sol agua terra
holistic architecture

Indoor Air + Environmental Quality

A Presentation for
2009 NFM&T Conference

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Welcome

sol agua terra offers a full range of professional services to meet your architectural needs...

- *Architectural Design & Consulting*
- *LEED Process Management & Sustainability Consulting*
- *Feasibility Studies*
- *Architectural Renderings & 3D Visualization*
- *ADA Consulting*
- *Agency Representation*

sol agua terra is a woman-owned, small, disadvantaged business enterprise.

sol agua terra

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Welcome

sol agua terra serves the community and the profession through active service and continuing education...

- *American Institute of Architects*
- *LEED™ Accredited Professional*
- *Western Maryland Branch of the Baltimore Chapter of the USGBC*
- *International Code Council Accessibility Inspector / Plans Examiner*
- *Frederick County Affordable Housing Council*

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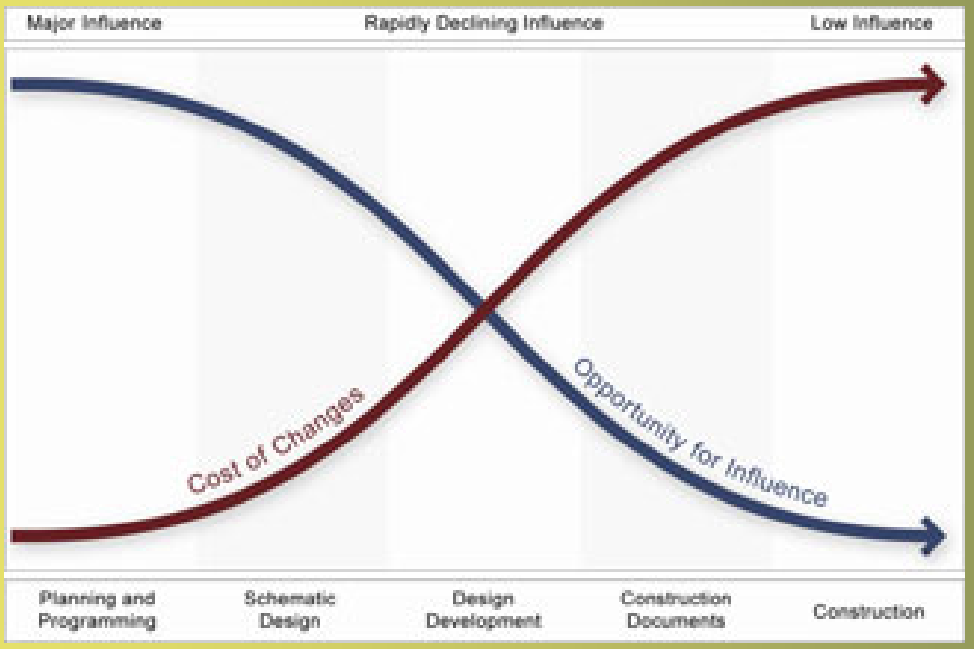
Design Process

- Development Team
  - Responsibility for Input
  - Project Goals
    - Priorities
    - Constraints



Graphic source:
Whole Building Design Guide

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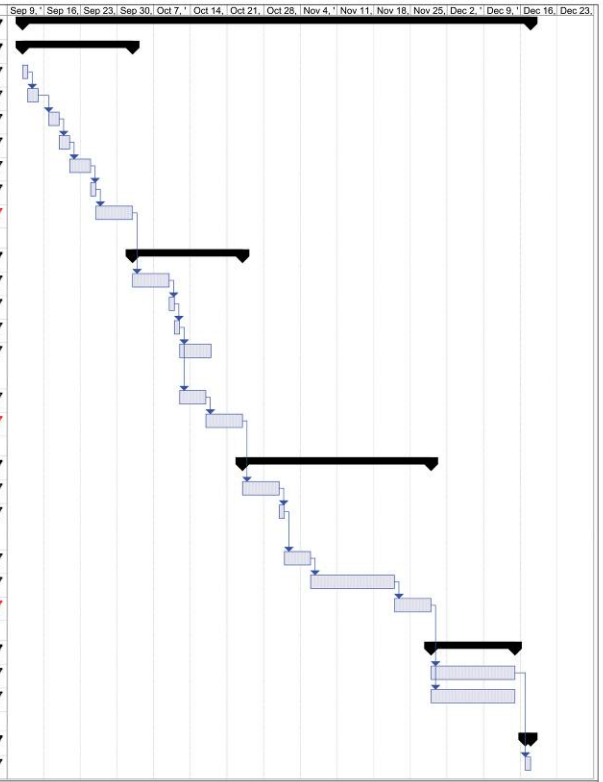
Project Timeline

- Facility Manager's role at Design Milestones

ID	Task Name	Duration	Start	Finish
1	**Overall Schedule**	**69 days**	**Wed 9/12/07**	**Mon 12/17/07**
2	**Programming/Concept Phase**	**15 days**	**Wed 9/12/07**	**Tue 10/2/07**
3	Kick off meeting	1 day	Wed 9/12/07	Wed 9/12/07
4	Interview of 8 tenants	2 days	Thu 9/13/07	Fri 9/14/07
5	Tour existing tenant facilities	2 days	Mon 9/17/07	Tue 9/18/07
6	Analyze gathered information	2 days	Wed 9/19/07	Thu 9/20/07
7	Compile written report for space requirements	2 days	Fri 9/21/07	Mon 9/24/07
8	Present written program	1 day	Tue 9/25/07	Tue 9/25/07
9	Client review	1 wk	Wed 9/26/07	Tue 10/2/07
10				
11	**Blocking/Schematic Design Phase**	**15 days**	**Wed 10/3/07**	**Tue 10/23/07**
12	Prepare block diagram indicating adjacencies	5 days	Wed 10/3/07	Tue 10/9/07
13	Review blocking plan with Tenants	1 day	Wed 10/10/07	Wed 10/10/07
14	Revise blocking plan per review comments	1 day	Thu 10/11/07	Thu 10/11/07
15	Based on approved blocking plan prepare schematic plans	4 days	Fri 10/12/07	Wed 10/17/07
16	Prepare schematic finish plans	3 days	Fri 10/12/07	Tue 10/16/07
17	Client review	1 wk	Wed 10/17/07	Tue 10/23/07
18				
19	**Design Development Design Phase**	**26 days**	**Wed 10/24/07**	**Wed 11/28/07**
20	Prepare design development documents	5 days	Wed 10/24/07	Tue 10/30/07
21	Meet with Tenants at 35% complete for progress review	1 day	Wed 10/31/07	Wed 10/31/07
22	Finalize design development documents	3 days	Thu 11/1/07	Mon 11/5/07
23	Prepare draft specifications	12 days	Tue 11/6/07	Wed 11/21/07
24	Client review	1 wk	Thu 11/22/07	Wed 11/28/07
25				
26	**Construction Document Phase**	**12 days**	**Thu 11/29/07**	**Fri 12/14/07**
27	Prepare cd's based on approved dd document	12 days	Thu 11/29/07	Fri 12/14/07
28	Prepare specifications	12 days	Thu 11/29/07	Fri 12/14/07
29				
30	**Permitting**	**1 day**	**Mon 12/17/07**	**Mon 12/17/07**
31	Submit documents for permit	1 day	Mon 12/17/07	Mon 12/17/07



Project: Tenant Fit-up
Date: Septeber 12, 2007

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

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Specifications / Preferred Purchasing

- Incorporation at early design phase
- BuildingGreen.com / GreenSpecs
  - search by LEED Credit categories
- Green Seal
  - Paints & Coatings – GS-11
  - Floor Care – GS-40
  - Cleaning Products – GS-37
- Carpet & Rug Institute
- Availability / Vendor contracts
- Industry Best Practices

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LEED™ Credit Categories (NC)

Indoor Environmental Quality		15 Points
Prereq 1	**Minimum IAQ Performance**	Required
Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required
Credit 1	**Outdoor Air Delivery Monitoring**	1
Credit 2	**Increased Ventilation**	1
Credit 3.1	**Construction IAQ Management Plan**, During Construction	1
Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1
Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1
Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1
Credit 4.3	**Low-Emitting Materials**, Carpet Systems	1
Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1
Credit 5	**Indoor Chemical & Pollutant Source Control**	1
Credit 6.1	**Controllability of Systems**, Lighting	1
Credit 6.2	**Controllability of Systems**, Thermal Comfort	1
Credit 7.1	**Thermal Comfort**, Design	1
Credit 7.2	**Thermal Comfort**, Verification	1
Credit 8.1	**Daylight & Views**, Daylight 75% of Spaces	1
Credit 8.2	**Daylight & Views**, Views for 90% of Spaces	1

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LEED™ Credit Categories (EB)

Indoor Environmental Quality		19 Points
Prereq 1	**Outdoor Air Introduction and Exhaust Systems**	Required
Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
Prereq 3	**Green Cleaning Policy**	Required
Credit 1.1	**IAQ Best Management Practices -** IAQ Management Program	1
Credit 1.2	**IAQ Best Management Practices -** Outdoor Air Delivery Monitoring	1
Credit 1.3	**IAQ Best Management Practices -** Increased Ventilation	1
Credit 1.4	**IAQ Best Management Practices -** Reduce Particulates in Air Distribution	1
Credit 1.5	**IAQ Best Management Practices -** IAQ Management for Facility Alterations and Additions	1
Credit 2.1	**Occupant Comfort -** Occupant Survey	1
Credit 2.2	**Occupant Comfort -** Occupant Controlled Lighting	1
Credit 2.3	**Occupant Comfort -** Thermal Comfort Monitoring	1
Credit 2.4	**Occupant Comfort -** Daylight and Views, 50% Daylight / 45% Views	1
Credit 2.5	**Occupant Comfort -** Daylight and Views, 75% Daylight / 90% Views	1
Credit 3.1	**Green Cleaning -** High Performance Cleaning Program	1
Credit 3.2	**Green Cleaning -** Custodial Effectiveness Assessment, < 3	1
Credit 3.3	**Green Cleaning -** Custodial Effectiveness Assessment, < 2	1
Credit 3.4	**Green Cleaning -** Sustainable Cleaning Products and Materials, 30%	1
Credit 3.5	**Green Cleaning -** Sustainable Cleaning Products and Materials, 60%	1
Credit 3.6	**GreenCleaning -** Sustainable Cleaning Products and Materials, 90%	1
Credit 3.7	**Green Cleaning -** Sustainable Cleaning Equipment	1
Credit 3.8	**Green Cleaning -** Entryway Systems	1
Credit 3.9	**Green Cleaning -** Indoor Integrated Pest Management	1

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Project – Elementary School

- Site Design contributed to water infiltration / mold
  - Teacher illnesses
  - Student absences
  - Demolition of entire classroom wing

- District policies prohibiting skylights
  - Maintenance
  - Reliance on electric light

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Project – Commercial Office

- Natural light to building interiors
- Preserve views to scenic parkway

- Transoms
- Borrowed lites
- Glazed doors

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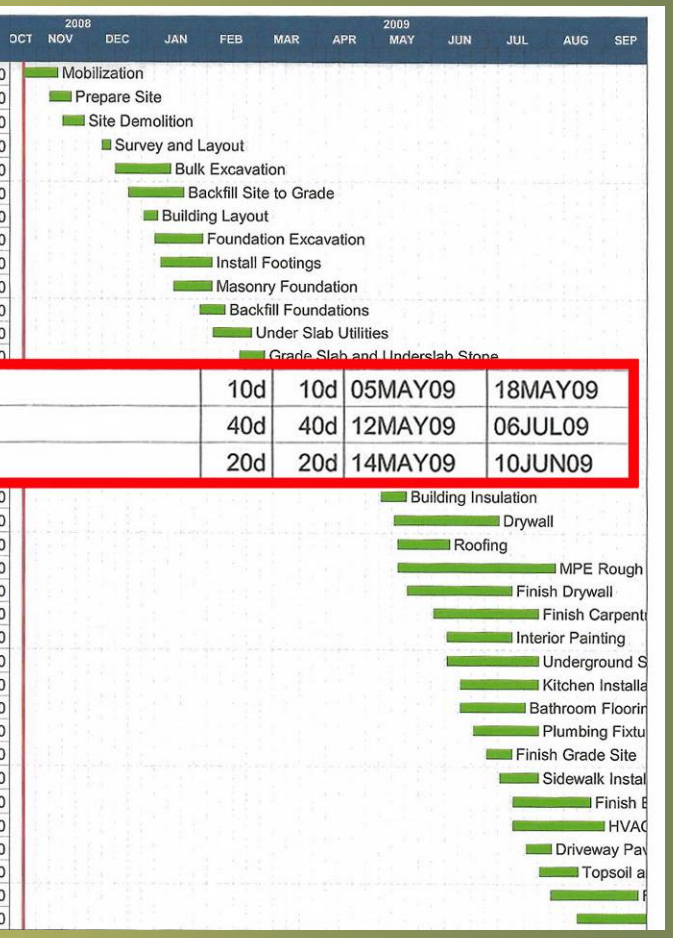
Project – New Construction

- Review construction schedule
- Building must be ‘dried-in’ prior to installation of absorbent materials

Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	Total Float	%
1000	Mobilization	15d	15d	27OCT08	14NOV08	1d	0
1010	Prepare Site	10d	10d	10NOV08	21NOV08	1d	0
1020	Site Demolition	10d	10d	17NOV08	28NOV08	1d	0
1030	Survey and Layout	5d	5d	08DEC08	12DEC08	1d	0
1040	Bulk Excavation	20d	20d	15DEC08	13JAN09	1d	0
1050	Backfill Site to Grade	20d	20d	22DEC08	20JAN09	1d	0
1060	Building Layout	5d	5d	30DEC08	06JAN09	1d	0
1070	Foundation Excavation	20d	20d	05JAN09	30JAN09	1d	0
1080	Install Footings	20d	20d	08JAN09	04FEB09	1d	0
1090	Masonry Foundation	15d	15d	15JAN09	04FEB09	1d	0
1100	Backfill Foundations	10d	10d	29JAN09	11FEB09	1d	0
1110	Under Slab Utilities	15d	15d	05FEB09	25FEB09	1d	0
1120	Grade Slab and Underslab Stone	10d	10d	19FEB09	04MAR09	1d	0
1130	Form and Pour Slab on Grade						
1140	Rough Frame Building						
1170	Window Installation						
1190	Exterior Door Installation						
1180	Exterior Plaster						
1200	Building Insulation	10d	10d	05MAY09	18MAY09	1d	0
1210	Drywall	40d	40d	12MAY09	06JUL09	1d	0
1150	Roofing	20d	20d	14MAY09	10JUN09	62d	0
1160	MPE Rough Ins	60d	60d	14MAY09	05AUG09	62d	0
1220	Finish Drywall	40d	40d	19MAY09	13JUL09	1d	0
1230	Finish Carpentry Work	40d	40d	02JUN09	27JUL09	1d	0
1240	Interior Painting	25d	25d	09JUN09	13JUL09	1d	0
1320	Underground Site Utilities	35d	35d	09JUN09	27JUL09	54d	0
1250	Kitchen Installation	30d	30d	16JUN09	27JUL09	69d	0
1260	Bathroom Flooring	25d	25d	16JUN09	20JUL09	69d	0
1270	Plumbing Fixture Install	25d	25d	23JUN09	27JUL09	69d	0
1330	Finish Grade Site	10d	10d	30JUN09	13JUL09	54d	0
1340	Sidewalk Install	15d	15d	07JUL09	27JUL09	54d	0
1280	Finish Electrical Work	30d	30d	14JUL09	24AUG09	49d	0
1290	HVAC Equipment Finish	35d	35d	14JUL09	31AUG09	1d	0
1350	Driveway Pavers	10d	10d	21JUL09	03AUG09	54d	0
1360	Topsoil and Landscaping	15d	15d	28JUL09	17AUG09	54d	0
1300	Finish Flooring	35d	35d	03AUG09	18SEP09	1d	0
1310	Painting Finish	35d	35d	17AUG09	02OCT09	1d	0

1200	Building Insulation	10d	10d	05MAY09	18MAY09
1210	Drywall	40d	40d	12MAY09	06JUL09
1150	Roofing	20d	20d	14MAY09	10JUN09



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Challenges + Opportunities

TABLE 1004.1.1
MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	FLOOR AREA IN SQ. FT. PER OCCUPANT
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Assembly with fixed seats	See Section 1004.7
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	100 gross
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
H-5 Fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mercantile	
Areas on other floors	60 gross
Basement and grade floor areas	30 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks, swimming pools	
Rink and pool	50 gross
Decks	15 gross
Stages and platforms	15 net
Warehouses	500 gross

- Communication / Policies
- Occupant Load / Occupant's in use
- Size – automatic vs. manual controls
- Location – appropriate analysis
- Scope – new construction vs. existing
- Ownership
- Installation oversight

Graphic Source: ICC 2006 IBC

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