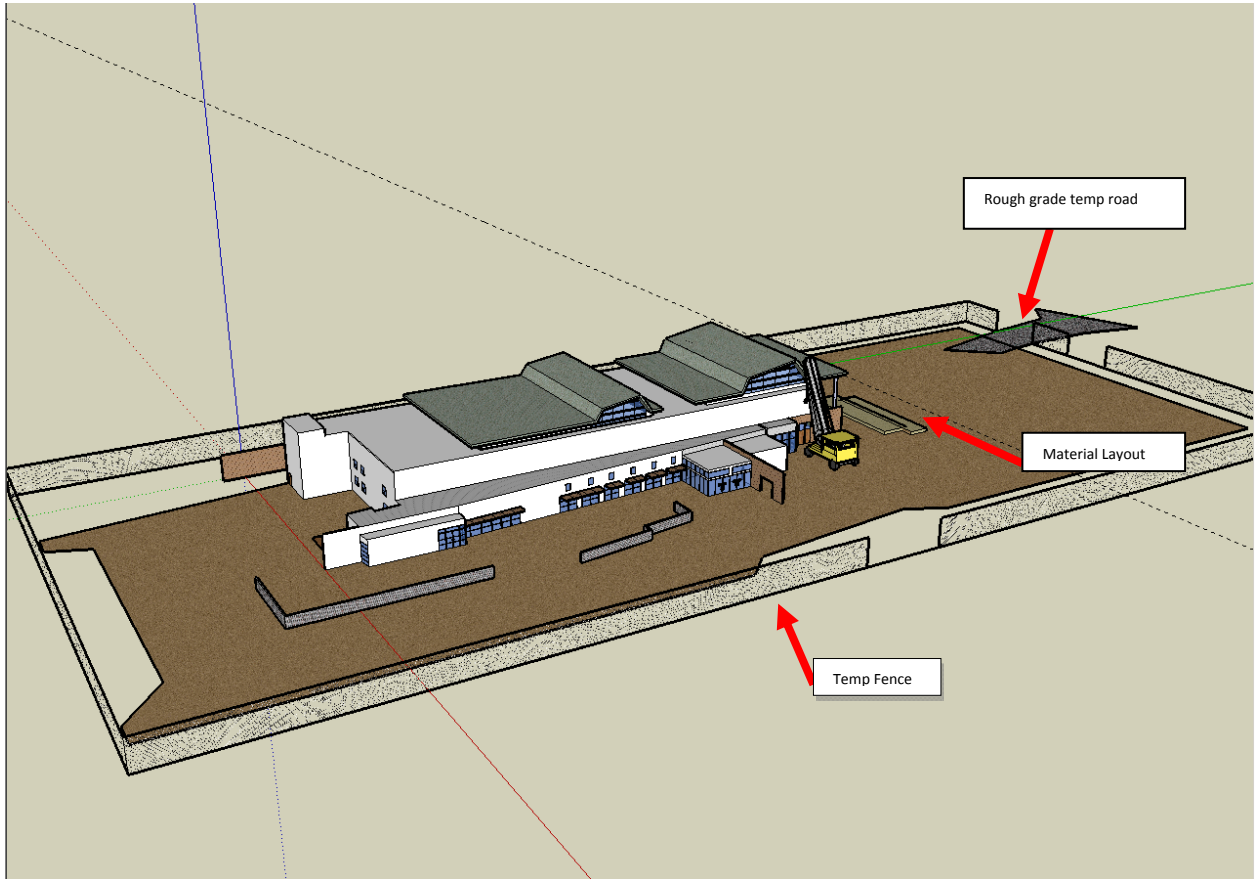


Figure 3: 3D Render Site Layout plan

ASSEMBLIES ESTIMATE

The additional building systems which is analyzed for cost and materials is the curtain wall system which are most predominant on the North and South facing façades, as well as the East facing glass wall. The curtain system is a free standing wall system composed architectural materials and is non-load bearing.

The curtain wall system for Shaare Tefila Congregation is composed of an aluminum storefront, aluminum window sills, glazing, aluminum metal composite panels, a sun control louver system and glass canopy.

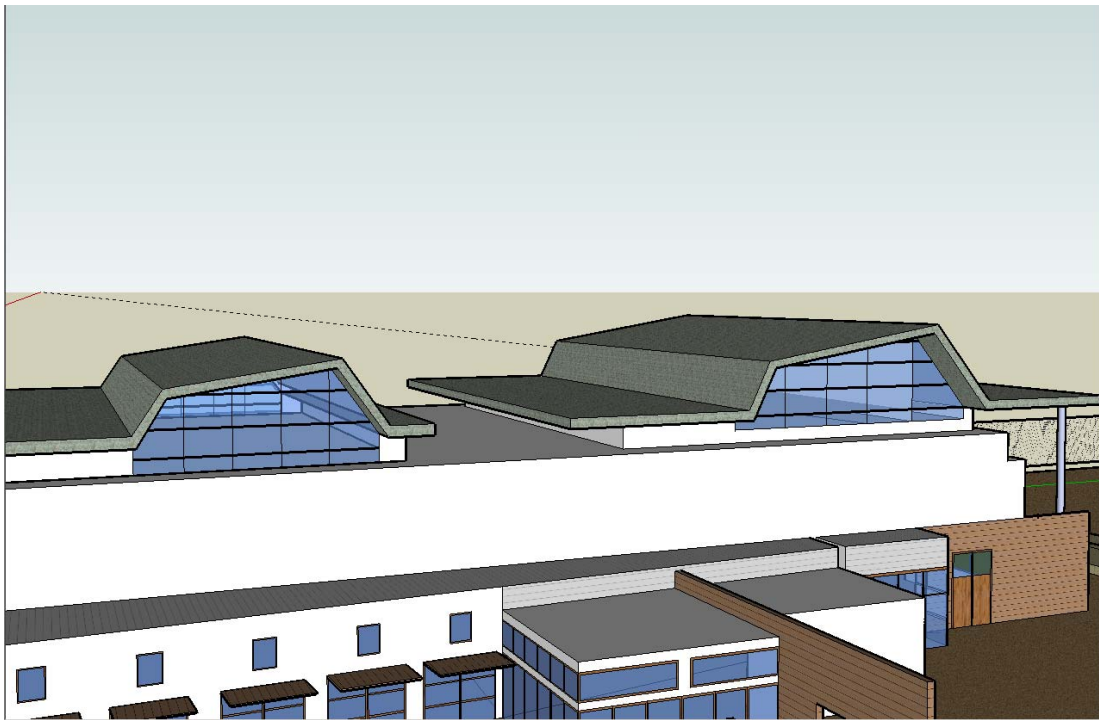


Figure 5. Curtain Wall System- roof



Figure 6. Curtain Wall Glass Wall

DETAILED STRUCTURAL SYSTEM ESTIMATE

The structural systems estimate for Shaare Tefila contains a take-off and estimate of the concrete system, structural masonry, and structural steel which composes the foundation, shell, and roof system of the entire building.

Data has been taken from R.S. Means Building Construction Cost Data for 2007. Although building data and information has been taken from the project drawings, the final numbers and estimated costs (including fees and factors) have been calculated with assumptions made by the student and do not necessarily reflect the final numbers for Shaare Tefila Congregation. See figure below for final figures.

Structural System Comparison		
Division	Item	Estimate
003	Concrete	\$247,351
004	Structural Masonry	\$174,730
005	Structural Steel	\$763,000
Total Structural System		\$1,185,081

Figure 4. Structural system cost comparison

GENERAL CONDITIONS ESTIMATE

The General Conditions (GC) estimate for Shaare Tefila Congregation reflects the indirect project costs including temporary utilities, temporary equipment, personnel, office supplies, quality control, insurance & bonding, fees and permitting. Home office overhead was not included into the estimate. Fees and unit costs are broken down monthly to reflect schedule changes on general costs. Temporary facilities include temporary fencing, lighting, roads, utilities, equipment and other costs.

Although building data and information has been taken from the project drawings, the final numbers and estimated costs (including fees and factors) have been calculated with assumptions made by the student and do not necessarily reflect the final numbers for Shaare Tefila Congregation.

General Conditions Estimate	
Description	Cost
Bonds/ Insurance	\$1,390,062
Staffing	\$24,240
Temp Utilities	\$4410/ mo
Office Support	\$1,784
Other	\$300



APENDIX A

Cost and Methods Analysis Supplement

Assemblies System Estimate	12
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ASSEMBLIES SYSTEM ESTIMATE

Glazing System - Scope of Work/Takeoff						
Item		Quantity	Units	Unit Price	Total	
Glazing System	SF / EA	QTY	Total SF			
A	316	1	316	SF	\$75	\$23,719
A3	390	1	390	SF	\$75	\$29,215
B	286	1	286	SF	\$75	\$21,481
C1	48	1	48	SF	\$75	\$3,624
C2	260	1	260	SF	\$75	\$19,478
C3	48	1	48	SF	\$75	\$3,627
D1	80	1	80	SF	\$75	\$6,036
E1	290	1	290	SF	\$75	\$21,727
E2	117	1	117	SF	\$75	\$8,754
E3	196	1	196	SF	\$75	\$14,719
E4	119	1	119	SF	\$75	\$8,923
E5	187	1	187	SF	\$75	\$14,018
E6	81	1	81	SF	\$75	\$6,049
E7	88	1	88	SF	\$75	\$6,637
F1	27	1	27	SF	\$75	\$1,991
F2	54	1	54	SF	\$75	\$4,052
F4	27	1	27	SF	\$75	\$2,034
F4	173	1	173	SF	\$75	\$12,957
W-01	20	7	140	SF	\$75	\$10,500
W-02	36	16	576	SF	\$75	\$43,200
W-06	148	1	148	SF	\$75	\$11,134
G	50	6	300	SF	\$75	\$22,488
H1	24	1	24	SF	\$75	\$1,783
H2	24	1	24	SF	\$75	\$1,783
H3	118	1	118	SF	\$75	\$8,820
H4	81	1	81	SF	\$75	\$6,057
H5	96	1	96	SF	\$75	\$7,166
K	88	1	88	SF	\$75	\$6,585
M	321	1	321	SF	\$75	\$24,068
N	321	1	321	SF	\$75	\$24,068
P	453	1	453	SF	\$75	\$33,953
Q	403	1	403	SF	\$75	\$30,231
SF1 - Doors	30x70/2	4	8	EA	\$500	\$4,000
	40x70/2	2	4	EA	\$500	\$2,000
AG - Doors	30x70/4	2	8	EA	\$500	

DETAILED STRUCTURAL SYSTEM ESTIMATE

Structural System Comparison		
Division	Item	Estimate
003	Concrete	\$247,351
004	Structural Masonry	\$174,730
005	Structural Steel	\$763,000
Total Structural System		\$1,185,081

Scope of Work/Takeoff					
Division	Item	Quantity	Units	Unit Price	Total
004	Spilt Face CMU- Veneer	2,892	SF	\$27	\$78,084
	Ground Face CMU-Veneer	3,400	SF	\$20	\$68,000
	Interior Wall- Type 7- 8" CMU	588	SF	\$22	\$12,936
	Site Wall- Note 11	480	SF	\$27	\$12,960
	Dumpsters	5	EA	\$550	\$2,750
	Total				

Scope of Work/Takeoff					
Division	Item	Quantity	Units	Unit Price	Total
003	Slab-on-grade - 4"	16,900	CY	\$71	\$14,814
	2nd Floor deck - 4-1/2"	24,300	CY	\$71	\$23,963
	Roof deck - 1-1/2"	18,000	CY	\$71	\$5,917
	Retaining wall A: cip concrete wall	132	CY	\$550	\$72,600
	Retaining wall C: cip concrete wall	74	CY	\$550	\$40,767
	Retaining wall D: cip concrete wall	71	CY	\$550	\$38,824
	Steel Reinforcement	6	Tons	\$700	\$26,750
	Footing for CMU wall	12	CY	\$350	\$4,096
	Formwork	1	CY	\$350	\$19,620
	Total				

Scope of Work/ Takeoff					
Division	Item	Quantity	Units	Unit Price	Total
005	Structural Steel- 170 tons	170	Tons	\$3,400	\$578,000
	Steel Joists- 17 tons	17	Tons	\$2,200	\$37,400
	Metal Deck: 2"- 210 SQ	210	SQ	\$300	\$63,000
	Metal Deck: 1-1/2"- 227 SQ	227	SQ	\$300	\$68,100
	Metal Deck: 3"- 55 SQ	55	SQ	\$300	\$16,500
	Total				

Structural Steel Takeoff

Division	Item	Length	Quantity	Unit	Unit Price	Total
005	Steel Column					
	W8 X 31	12	28.0	LF	24.04	\$8,077
	HSS6 X 6-1/4"	6	41.0	EA	226	\$55,596
	HSS12.25 X 0.25	6	72.0	EA	728	\$314,496
	W8 X 48	12	52.0	LF	35.68	\$22,264
	W10 X 68	12	40.0	LF	49.33	\$23,678
	HSS8 X 8 X 3/8"	0.5	60.0	LF	425.5	\$12,765
	HSS4.5 X 0.188	7	65.0	EA	157.5	\$71,663
	W14 X 74	12	60.0	LF	53.33	\$38,398
	Beams					
	W16 x 26	14	48	LF	20.78	\$13,964
	W18 x 40	18	65	LF	31.38	\$36,715
	W12 x 22	11	75	LF	18.53	\$15,287
	W18 x 40	8	55	LF	31.38	\$13,807
	W12 x 22	18	25	LF	18.53	\$8,339
	W8 x 21	8	56	LF	19.62	\$8,790
	W16 x 26	12	25	LF	20.78	\$6,234
	W14 x 22	14	29	LF	20.82	\$8,453
	W14 x 26	25	21	LF	20.82	\$10,931
	W10 x 22	12	35	LF	20.27	\$8,513
	W6 x 9	9	30	LF	11.52	\$3,110
	Joists					
	20K6	27	38	LF	5.86	\$6,012
	12K3	14	35	LF	5.49	\$2,690
	12K1	15	27	LF	5.49	\$2,223
	16K3	15	30	LF	5.29	\$2,381
	18K9	25	68	LF	6.84	\$11,628
	10K1	15	35	LF	5.88	\$3,087
	14K26	32	32	LF	5.63	\$5,765
	Subtotal					\$714,866
					x MD Factor (0.98) + 5 % waste factor	
Total						\$735,597

Concrete Takeoff

Division	Item	Length	Quantity	Unit	Unit Price	Total
003	Column Footings/ Grade Beams					
	2'0" x 12" x continuous	81	1.0	CY	\$69	\$1,242
	2'6" x 12" x continuous	135	1.0	CY	\$69	\$2,588
	3'0" x 12" x continuous	220	1.0	CY	\$69	\$5,060
	4'0" x 12" x continuous	18	1.0	CY	\$69	\$552
	4'6" x 12" x continuous	120	1.0	CY	\$69	\$4,140
	3'0" x 3'0" x 12"		11.0	EA	\$69	\$759
	4'0" x 4'0" x 12"		8.0	EA	\$69	\$981
	4'6" x 4'6" x 12"		3.0	EA	\$69	\$466
	5'0" x 5'0" x 12"		6.0	EA	\$69	\$1,150
	5'6" x 5'6" x 12"		4.0	EA	\$69	\$928
	6'0" x 6'0" x 12"		6.0	EA	\$69	\$1,656
	6'6" x 6'6" x 14"		6.0	EA	\$69	\$2,267
	7'0" x 7'0" x 14"		6.0	EA	\$69	\$2,200
	7'6" x 6'0" x 28"		2.0	EA	\$69	\$1,610
	8'0" x 7'0" x 28"		2.0	EA	\$69	\$2,004
	7'6" x 7'6" x 16"		6.0	EA	\$69	\$3,450
	8'0" x 8'0" x 16"		4.0	EA	\$69	\$2,617
	8'6" x 8'6" x 18"		2.0	EA	\$69	\$1,662
	9'6" x 9'6" x 20"		1.0	EA	\$69	\$1,153
	10'0" x 10'0" x 20"		1.0	EA	\$69	\$1,278
	Slab On Grade - 4"	16,900	1.0	CY	\$71	\$14,813
	Composite Floor Deck- 4-1/2"	24,300	1.0	CY	\$71	\$22,365
	Roof Deck - 1-1/2"	1,800	1.0	CY	\$71	\$592
	Concrete Pier					
	18" x 18"		6.0	EA	\$69	\$414.0
	12" x 12"		6.0	EA	\$69	\$414.0
	18" x 18"		2.0	EA	\$69	\$138.0
	22" x 22"		3.0	EA	\$69	\$207.0
	12" x 18"		7.0	EA	\$69	\$483.0
	11" x 18"		11.0	EA	\$69	\$759.0
	16" x 16"		11.0	EA	\$69	\$759.0

Concrete Takeoff (Continued)						
Division	Item	Dimensions	Quantity	Unit	Unit Price	Total
003	CIP Concrete Retaining Wall					
	Retaining wall A: cip concrete wall	132	1.0	CY	\$550	\$72,600
	Retaining wall C: cip concrete wall	74	1.0	CY	\$550	\$40,767
	Retaining wall D: cip concrete wall	71	1.0	CY	\$550	\$38,824
	CIP Formwork					
	Footing	18" x" 18"	72.0	SFA	3.4	\$2,203
	Columns	20" x 12"	15.0	SFA	10	\$3,000
	Composite Floor Deck- 4-1/2"	24,300	1.0	SFA	3.78	\$1,176
	Roof Deck - 1-1/2"	1,800	1.0	SFA	3.78	\$392
	Slab on Grade - 4"	16,900	1.0	SFA	4.56	\$788
	Beams and Girders	24" x 12"	68.0	SFA	6.1	\$16,592
	Subtotal					\$255,049
						x MD factor(0.97)
						+ 5% waste factor
	Total					\$247,351

GENERAL CONDITIONS ESTIMATE

General Conditions Estimate	
Description	Cost
Bonds/ Insurance	\$1,390,062
Staffing	\$24,240
Temp Utilities	\$4410/ mo
Office Support	\$1,784
Other	\$300

Bonds/ Insurance	
Description	Cost Associated
Design Team Fees	\$0
Builder's Risk Insurance	\$20,292
Subcontractor's Bond	\$0
Payment & Performance Bond	\$80,460
General Contractor Insurances	\$0
Owner's Contingency	\$586,050
Gross Receipts Taxes	\$0
Escalation/ GC Contingency	\$234,420
Overhead & Profit	\$468,840
Total	\$1,390,062

Project Staffing	
Description	Cost Associated
Layout Engineer	\$4,340
Field Personnel, P M	\$7,100
Field Personnel, A P M	\$6,200
Field Personnel, Super	\$6,600
Total	\$24,240

Temporary Utilities			
Description	Fee	Units	Monthly
Temp Protection	0.53	SF	\$1,899
Temp Fencing	8.03	LF	\$368
Temp Utilities	48	CSF	\$1,218
Temp Toilets	110	Ea	\$550
Dumpster Rental	14.75	CSF	\$264
Continuous Cleanup	31	MSF	\$111
Total		\$4,410	/mo

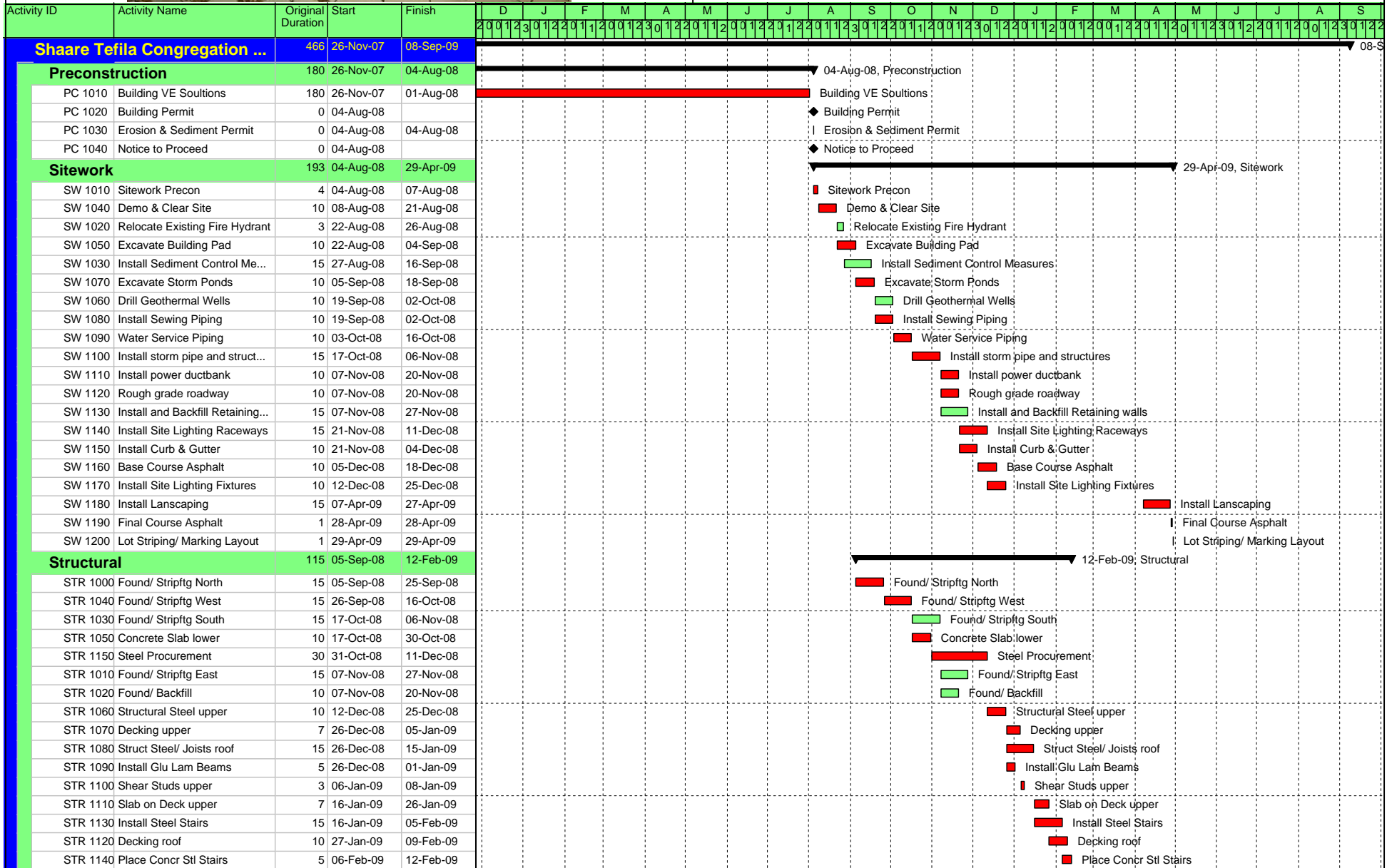
Office Support	
Description	
Office Trailer	\$265
Field Office Expenses	\$565
Project Signs	\$825
Final Cleanup	\$129
Total	\$1,784

Other Costs			
Description	Fee	Units	Monthly
Persn Protect Equip	50	Ea	\$100
General Hand Toons	60	Ea	\$200
Total			\$300



Shaare Tefila Congregation

Olney, Montgomery County, MD





Shaare Tefila Congregation

Olney, Montgomery County, MD

Activity ID	Activity Name	Original Duration	Start	Finish	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	
A.I 14	Finish Paint upper	10	26-Jun-09	09-Jul-09																							
A.I 13	Prime & Point lower	10	10-Jul-09	23-Jul-09																							
A.I 14	Casework/ Millwork upper	7	10-Jul-09	20-Jul-09																							
A.I 14	Flooring upper	10	21-Jul-09	03-Aug-09																							
A.I 13	Casework/ Millwork lower	7	24-Jul-09	03-Aug-09																							
A.I 13	Flooring lower	10	04-Aug-09	17-Aug-09																							
A.I 14	Toilet access/part upper	5	04-Aug-09	10-Aug-09																							
A.I 15	Final Inspections	10	11-Aug-09	24-Aug-09																							
A.I 13	Toilet access/partit lower	5	18-Aug-09	24-Aug-09																							
A.I 15	Tack, Mrkerbrds etc	5	25-Aug-09	31-Aug-09																							
A.I 15	Punchlist	10	25-Aug-09	07-Sep-09																							
A.I 15	Substantial Completion	0	08-Sep-09																								
A.I 15	Occupancy	0	08-Sep-09																								
Mech/ Electr		195	26-Sep-08	25-Jun-09																							
ME 1540	Elevator Jack Hole	5	26-Sep-08*	02-Oct-08																							
ME 1550	Under Slab Piping	15	03-Oct-08*	23-Oct-08																							
ME 1570	Install Rooftop Equip	5	24-Oct-08*	30-Oct-08																							
ME 1590	Piping Rooftop Equipment	15	31-Oct-08*	20-Nov-08																							
ME 1600	Install AHU's/ Pump lower	15	19-Nov-08*	09-Dec-08																							
ME 1680	Install Elevator System	20	19-Nov-08*	16-Dec-08																							
ME 1640	Rough-in Electric Room lower	20	21-Nov-08*	18-Dec-08																							
ME 1560	Ductwork Rough-in lower	20	09-Jan-09*	05-Feb-09																							
ME 1650	Piping AHU pumps lower	20	09-Jan-09*	05-Feb-09																							
ME 1670	Water Meter inspection	0	09-Jan-09*	09-Jan-09																							
ME 1690	Building Conditioned Air	0	09-Jan-09*																								
ME 1700	Elevator Inspected & Operat...	0	16-Jan-09*	16-Jan-09																							
ME 1580	Above Ceiling Piping lower	20	06-Feb-09*	05-Mar-09																							
ME 1610	Ductwork Rough-in upper	20	06-Feb-09*	05-Mar-09																							
ME 1620	Wall Rough-in lower	20	06-Mar-09*	02-Apr-09																							
ME 1630	Above Ceiling piping upper	20	06-Mar-09*	02-Apr-09																							
ME 1660	Wall Rough-in upper	20	03-Apr-09*	30-Apr-09																							
ME 1710	Lighting Fixtures lower	15	03-Apr-09*	23-Apr-09																							
ME 1740	Toilet Fixtures/ Casework lo...	10	24-Apr-09*	07-May-09																							
ME 1720	Lighting Fixtures upper	15	01-May-09*	21-May-09																							
ME 1730	Electrical Trim-out lower	10	08-May-09*	21-May-09																							
ME 1750	Toilet Fixtures upper	10	22-May-09*	04-Jun-09																							
ME 1760	Electrical Trim-out upper	10	05-Jun-09*	18-Jun-09																							
ME 1770	Install Kitch Fixt/ Equip Dairy	7	05-Jun-09*	15-Jun-09																							
ME 1780	Install Kitch Fixt/ Equip Meat	8	16-Jun-09*	25-Jun-09																							

