

AIRPORT TERMINAL

EASTERN

UNITED STATES



GENERAL

- MIXED USE BUILDING
 - OFFICE SPACE
 - SECURITY CHECKPOINT
 - BAGGAGE HANDLING
- 4 STORIES
- 250,000 SQUARE FEET
- 185 MILLION DOLLARS
- 300' LONG Poured TERRAZZO CURVED CORRIDOR TO CORRECT ELEVATION DIFFERENCES BETWEEN ADJOINING BUILDINGS

ARCHITECT AND PROJECT TEAM

- DDI ARCHITECTS / ODELL ASSOCIATES
- DEPARTMENT OF AVIATION
- GILBANE / MCKISSACK
- ERNEST BOCK AND SONS
- KBR, BNP RALPH TYLER, URBAN ENGINEERING, AND BRINJAC

STRUCTURAL SYSTEM AND ENVELOPE

- STEEL COLUMNS AND TRUSSES
- EXISTING CAST-IN-PLACE COLUMNS
- 6" Poured SLAB ON DECK
- CURTAIN WALL
 - GLASS
 - METAL PANELS
- MASONRY 1ST FLOOR
- PARADIENE 30 CR FR ROOFING WITH AN SRI OF 87%

MECHANICAL AND ELECTRICAL

- REMOTE THERMAL PLANT
 - CHILLERS
 - BOILERS
- CRAC UNITS
- NORMAL POWER
 - 480/277, 3 ϕ , 4 WIRE AND GROUND
- UPS, CPS, AND BLUE BUSS EMERGENCY POWER
- FIVE HYDRAULIC ELEVATORS

SUSTAINABILITY

- INTERIOR 3RD FLOOR LEED[®] CERTIFICATION

CONSTRUCTION MANAGEMENT OPTION

<http://www.engr.psu.edu/ae/thesis/portfolios/2009/pdy103/index.html>

PAUL YINGLING

Building Systems Summary

Yes	No	Work Scope	If yes, address these questions / issues
X		Demolition Required?	<ul style="list-style-type: none"> Remove existing pipe columns and concrete grade beams Remove existing lighting standard, support pier and footing Remove and salvage existing wall mounted light fixtures & conduit Demolish entire existing concrete stairwell assembly Demolish existing loading dock in its entirety including but not limited to: bollards, bumpers, lighting retaining walls, dock levers & all below grade foundations Remove and salvage existing glazing Demolish temporary egress corridor structure Demolish existing exit doors and all associated signage
X		Structural Steel Framing	<ul style="list-style-type: none"> A Combination of trusses and columns 8 ton crane for steel erection
X		Cast in Place Concrete	<ul style="list-style-type: none"> Plywood and Metal Forming Steel reinforce Grade 60 Plain-Steel Wire: ASTM A 82, galvanized
	X	Precast Concrete	
X		Mechanical System	<ul style="list-style-type: none"> Remote Thermal Plant
X		Electrical System	<ul style="list-style-type: none"> 480/277 3ϕ 3200A UPS backup CPS backup Blue Buss backup
X		Masonry	<ul style="list-style-type: none"> Stone Veneer Non load bearing Walk through masonry scaffold Vertical Support #6 @ 24"
X		Curtain Wall	<ul style="list-style-type: none"> Stick built Fire rated Insulated
	X	Support of Excavation	<ul style="list-style-type: none"> Existing conditions

Project Cost Evaluation

Report the actual building Construction Cost (CC) and CC / SF. Do not include land costs, sitework, permitting etc.

The construction cost is \$80 million

The construction cost per square foot is \$325

Report the Total project Costs (TC) and TC

The total cost is \$185 million

The total cost per square foot is \$740

Report the major Building Systems Costs and Cost / SF (May place and emphasis on option). This should include as a minimum the mechanical system, electrical system, and structural system.

System	Cost
Electrical	\$14000000
Mechanical	\$9000000
Plumbing	\$3000000
Baggage Claim Equipment	\$25000000
Satellite Thermal Plant	\$6000000
Total:	\$57 million

Produce a parametric estimate for your building using D4 Cost 2002 Estimating software

Specific Building information is provided in Appendix A.

	Cost
Building 1	\$16994389
Building 2	\$41432016
Building 3	\$34510200
Building 4	\$21334808
Building 5	\$55766441
Average:	\$34007570
SQFT Average:	\$136

Produce a Square Foot estimate for your building using R.S. Means data, and attach a reference from the source you use for cost information. Include your assumptions and any revisions to the standard square foot data.

Specific citations of the Means catalog are provided in Appendix B.

Airport terminals are not included in this catalog. To approximate the value I used a Hospital. MEP variations in the buildings are, in my opinion, corrected by the equally complicated baggage handling and security provisions of an airport.

The value I determined to be the closest is \$230 per sqft, which still falls well below the actual cost of \$740 per sqft.

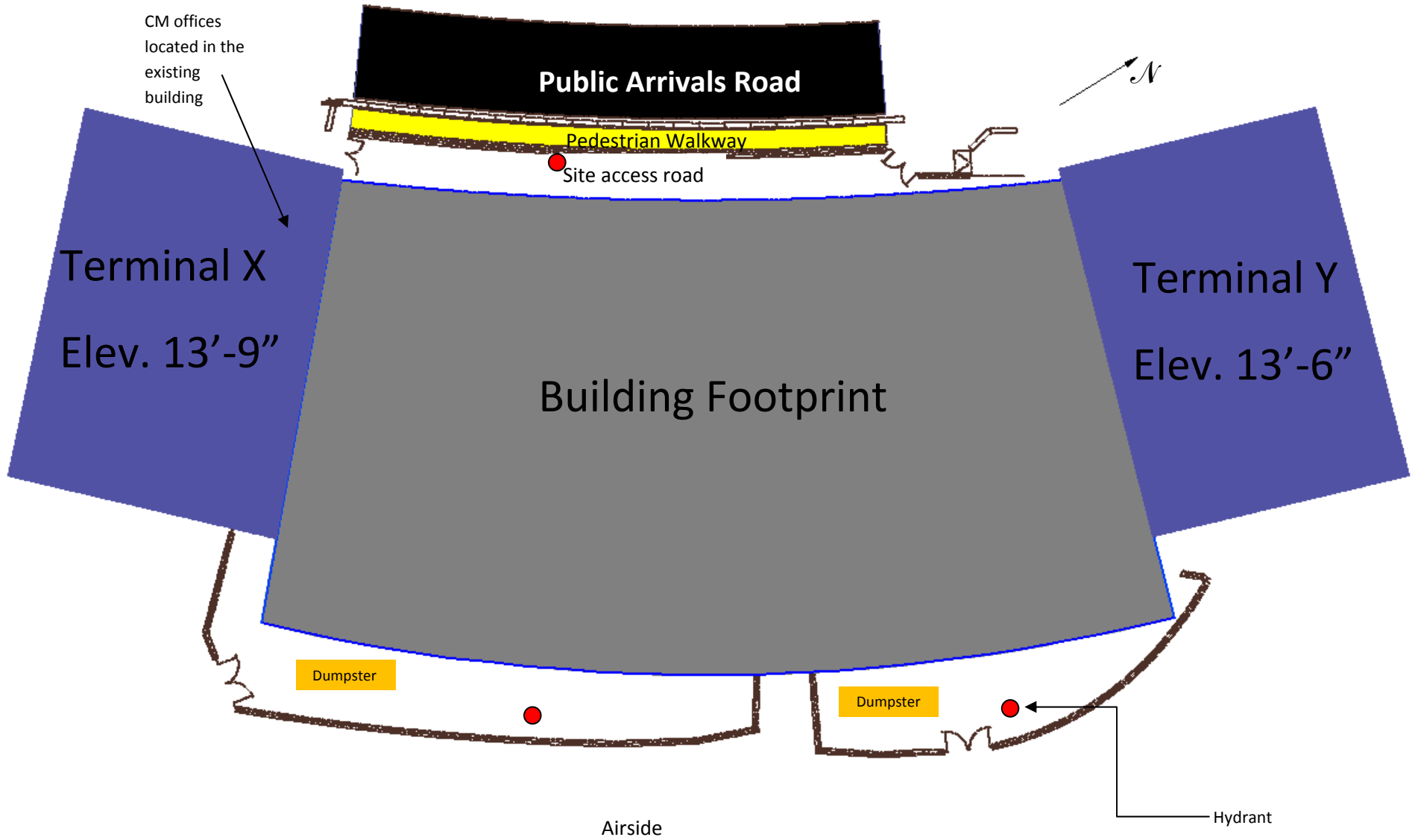
Briefly compare and discuss the differences between your estimates and the actual project costs.

D4 provides limited information on airports, and Means provides no such information. The five similar buildings in D4 incorporate parking garages, which do not constitute an actual building. Means comparison of a hospital fails to identify the security after 9/11. The building is equipped with three rather large and expensive CTX machines to ensure security.

Site Plan of Existing Conditions

Landside

- NOTE:
 - Site parking, short-haul, lay down area, and general contractor's offices are located offsite.



CM offices
located in the
existing
building

Terminal X
Elev. 13'-9"

Building Footprint

Public Arrivals Road

Pedestrian Walkway

Site access road

Terminal Y
Elev. 13'-6"

Dumpster

Dumpster

Airside

Hydrant

Local Conditions

List any preferred methods of construction in the region, availability for construction parking, available recycling and tipping fees, and type of soil/subsurface water conditions.

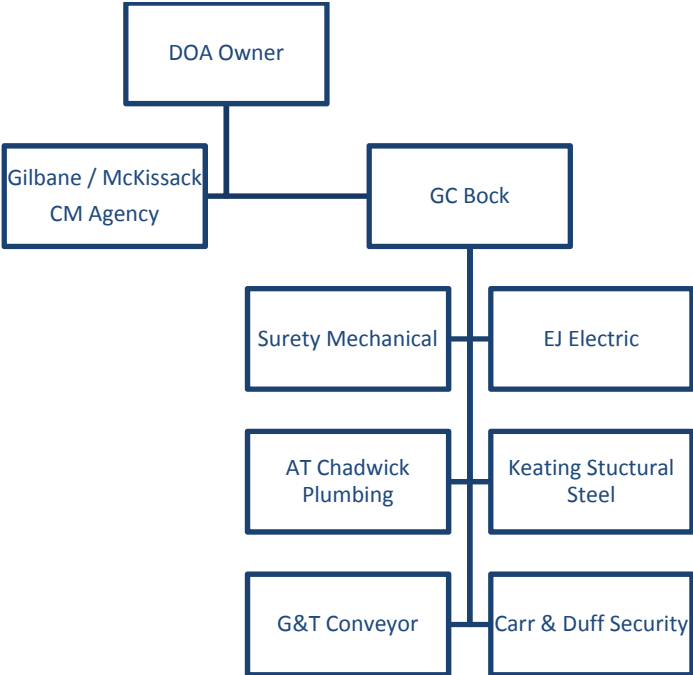
As a major city goes, there are various preferred methods of construction. However, to become more energy compliant and LEED certified the building are primarily non-load bearing glass curtain walls. To achieve LEED certification an attempt is to supply material that is located and manufactured within 500 miles of the site. Construction parking is located approximately two miles from the site and the workers are bused in similarly to all airport staff. The common tipping fee is \$500, and the current recycling techniques only are provided for metals. The unfortunate part is that the site, shown above, does not allow for more than two dumpsters at a time. The soil report is presented in Appendix C.

Client Information

Describe the owner of the project. Why are they building this facility e.g. mission critical growth, relocation, etc.? What are the cost, quality, schedule and safety expectations for the project? Identify examples of their actions to support descriptions. What sequencing issues are of interest to the owner? Are there any joint, dual, or phased occupancy requirements? What are the keys to completing the project to owner's satisfaction?

The Department of Aviation is the owner. The mission was to rehabilitate one of the top airports in the country. Safety expectation is the primary goal of Gilbane, however, this is not enforced due to the CM Agency does not own the contracts. The goal is to have the security check point opened by November 11, 2008 to accommodate Thanksgiving travel. However, the original contract plans to open the building early next year.

Project Delivery System – All Lump Sum and Illustration of 6 Primes



The project delivery system is typical of public work projects. Multiple Primes with an overseeing CM Agency to comply with Pennsylvania law. The typical contractor is selected by the lowest bid, that is, if anyone else bids, which was not the case with the GC selection. Bonds and insurance are required on bid day, however kept private. The appropriateness of the contract is void for analysis, since it is a public project.

Statement of Probable Cost

Yingling Thesis - May 1995 - NV - Las Vegas

Prepared By: JMA Architectural Studios 4292 S. Maryland Pkwy. Las Vegas, NV 89119 Fax: Building Sq. Size: 250000 Bid Date: 5/1/1995 No. of floors: 4 No. of buildings: 1 Project Height: 44 1st Floor Height: 20 1st Floor Size: 17200	Prepared For: , Fax: Site Sq. Size: 479160 Building use: Civic/Gov. Foundation: CON Exterior Walls: PEB Interior Walls: MSD Roof Type: BUP Floor Type: CAR Project Type: NEW
---	--

Division	Percent	Sq. Cost	Amount
00	Bidding Requirements	0.00	0.00
	Bidding Requirements	0.00	0
01	General Requirements	9.73	7.54
	General Requirements	9.73	1,885,717
03	Concrete	8.28	6.42
	Concrete	8.28	1,604,410
05	Metals	11.86	9.19
	Metals	11.86	2,296,837
06	Wood & Plastics	1.89	1.47
	Wood & Plastics	1.89	366,565
07	Thermal & Moisture Protection	5.45	4.22
	Thermal & Moisture Protection	5.45	1,055,985
08	Doors & Windows	9.02	6.99
	Doors & Windows	9.02	1,746,686
09	Finishes	15.54	12.04
	Finishes	15.54	3,009,414
10	Specialties	1.24	0.96
	Specialties	1.24	239,889
11	Equipment	0.11	0.08
	Food Service	0.11	20,467
13	Special Construction	2.33	1.80
	Pre-Engineered Structures	2.33	451,162
14	Conveying Systems	0.64	0.50
	Elevators	0.64	123,814
15	Mechanical	17.87	13.84
	Mechanical	17.87	3,461,123
16	Electrical	16.05	12.44
	Electrical	16.05	3,109,504
Total Building Costs		100.00	77.49
			19,371,574
02	Site Work	100.00	4.10
	Site Work	100.00	4.10
Total Non-Building Costs		100.00	4.10
Total Project Costs		--	--
			21,334,808

Building Division Notes

Yingling Thesis - May 1995 - NV - Las Vegas

Bidding Requirements	Inst. to bidders, bid forms, bonds & certificates, general conditions, supplementary conditions, addenda.
General Requirements	Summary of work, coordination, field engineering, project meetings, submittals, quality control, contract closeout, maintenance.
Concrete	Formwork, reinforcement, accessories, cast-in-place, curing, grout.
Metals	Materials, structural framing, joists, decking, cold formed framing, fabrications, sheet metal fabrications, ornamental.
Wood & Plastics	Fasteners & adhesives, rough carpentry, finish carpentry, architectural woodwork, solid polymer fabrications.
Thermal & Moisture Protection	Waterproofing, vapor retarders, insulation, firestopping, manufactured roofing & siding, membrane rrfing, flashing & sheet metal, roof specialties & accessories, joint sealers.
Doors & Windows	Metal doors & frames, wood & plastic doors, special doors, entrances & storefronts, hardware, glazing.
Finishes	Metal support systems, lath & plaster, gypsum board, tile, acoustical treatment, resilient flooring, carpet, special flooring, special coatings, painting, wall coverings.
Specialties	Louvers & vents, grilles & screens, manufactured exterior specialties, identifying devices, lockers, fire protection, toilet & bath accessories.
Mechanical	Basic materials & methods, insulation, fire protection, plumbing, HVAC, air distribution, controls, testing, adjusting & balancing.
Electrical	Basic materials & methods, power generation--built-up systems, service & distribution, lighting, special systems, communications, controls, testing.

Non-Building Division Notes

Yingling Thesis - May 1995 - NV - Las Vegas

Site Work

Subsurface investigation, demolition, earthwork, paving & surfacing, utility piping materials, water distribution, sewerage & drainage, power & communications, improvements, landscaping.

Project Notes

Yingling Thesis - May 1995 - NV - Las Vegas

Estimate Based On Case: CV970522 - Las Vegas Executive Air Terminal
 Location: NV - Las Vegas
 Date: May 1995
 Building Size: 47,800

*Las Vegas, Nevada
 *Construction Period Aug 95 to May 96

Special Project Notes

The Las Vegas Executive Air Terminal is an aviation fixed base operations facility, offering flight support services for fueling, maintenance, pilot amenities, and conference services to private and corporate owned aircraft. Serviceable aircraft range in size from the smaller Cessna and Lear to the Boeing 727. The terminal also acts as host to the company's other operation-scenic tours of the Grand Canyon.

The building concept originated with two porte-cocheres, linked by a processional arrival corridor, which transitions in scale from the pedestrian side, where arrival is by automobile or limousine, to the flight side, where arrival is by aircraft. Both entry points are defined by canopies, and guests are literally given the red carpet treatment from the moment they arrive under one canopy to the moment they depart the opposite canopy. Defined from end to end by a light truss fixture, this axial corridor divides and defines all building functions, separating flight planning and administration, from the waiting area and client amenities. The building trademark is the flight side porte-cochere, made of translucent fabric that extends 76 feet over the tarmac with a 40 foot clearance. The client has used an image of this canopy as a logo on their company graphic material.

The main challenge in this project was phasing the various components so that normal business activities were undisturbed. The various flight scheduling, hangar, maintenance and touring facilities had been spread between several locations around McCarran International Airport, and were going to be demolished due to runway improvements and general age of the facility. With the explosive growth at McCarran, the site for the Las Vegas Executive Air Terminal was the last available on actual airport ground.

This fixed base operations facility was designed to be the best in the country. Though relatively simple in function, the 24-hour facility caters to an exclusive clientele, from the Trumps to President Clinton to private corporations. This is the only FBO in the country that valet parks client planes, a glamour of arriving in Las Vegas.

In keeping with its function, the building has been carefully detailed. The north arrow compass point that is so important to navigation has been used as an interior theme throughout the building, in the form of an abstracted geometric triangle, found in the terrazzo flooring, wall accents, and ceiling panels. The canopy shading the tarmac is an abstracted eagle-two stanchion "legs" support a triangular "body", with the point representing the eagle's beak. Slick, modern metal and stainless steel materials give the building a high technology feel. Building colors match and complement the color scheme of the adjacent McCarran International Airport, now the eighth busiest airport in the nation. The facility design has contributed to the overall image of exclusiveness that the air terminal has attempted to cultivate.

Manufacturers/Suppliers

Exterior Walls -

Pre-Engineered Structure: Varco Pruden
 Metal Panels: Benchmark Architectural Wall Panel Systems (DesignWall 1000) Entrances & Storefronts, Aluminum Windows: EFCO Corp.

Wood Doors: Graham
 Special Doors: Anozir
 Doors; Automatic Doors: EFCO Corp, Rotoswing Division

Roof -

Built-Up: Schuller Roofing System
 Prefinished Metal Canopy: Berridge Manufacturing
 Tensile Fabric Space Frame: ASI Advanced Structures
 Light Truss Fixture: Elliptipar

Floors -

Carpet: Shaw Contract Group

Interior Walls -

Gypsum Board: Georgia Pacific
 Acoustical Treatment: Armstrong
 Paint: Frazee
 Wall Coverings: Koroseal
 Ceiling Grid: USG Interiors
 Metal Ceiling: Linar, Chicago Metallic
 Acoustic Wall Panels: Acoustic Environments
 Toilet & Bath Accessories: Bobrick

Project Notes

Yingling Thesis - May 1995 - NV - Las Vegas

Lockers: Republic Storage Systems
Toilet Partitions: All American Metal Corp
Elevators - U.S. Elevator
Lighting -
Hanging Fixtures: SPI
Recessed: Lithonia
Office: Litecontrol

*Photo courtesy: Opulence Studios.

*Illustrations in the D4COST-2002 CD-ROM Architectural Library are reproduced, with permission, from the pages of Design Cost Data magazine, (c) DCD.

Unless noted otherwise illustrations are copyrights of the architectural firm in "Prepared By" on the Sources Tab. Illustrations are for reference only and may not be reproduced by users of D4COST-2002.

User Defined Fields

Yingling Thesis - May 1995 - NV - Las Vegas

User Defined 1:

User Defined 2:

User Defined 3:

User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8:

Statement of Probable Cost

Thesis Yingling - Nov 2005 - PA - Philadelphia

Prepared By: Turner Associates Arch. & Planners 57 Forsyth St., #1300 Atlanta, GA 30303 Fax: Building Sq. Size: 250000 Bid Date: 1/1/1993 No. of floors: 4 No. of buildings: 1 Project Height: 60 1st Floor Height: 16 1st Floor Size: 71000	Prepared For: , Fax: Site Sq. Size: 0 Building use: Civic/Gov. Foundation: CON Exterior Walls: MET Interior Walls: GYP Roof Type: MEM Floor Type: TER Project Type: ADD
---	---

Division		Percent	Sq. Cost	Amount
03	Concrete	9.37	12.70	3,175,630
	Cast-In-Place	9.11	12.35	3,086,601
	Reinforcement	0.26	0.36	89,030
04	Masonry	0.84	1.14	285,930
	Masonry & Grout	0.84	1.14	285,930
05	Metals	26.26	35.59	8,897,370
	Cold Formed Framing	1.05	1.43	356,617
	Materials	23.81	32.26	8,066,102
	Ornamental	1.40	1.90	474,652
07	Thermal & Moisture Protection	6.33	8.57	2,142,999
	Fireproofing	2.04	2.76	690,924
	Joint Sealers	0.44	0.59	147,436
	Manufactured Roofing & Siding	0.52	0.71	176,546
	Membrane Roofing	1.84	2.49	622,144
	Roof Specialties & Accessories	0.68	0.92	230,565
	Skylights	0.81	1.10	275,385
08	Doors & Windows	0.91	1.23	307,936
	Glazing	0.50	0.68	169,067
	Special Doors	0.18	0.25	62,058
	Special Windows	0.23	0.31	76,812
09	Finishes	10.86	14.72	3,679,146
	Carpet	0.79	1.06	266,082
	Gypsum Board	6.20	8.40	2,099,491
	Painting	0.62	0.85	211,629
	Terrazzo	3.25	4.41	1,101,943
10	Specialties	0.15	0.21	52,401
	Toilet & Bath Accessories	0.15	0.21	52,401
12	Furnishings	0.46	0.62	155,003
	Artwork	0.46	0.62	155,003
13	Special Construction	7.94	10.76	2,689,689
	Building Automation Systems	7.66	10.38	2,594,520
	Special Security Construction	0.28	0.38	95,169
14	Conveying Systems	4.33	5.86	1,465,890
	Elevators	1.24	1.68	419,209
	Escalators & Moving Walks	3.09	4.19	1,046,681
15	Mechanical	20.19	27.36	6,840,192
	Air Distribution	5.57	7.55	1,886,441
	Basic Materials & Methods	12.61	17.08	4,270,820
	Controls	0.55	0.74	185,429
	Fire Protection	1.47	1.99	497,503
16	Electrical	12.35	16.74	4,184,834
	Basic Materials & Methods	11.94	16.18	4,044,900

	Communications	0.41	0.56	139,934
Total Building Costs		100.00	135.51	33,877,020
02	Site Work	100.00	INF	633,180
	Piles & Caissons	100.00	INF	633,180
Total Non-Building Costs		100.00	N/A	633,180
Total Project Costs		--	--	34,510,200

Building Division Notes

Thesis Yingling - Nov 2005 - PA - Philadelphia

Artwork

Clock tower.

Non-Building Division Notes

Thesis Yingling - Nov 2005 - PA - Philadelphia

Project Notes

Thesis Yingling - Nov 2005 - PA - Philadelphia

Estimate Based On Case: CV970106 - Atrium at Hartsfield Airport
Location: GA - Atlanta
Date: Jan 1993
Building Size: 225,000

*Atlanta, Georgia
*Construction Period May 93 to Sep 95

Special Project Notes

When Hartsfield Atlanta International Airport opened in 1980, the main terminal building functioned as a great improvement to the previous, outgrown facility. The configuration of the ticketing and baggage claim areas as two parallel, north and south wings connected by cross corridors created a large open area. The use of this left over space was conceived as a valuable future addition to the facility.

Constructed in several phases, a "Town Center" for the traveling public has been developed in the center of Hartsfield's main terminal, the "heart of Hartsfield" as it has been called. "We've taken what was an outdoor area dedicated to service, deliveries and baggage handling in the middle of the terminal and totally transformed it," said Cedric Curtis, AIA, Turner Associates' Project Manager. Officially named the Atrium, it is the crossroads of the passages between the north and south terminal wings and between the gatebound passengers and baggage claim. The ceiling of the four-story, 225,000-square-foot expansion is an atrium space designed as a circle within a square within a circle, supported by four full-height light enhanced pillars.

Light plays an important role in the sensation of the visitor to the Atrium. The balconies and soffits are inset with cold cathode tubes and fluorescent and incandescent light. Coupled with the lights on the columns and the several types of skylight glazing, a rich mix of lighting effects evolve during the mornings into the evenings and night.

The ground floor consists of seating and waiting areas, food court, restaurants and shops, rest rooms, bank, pharmacy, and business services. At the upper levels are another full service restaurant and a state-of-the-art conference center, as well as offices. At the main level, terrazzo flooring patterns create a dynamic circular reflection of the skylight, all arranged around the internally lighted clock tower of glass and chrome. Chimes add a pleasant sound to the activities of the bustling crossroads

Construction of the Atrium had to take place without interfering with the daily operation of the passenger, baggage, or airport delivery functions. Directly below the project is the passenger train system. The locating of the giant pillars supporting the Atrium had to span the train tunnel. The Atrium has become a popular meeting place for meeters and greeters.

Suppliers/Manufacturers

Exterior Walls -

Insulated Metal Siding: Morin
Special Windows: Kawneer
Fire Doors: Won-Door

Roof -

Membrane: Firestone
Skylight: Skywall

Floors -

Terrazzo: Crossville Ceramics
Carpet: DuPont, Bloomsburg

Interior Walls -

Gypsum Board: United States Gypsum
Paint: Duron

Elevators - Montgomery .

*Photo courtesy: Rion C. Rizzo, Creative Sources Photography, Inc.

Illustrations in the D4COST-2002 CD-ROM Architectural Library are reproduced, with permission, from the pages of Design Cost Data magazine, (c) DCD.

Unless noted otherwise illustrations are copyrights of the architectural firm in "Prepared By" on the Sources Tab. Illustrations are for reference only and may not be reproduced by users of D4COST-2002.

User Defined Fields

Thesis Yingling - Nov 2005 - PA - Philadelphia

User Defined 1:

User Defined 2:

User Defined 3:

User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8:

Statement of Probable Cost

Yingling Thesis - Jan 2006 - FL - Tampa

Prepared By:	Hellmuth, Obata & Kassabaum, Inc.	Prepared For:	
	One Tampa City Center, #3000		
	Tampa, FL 33602		
	Fax:		Fax:
Building Sq. Size:	250000	Site Sq. Size:	1785960
Bid Date:	10/1/2005	Building use:	Civic/Gov.
No. of floors:	4	Foundation:	CON
No. of buildings:	1	Exterior Walls:	CUR
Project Height:	47.5	Interior Walls:	GYP
1st Floor Height:	11.1	Roof Type:	MET
1st Floor Size:	117200	Floor Type:	CAR
		Project Type:	NEW

Division	Percent	Sq. Cost	Amount
00 Bidding Requirements	0.00	0.00	0
Bidding Requirements	0.00	0.00	0
01 General Requirements	9.04	14.31	3,578,396
General Requirements	9.04	14.31	3,578,396
03 Concrete	11.49	18.19	4,546,295
Concrete	11.49	18.19	4,546,295
04 Masonry	0.97	1.54	385,354
Masonry	0.97	1.54	385,354
05 Metals	10.09	15.96	3,991,115
Metals	10.09	15.96	3,991,115
06 Wood & Plastics	2.19	3.47	868,128
Wood & Plastics	2.19	3.47	868,128
07 Thermal & Moisture Protection	5.06	8.01	2,001,434
Thermal & Moisture Protection	5.06	8.01	2,001,434
08 Doors & Windows	3.41	5.39	1,347,517
Doors & Windows	3.41	5.39	1,347,517
09 Finishes	14.83	23.47	5,867,295
Finishes	14.83	23.47	5,867,295
10 Specialties	0.89	1.41	352,254
Specialties	0.89	1.41	352,254
11 Equipment	0.01	0.02	4,702
Equipment	0.01	0.02	4,702
12 Furnishings	4.50	7.13	1,782,146
Furnishings	4.50	7.13	1,782,146
13 Special Construction	0.07	0.10	25,766
Special Construction	0.07	0.10	25,766
14 Conveying Systems	10.40	16.46	4,114,488
Conveying Systems	10.40	16.46	4,114,488
15 Mechanical	18.13	28.70	7,174,189
Mechanical	18.13	28.70	7,174,189
16 Electrical	8.93	14.14	3,534,106
Electrical	8.93	14.14	3,534,106
Total Building Costs	100.00	158.29	39,573,185
02 Site Work	100.00	1.04	1,858,831
Site Work	100.00	1.04	1,858,831

Total Non-Building Costs	100.00	1.04	1,858,831
Total Project Costs	--	--	41,432,016

Building Division Notes

Yingling Thesis - Jan 2006 - FL - Tampa

Bidding Requirements	Pre-bid info., instructions to bidders, info. available to bidders, bid forms, supplements to bid forms, agreement forms, bonds & certificates, general conditions, supplementary conditions, addenda.
General Requirements	Summary of work, allowances, measurement & payment, modification procedures, coordination, field engineering, regulatory requirements, identification systems, references, special project procedures, project meetings, submittals, quality control, constr. facilities & temp. controls, material & equipment, facility startup/commissioning, contract closeout, maintenance.
Concrete	Formwork, reinforcement, accessories, cast-in-place, curing, precast, grout.
Masonry	Masonry & grout, accessories, stone.
Metals	Materials, coatings, fastening, structural framing, joists, decking, cold formed faming, fabrications, sheet metal fabrications, ornamental, expansion control, hydraulic structures.
Wood & Plastics	Fasteners & adhesives, rough carpentry, finish carpentry, architectural woodwork, solid polymer fabrications.
Thermal & Moisture Protection	Waterproofing, dampproofing, water repellents, vapor retarders, insulation, fireproofing, firestopping, manufactured roofing & siding, membrane roofing, flashing & sheet metal, joint sealers.
Doors & Windows	Metal doors & frames, wood & plastic doors, entrances & storefronts, hardware, glazing, glazed curtainwalls.
Finishes	Lath & plaster, gypsum board, tile, acoustical treatment, special ceiling surfaces, resilient flooring, carpet, special coatings, painting, wall coverings.
Specialties	Louvers & vents, grilles & screens, wall & corner guards, identifying devices, pedestrian control devices, fire protection, toilet & bath accessories.
Equipment	Parking control, loading dock.
Furnishings	Furniture & accessories, interior plants & planters.
Special Construction	Liquid & gas storage tanks, fire suppression & supervisory systems.
Conveying Systems	Dumbwaiters, elevators, escalators & moving walks.
Mechanical	Basic materials & methods, insulation, fire protection, plumbing, HVAC, air distribution, controls, testing, adjusting & balancing.
Electrical	Basic materials & methods, power generation - built-up systems, medium voltage dist., service & dist., lighting, special systems, communications, controls, testing.

Non-Building Division Notes

Yingling Thesis - Jan 2006 - FL - Tampa

Site Work

Subsurface investigation, demolition, preparation, dewatering, shoring & underpinning, earthwork, piles & caissons, paving & surfacing, utility piping materials, water distribution, sewerage & drainage, restoration of underground pipe, ponds & reservoirs, power & communications, improvements.

Project Notes

Yingling Thesis - Jan 2006 - FL - Tampa

Estimate Based On Case: CV960106 - Tampa Int. Airport - Airside A
Location: FL - Tampa
Date: Oct 1993
Building Size: 240,200

*Tampa, Florida
*Construction Period Nov 93 to Apr 95

Special Project Notes

Airside "A" completes the original master plan for TIA. The concept of a single Landside Terminal linked to six airside facilities by elevated automated transit systems has been recognized for its comfort and convenience.

Goals for the new terminal included flexibility for planning and adapting passenger boarding areas, ease of maintenance of the mechanical systems, and longevity through the use of durable materials. This was to be accomplished within restrictive height limitations placed on the site by runway glide slope path regulations and FAA control tower view requirements.

The plan limitations were established by taxiway clearances and aircraft accessibility with the site impacted by adjacent roadways. The resulting linear organization accommodates fifteen aircraft gates from the second floor boarding level as well as two commuter holdrooms at the apron level. The 110-foot clear span structure was designed to provide maximum flexibility for planning gate locations and the related check-in and seating configurations.

The height limitations required a thin structure for the length of the span. The tapered beams are only two feet deep at the center. Buttresses, designed to resist the thrust of the roof structure, create an exterior zone around the building. Service functions have been located in this area to further the flexibility of the main boarding level. Mechanical spaces are provided on the apron level for ease of accessibility of the air handling equipment. Cylindrical shafts rise to the ceiling plenum for air distribution.

The exposed cast-in-place concrete structure is combined with a painted standing seam metal roof, galvanized exit stairs, and aluminum and glass curtainwall to provide long term durability.

The building uses its architecture as a guide for the path one must follow. After arriving from the Landside Terminal via the transit system and clearing security screening, the main concourse opens to the north and south. The route is clearly marked by the light trough in the ceiling. The food and beverage oasis is the central focus of the terminal. Defined by landscape in free-form planters and flowing lines in carpet and tile, activities at all of the gates can be monitored from here. The wavelike serpentine walls that enclose the retail shops, restroom facilities and third floor airline club spaces are sand colored stripes of a very durable glass material. The ceiling is fabricated of perforated metal planks with sound absorbing backup. The lights, sprinklers and public address speakers are integrated into a single design element that reduces visual clutter in the ceiling. This acoustically efficient ceiling, along with the carpeted floor have helped create a quiet, relaxed space.

The signage and the flight information display system have been positioned low enough to be easily read for the disabled. Companion restrooms have been incorporated in addition to handicapped facilities.

Editor's Note: Costs do not include aircraft apron.

Suppliers/Manufacturers

Exterior Walls -

Curtainwall: Arch Amarlite
Insulated CMU: Rinker Materials
Insulated Metal Panels: H.H. Robertson
Composite Metal Panels: Reynolds Metals
Glass: Viracon

Roof -

Standing Seam Metal: Smith Steelite

Floors -

Carpet: Bloomsburg
Ceramic Tile: Ceramica D'Imola

Interior Walls -

Glass Ceramic Panels: N.E.G. America
Gypsum Board: United States Gypsum
Special Coatings: Vari-Krom

Ceilings - Custom Perforated Metal Panel: Hunter Douglas

Specialties -

Toilet & Bath Accessories: Bobrick
Public Holdroom Seating: Herman Miller

Project Notes

Yingling Thesis - Jan 2006 - FL - Tampa

Elevators - Schindler

*Photo courtesy: Chroma, Inc.-Geroge Cott.

*Illustrations in the D4COST-2002 CD-ROM Architectural Library are reproduced, with permission, from the pages of Design Cost Data magazine, (c) DCD.

Unless noted otherwise illustrations are copyrights of the architectural firm in "Prepared By" on the Sources Tab. Illustrations are for reference only and may not be reproduced by users of D4COST-2002.

User Defined Fields

Yingling Thesis - Jan 2006 - FL - Tampa

User Defined 1:

User Defined 2:

User Defined 3:

User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8:

Statement of Probable Cost

YinglingThesis - Jan 2006 - FL - Other

Prepared By: Graves + Carlos, Architects, Engineers 121 East Government Street Pensacola, FL 32501 Fax: Building Sq. Size: 250000 Bid Date: 2/20/1998 No. of floors: 4 No. of buildings: 4 Project Height: 58.8 1st Floor Height: 38 1st Floor Size: 26906	Prepared For: , Fax: Site Sq. Size: 150000 Building use: Civic/Gov. Foundation: CON Exterior Walls: CON Interior Walls: GYP Roof Type: MEM Floor Type: CON Project Type: NEWREN
---	---

Division		Percent	Sq. Cost	Amount
00	Bidding Requirements	0.00	0.00	0
	General Conditions	0.00	0.00	0
01	General Requirements	13.62	6.96	1,740,706
	General Requirements	7.09	3.62	906,233
	Profit, Bond & Insurance	6.53	3.34	834,473
03	Concrete	39.58	20.23	5,058,582
	Cast-In-Place	12.06	6.17	1,541,573
	Floor Planks	0.22	0.11	28,195
	Precast	6.34	3.24	809,893
	Structural	20.96	10.72	2,678,921
04	Masonry	0.89	0.46	114,089
	Masonry	0.89	0.46	114,089
05	Metals	6.88	3.52	879,891
	Fireproofing Of Steel	0.34	0.17	43,485
	Metals	6.54	3.35	836,406
06	Wood & Plastics	0.48	0.24	60,961
	Wood & Plastics	0.00	0.00	0
	Finish Carpentry	0.37	0.19	46,988
	Rough Carpentry	0.11	0.06	13,973
07	Thermal & Moisture Protection	2.83	1.45	362,154
	Thermal & Moisture Protection	0.00	0.00	0
	Building Insulation	0.07	0.04	8,798
	Caulking	0.30	0.15	38,685
	Metal Wall Panels	0.82	0.42	104,434
	Roofing & Sheet Metal	1.55	0.79	198,492
	Waterproofing	0.09	0.05	11,744
08	Doors & Windows	3.50	1.79	447,825
	Doors & Windows	0.00	0.00	0
	Hollow Metal/Finish Hardware	0.50	0.25	63,568
	Special Doors	0.96	0.49	122,721
	Storefront/Glass & Glazing	2.05	1.05	261,536
09	Finishes	4.57	2.34	584,072
	Finishes	0.00	0.00	0
	Acoustical Ceilings	0.77	0.39	98,081
	Carpet & VCT	0.31	0.16	39,377
	Ceramic Tile	0.55	0.28	69,947
	Drywall & EIFS	2.50	1.28	319,008
	Painting	0.45	0.23	57,661
10	Specialties	1.28	0.65	163,211
	Specialties	1.28	0.65	163,211
11	Equipment	0.00	0.00	0
	Equipment	0.00	0.00	0

12	Furnishings	0.00	0.00	0
13	Special Construction	0.98	0.50	125,108
	Special Construction	0.98	0.50	125,108
14	Conveying Systems	4.04	2.06	515,879
	Conveyors	1.88	0.96	240,191
	Elevators/Escalators	2.16	1.10	275,688
15	Mechanical	9.16	4.68	1,170,610
	Mechanical	0.00	0.00	0
	Fire Protection	0.69	0.35	87,671
	HVAC	3.50	1.79	447,991
	Plumbing	4.97	2.54	634,948
16	Electrical	12.19	6.23	1,558,733
	Electrical	12.19	6.23	1,558,733
Total Building Costs		100.00	51.13	12,781,820
02	Site Work	100.00	28.08	4,212,569
	Caissons	2.66	0.75	112,081
	Demolition/Protection	10.55	2.96	444,248
	Piling	12.76	3.58	537,514
	Site Work	74.03	20.79	3,118,726
Total Non-Building Costs		100.00	28.08	4,212,569
Total Project Costs		--	--	16,994,389

Building Division Notes

YinglingThesis - Jan 2006 - FL - Other

General Requirements	Summary of work, allowances, measurement & payment, submittals, construction facilities & temporary controls, contract closeout, general condition
Masonry	U
Metals	Structural framing, decking, ornamental, expansion cont
Wood & Plastics	Architectural wood
Thermal & Moisture Protection	Waterproofing, dampproofing, water repellents, insulation, fireproofing, firestopping, manufactured roofing & siding, membrane roofing, roof specialties & accessories, joint sea
Doors & Windows	Metal doors & frames, special doors, entrances & storefronts, special windows, hardware, glazing, glazed curtainw
Finishes	Metal support systems, gypsum board, tile, acoustical treatment, special wall surfaces, special ceiling surfaces, resilient flooring, carpet, special coatings, painting, wall cover
Specialties	Compartments & cubicles, wall & corner guards, lockers, toilet & bath accessor
Equipment	Loading dock equip
Special Construction	Pre-engineered structu
Elevators/Escalators	Elevators, (5)
Mechanical	Basic materials & methods, insulation, fire protection, plumbing, air distribution, cont
Electrical	Basic materials & methods, service & distribution, lighting, special systems, communicati

Non-Building Division Notes

YinglingThesis - Jan 2006 - FL - Other

Site Work

Demolition, preparation, earthwork, paving & surfacing, water distribution, sewerage & drainage, improvements, landscap

Project Notes

YinglingThesis - Jan 2006 - FL - Other

Estimate Based On Case: CV010556 - Pensacola Regional Airport
 Location: FL - Other
 Date: Feb 1998
 Building Size: 537,170

*Pensacola, Florida

*Construction Period Mar 98 to May 00

*Number of Buildings: Four; new Concourse/Terminal, new Parking Garage, Skybridge, existing building renovations.

*Building Sizes: Concourse/Terminal, 26,906; Parking Garage, 495,552; Skybridge, 8,400; existing building, 6,312; total, 537,170 square feet.

*Building Height: Concourse/Terminal, 38'; Parking Garage, 42'4"; Skybridge, 58'8"; existing building, 36'8"; total, 58'8".

*Basic Construction Type: New Concourse: New/II; Parking Garage: New/IV; Skybridge: New/IV; Existing: Ren/II.

Special Project Notes

New construction and renovations to the Pensacola Regional Airport included the expansion of the existing concourse, ticketing and baggage claim areas and the addition of a new four-level 1,400 car parking garage with an elevator lobby and a skybridge connecting to the main terminal. The expansion is designed to support the projected increase in the enplanements through the year 2005. The new concourse building expansion terminates the existing circulation spine with a three-story volume of space that provides a panorama of views and is filled with natural daylight. The design meets all the demands of today's airport operations and rewards travelers with modern spaces that reflect the energy of its growing host city.

The concourse addition is located at the end of an existing six-gate concourse and faces the aircraft runway with 2 new jetbridge gates on the second level and four new commuter plane gates on the first floor. The gates are supported by two levels of holding rooms, escalators, elevators and restrooms that serve commuter and regional aircraft passengers. The design includes floor to ceiling aluminum storefront glazing at the building perimeter and a glass-backed elevator to allow passengers and visitors views of the incoming and outgoing aircraft. Solar shading devices are incorporated into the building facade's design in response to heavy solar exposures of the region.

The new ticketing area was expanded to provide suitable passenger queuing space for the year 2005. The new expansion provides airline ticketing counters, baggage "make-up" conveyors, and support offices for each airline. The new baggage claim area addition provides one additional baggage conveyor system. Building modifications required the existing airport receiving area, including a loading dock and freight elevator, to be relocated. The new four-level parking garage provides convenient and secured parking for 1,400 passengers, visitors, and rental car vehicles. The parking garage is linked to the terminal with a second level open-air skybridge that incorporates solar shading and rain protection devices to provide safe and comfortable access to the terminal.

The airport loop drive focuses the vehicular approach on the skybridge and four-story perforated panel "sail" that serves as a sunshade for the glass elevators. The Tectonic System of the skybridge that links the two masses of the precast concrete garage and precast/GFRC terminal construction creates a dynamic vision for approaching passengers and visitors.

The parking garage is constructed of precast and architectural panels with various finishes and textures. The garage is bisected by a central ground level landscaped pedestrian courtyard that is filled with light from a continuous three-story lightwell above. The pedestrian circulation courtyard and lightwell align with the skybridge and terminal circulation to provide a direct path through the garage to the terminal. Vertical circulation in the garage is achieved by three elevators in the air-conditioned elevator lobbies and three separate covered stairs. The new parking garage and terminal expansion project serves as a symbol for Pensacola as an evolving and modern city.

Photo Courtesy of Gresham Smith/Graves + Carlos

MANUFACTURERS/SUPPLIERS

Exterior Walls # EIFS: Parex; Colored CMU: Graselli; Entrances & Storefronts: Kawneer; Special Coatings: Tnemec; Insulated Wall Panels: Centria; Fire Rated Glazing: G.E. Lexan; Fire Protection: W.R. Grace. Roof # Single-Ply: Sarnafil; Standing Seam: Merchant & Evans.

Floors # Carpet: Interface; Tile: Dal-Tile; VCT: Armstrong.

Interior Walls # Gypsum Board: Georgia Pacific; Wood Doors: Marshfield DoorSystems, Inc.; Hollow Metal Doors: Steelcraft;

Acoustical Ceilings: Armstrong. Elevators # Schindler.

*Illustrations in the D4COST-2002 CD-ROM Architectural Library are reproduced, with permission, from the pages of Design Cost Data magazine, (c) DCD.

Unless noted otherwise illustrations are copyrights of the architectural firm in "Prepared By" on the Sources tab. Illustrations are for reference only and may not be reproduced by users of D4COST-2002.

User Defined Fields

YinglingThesis - Jan 2006 - FL - Other

User Defined 1:

User Defined 2:

User Defined 3:

User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8:

Statement of Probable Cost

Yingling Thesis - Nov 2005 - PA - Philadelphia

Prepared By:	Hurst-Rosche Engineers, Inc.	Prepared For:	
	1400 E. Tremont St.		
	Hillsboro, IL 62049		
	Fax:		Fax:
Building Sq. Size:	250000	Site Sq. Size:	1
Bid Date:	3/1/1996	Building use:	Civic/Gov.
No. of floors:	4	Foundation:	CON
No. of buildings:	1	Exterior Walls:	EIF
Project Height:	59.11	Interior Walls:	PLA
1st Floor Height:	14	Roof Type:	MET
1st Floor Size:	29456	Floor Type:	TIL
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
00	Bidding Requirements	0.00	0.00	0
01	General Requirements	12.02	26.48	6,621,030
	Alternates & Alternatives	8.07	17.79	4,448,459
	General Requirements	3.94	8.69	2,172,571
03	Concrete	12.51	27.58	6,894,717
	Concrete	12.51	27.58	6,894,717
04	Masonry	2.78	6.13	1,532,159
	Unit	2.78	6.13	1,532,159
05	Metals	10.41	22.95	5,738,237
	Metals	10.41	22.95	5,738,237
06	Wood & Plastics	1.45	3.20	801,123
	Wood & Plastics	1.45	3.20	801,123
07	Thermal & Moisture Protection	6.46	14.24	3,558,979
	Thermal & Moisture Protection	6.46	14.24	3,558,979
08	Doors & Windows	9.72	21.42	5,354,774
	Doors & Windows	9.72	21.42	5,354,774
09	Finishes	6.59	14.53	3,631,818
	Finishes	6.59	14.53	3,631,818
10	Specialties	1.85	4.07	1,017,967
	Specialties	1.85	4.07	1,017,967
11	Equipment	0.07	0.15	38,610
	Equipment	0.07	0.15	38,610
12	Furnishings	0.13	0.28	69,775
	Furnishings	0.13	0.28	69,775
13	Special Construction	0.65	1.42	355,461
	Special Construction	0.65	1.42	355,461
14	Conveying Systems	8.52	18.79	4,697,600
	Conveying Systems	8.52	18.79	4,697,600
15	Mechanical	17.97	39.60	9,899,894
	Mechanical	17.97	39.60	9,899,894
16	Electrical	8.88	19.57	4,893,429
	Electrical	8.88	19.57	4,893,429
Total Building Costs		100.00	220.42	55,105,571
02	Site Work	100.00	660,869.53	660,870
	Site Work	100.00	660,869.53	660,870

Total Non-Building Costs	100.00	660,869.53	660,870
Total Project Costs	--	--	55,766,441

Building Division Notes

Yingling Thesis - Nov 2005 - PA - Philadelphia

General Requirements	Mobilization, field supervision & overhead, permit, performance & payment bond.
Concrete	Cast-in-place, precast.
Metals	Structural framing, joists, decking, fabrications, ornamental.
Wood & Plastics	Rough carpentry, finish carpentry.
Thermal & Moisture Protection	Waterproofing, insulation, exterior insulation & finish systems, fireproofing, firestopping, manufactured roofing & siding, membrane roofing, flashing & sheet metal, roof specialties & accessories, skylights, joint sealers.
Doors & Windows	Metal doors & frames, wood & plastic doors, special doors, entrances & storefronts, hardware, glazing, glazed curtainwalls.
Finishes	Lath & plaster, gypsum board, acoustical treatment, resilient flooring, carpet, painting.
Specialties	Compartments & cubicles, louvers & vents, access flooring, fire protection specialties, operable partitions, exterior protection devices for openings, telephone specialties, toilet & bath accessories.
Equipment	Loading dock.
Furnishings	Furniture & accessories.
Special Construction	Building automation systems.
Conveying Systems	Elevators, escalators & moving walls, material handling systems, transportation systems.
Mechanical	Plumbing, HVAC.

Non-Building Division Notes

Yingling Thesis - Nov 2005 - PA - Philadelphia

Site Work

Earthwork, improvements, landscaping.

Project Notes

Yingling Thesis - Nov 2005 - PA - Philadelphia

Estimate Based On Case: CV990510 - Mid-America Airport Passenger Termi
Location: IL - Other
Date: Mar 1996
Building Size: 67,028

*St. Clair County, Illinois
*Construction Period Apr 96 to Mar 98

Special Project Notes

The new passenger terminal was planned as an expandable facility that will provide passenger accommodations for the initial opening of the Mid-America Airport. The airport will service the region primarily as a "spoke" facility (rather than a "hub" facility) providing one-stop service to the air network of the country. The passenger terminal is located in a 250-foot-wide by 7,000-foot-long terminal building expansion envelope, bounded by the new runway and new parking lot. In the initial build-out, the terminal will provide two upper-level departure gates with additional ground-level gates to serve commuter air carriers.

One of the most significant challenges of this project was to design a facility that was appropriate for the initial four gate scheme that was comfortable, convenient, and appropriate for now, but was to serve successfully as the core for an eighty-five gate facility and still serve travelers in a comfortable, convenient way. These challenges led to detailed analysis of every building system well beyond normal care, structural expansion, as well as expansion of the mechanical/electrical, security, and data systems and were all key issues to the design team. The building is conceived as a linear terminal with a partial second floor level along the airside to afford direct access to aircraft from departure lounges. The ground level of the terminal is treated as a grand, two-story high space that imparts a unique identity and presence to the airport. The cross section of the building is expressed in the exterior massing, with the main hall articulated as a two-story-high vaulted form linked to the rectangular, two-story airside portion that contains baggage handling on the lower level and departure lounges on the upper level.

Extension of the new Saint Louis Metro Link Rail System to the Mid-America Airport is anticipated in the near future. In response, the terminal is designed to receive a second level pedestrian bridge connection from a future metro link station that would be constructed directly opposite in the new parking lot. The bridge would land at the center mezzanine level where circulation options allow for passage to ticketing on the first floor or continuation into the secure portion of the second floor.

Manufacturers/Suppliers

Exterior Walls: Architectural Precast Concrete Panel: Concrete Technology; EIFS: Senergy; Glazed Aluminum Curtain Walls: Vistawall; Metal Doors & Frames: CECO.
Roof: Standing Seam: Overly Manufacturing Co.; Composite Foam Roof Panels: Smith Steelite; Translucent Roof Panel: Kalwall, Sealants & Caulking: Pecora.
Floors: Porcelain Paver Tile: Dal-Tile; Grout: Laticrete; VCT: Armstrong; Rubber Tile: Flexco; Carpet: Shaw/Stratton; Edge & Reducer Strips: Roppe.
Interior Walls: Unglazed Wall Tile: Dal-Tile; Operable Partitions: Panelfold; Wood Doors & Frames: Algoma Hardwoods; Paint: Glidden; Acoustical Treatment: USG
Interiors, Chicago Metallic; Aircraft Passenger Loading Bridges Ceiling Plank: Hunter Douglas.
Conveying Systems: Elevators, Escalators: Montgomery-KONE.

*Photo courtesy: Rick Birger Photography

*Illustrations in the D4COST-2002 CD-ROM Architectural Library are reproduced, with permission, from the pages of Design Cost Data magazine, (c) DCD.

Unless noted otherwise illustrations are copyrights of the architectural firm in "Prepared By" on the Sources Tab. Illustrations are for reference only and may not be reproduced by users of D4COST-2002.

User Defined Fields

Yingling Thesis - Nov 2005 - PA - Philadelphia

User Defined 1:

User Defined 2:

User Defined 3:

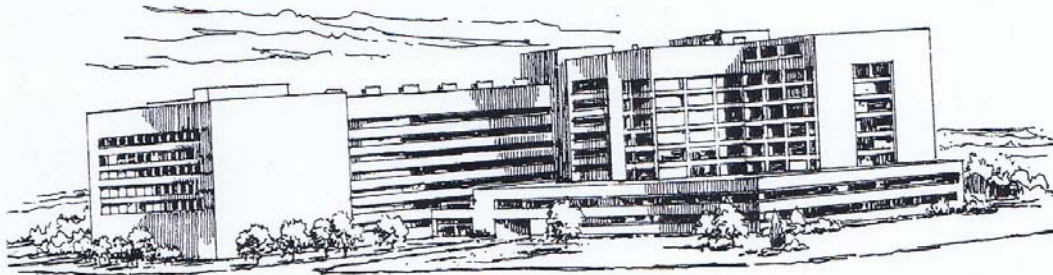
User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8:



Costs per square foot of floor area

Exterior Wall	S.F. Area	100000	125000	150000	175000	200000	225000	250000	275000	300000
	L.F. Perimeter	594	705	816	783	866	950	1033	1116	1200
Face Brick with Structural Facing Tile	Steel Frame	252.95	246.70	242.50	236.10	233.70	231.80	230.35	229.15	228.10
	R/Conc. Frame	262.40	256.00	251.80	245.35	242.95	241.05	239.55	238.30	237.30
Face Brick with Concrete Block Back-up	Steel Frame	247.30	241.10	236.95	231.20	228.90	227.05	225.55	224.45	223.45
	R/Conc. Frame	258.50	252.35	248.20	242.45	240.10	238.30	236.85	235.70	234.65
Precast Concrete Panels With Exposed Aggregate	Steel Frame	249.85	243.65	239.50	233.55	231.20	229.40	227.90	226.75	225.75
	R/Conc. Frame	259.35	253.15	249.00	243.05	240.70	238.90	237.40	236.25	235.25
Perimeter Adj., Add or Deduct	Per 100 L.F.	4.15	3.30	2.75	2.35	2.05	1.90	1.60	1.50	1.40
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	1.85	1.75	1.70	1.40	1.35	1.35	1.30	1.30	1.30

For Basement, add \$31.25 per square foot of basement area

The above costs were calculated using the basic specifications shown on the facing page. These costs should be adjusted where necessary for design alternatives and owner's requirements. Reported completed project costs, for this type of structure, range from \$151.70 to \$369.90 per S.F.

Common additives

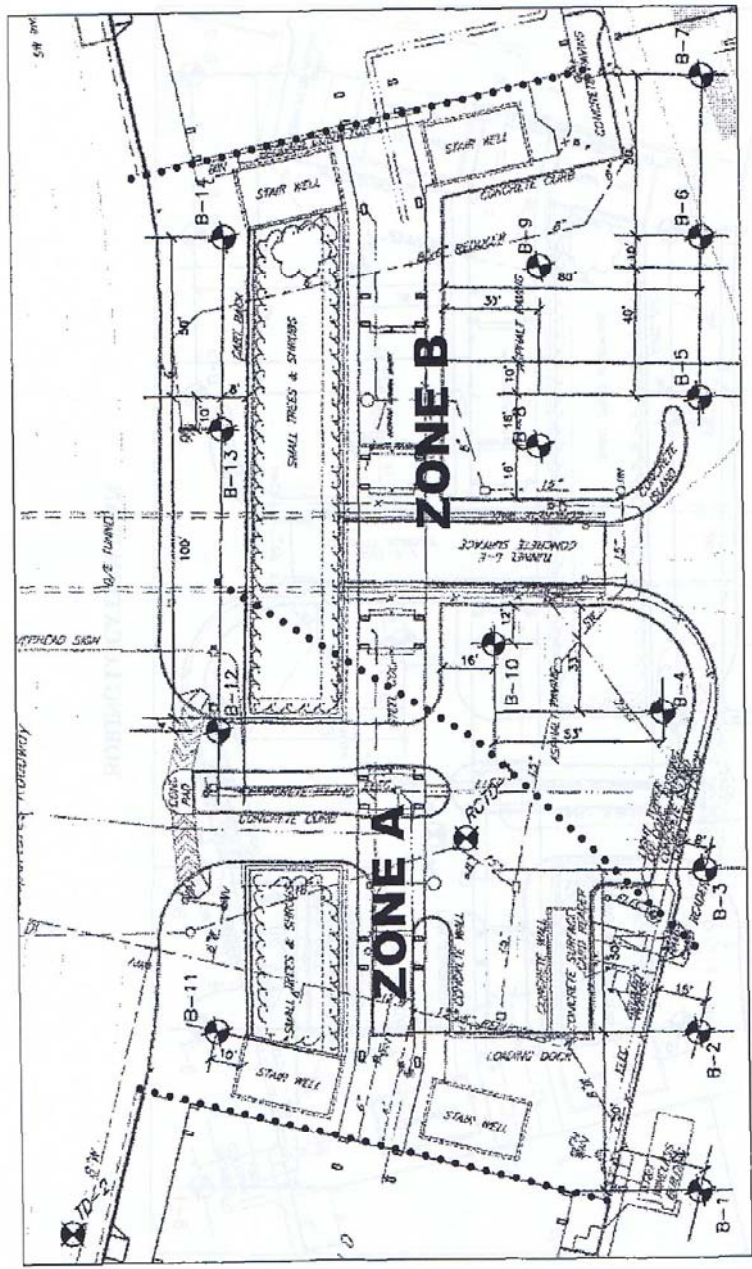
Description	Unit	\$ Cost	Description	Unit	\$ Cost
Cabinets, Base, door units, metal	L.F.	243	Nurses Call Station	Each	299
Drawer units	L.F.	480	Single bedside call station	Each	136
Tall storage cabinets, 7' high, open	L.F.	455	Ceiling speaker station	Each	182
With doors	L.F.	690	Emergency call station	Each	286
Wall, metal 12-1/2" deep, open	L.F.	180	Pillow speaker	Each	365
With doors	L.F.	325	Double bedside call station	Each	310
Closed Circuit TV (Patient monitoring)	Each	1750	Duty station	Each	157
One station camera & monitor	Each	940	Standard call button	Each	5775
For additional camera add	Each	2425	Master control station for 20 stations	Each	5775
For automatic iris for low light add	Each	2425	Sound System	Each	2225
Hubbard Tank, with accessories	Each	26,800	Amplifier, 250 watts	Each	181
Stainless steel, 125 GPM 45 psi	Each	2925	Speaker, ceiling or wall	Each	345
For electric hoist, add	Each		Trumpet	Each	16,300
Mortuary Refrigerator, End operated	Each	12,500	Station, Dietary with ice	Each	161,500
2 capacity	Each	22,500	Sterilizers	Each	207,500
0 capacity	Each		Single door, steam	Each	3875 - 6050
			Double door, steam	Each	40,000
			Portable, counter top, steam	Each	55,500
			Gas	Each	
			Automatic washer/sterilizer	Each	

Important: See the Reference Section for Location Factor

Model costs calculated for a 6 story building
with 12' story height and 200,000 square feet
of floor area

Hospital, 4-8 Story

				Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE							
010	Standard Foundations	Paired concrete; strip and spread footings	S.F. Ground	13.06	2.18		
020	Special Foundations	N/A	—	—	—		
030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base	S.F. Slab	6.97	1.16	2.1%	
010	Basement Excavation	Site preparation for slab and trench for foundation wall and footing	S.F. Ground	.15	.03		
020	Basement Walls	4' foundation wall	L.F. Wall	70	.30		
B. SHELL							
B10 Superstructure							
010	Floor Construction	Concrete slab with metal deck and beams, steel columns	S.F. Floor	19.13	15.94	10.1%	
020	Roof Construction	Metal deck, open web steel joists, beams, interior columns	S.F. Roof	7.92	1.32		
B20 Exterior Enclosure							
010	Exterior Walls	Face brick and structural facing tile	S.F. Wall	39.09	8.53		
020	Exterior Windows	Aluminum sliding	Each	523	3.26	7.3%	
030	Exterior Doors	Double aluminum and glass and sliding doors	Each	4770	.68		
B30 Roofing							
010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPG composite insulation	S.F. Roof	6.96	1.16	0.7%	
020	Roof Openings	Roof hatches	S.F. Roof	.18	.03		
C. INTERIORS							
010	Partitions	Gypsum board on metal studs with sound deadening board	9 S.F. Floor/L.F. Partition	S.F. Partition	6.69	7.43	
020	Interior Doors	Single leaf hollow metal	90 S.F. Floor/Door	Each	869	9.64	
030	Fittings	Hospital curtains	S.F. Floor	.93	.93		
010	Stair Construction	Concrete filled metal pan	Flight	9700	1.26	24.5%	
010	Wall Finishes	40% vinyl wall covering, 35% ceramic tile, 25% epoxy coating	S.F. Surface	3.19	7.08		
020	Floor Finishes	60% vinyl tile, 20% ceramic, 20% terrazzo	S.F. Floor	9.84	9.84		
030	Ceiling Finishes	Plaster on suspended metal lath	S.F. Ceiling	5.76	5.76		
D. SERVICES							
D10 Conveying							
010	Elevators & Lifts	Six geared hospital elevators	Each	187,667	5.63	3.3%	
020	Escalators & Moving Walks	N/A	—	—	—		
D20 Plumbing							
010	Plumbing Fixtures	Kitchen, toilet and service fixtures, supply and drainage	1 Fixture/416 S.F. Floor	Each	2658	6.39	
020	Domestic Water Distribution	Electric water heater	S.F. Floor	4.61	4.61	6.7%	
040	Rain Water Drainage	Roof drains	S.F. Floor	3.30	.55		
D30 HVAC							
010	Energy Supply	Oil fired hot water, wall fin radiation	S.F. Floor	3.13	3.13		
020	Heat Generating Systems	Hot water boilers, steam boiler for services	Each	27,625	.34		
030	Cooling Generating Systems	Chilled water units	S.F. Floor	2.67	2.67	19.2%	
050	Terminal & Package Units	N/A	—	—	—		
090	Other HVAC Sys. & Equipment	Conditioned air with reheat, operating room air curtains	S.F. Floor	26.75	26.75		
D40 Fire Protection							
010	Sprinklers	Wet pipe sprinkler system	S.F. Floor	2.16	2.16	1.5%	
020	Standpipes	Standpipe	S.F. Floor	.46	.46		
D50 Electrical							
010	Electrical Service/Distribution	4000 ampere service, panel board and feeders	S.F. Floor	3.84	3.84		
020	Lighting & Branch Wiring	Hospital grade light fixtures, receptacles, switches, A.C. and misc. power	S.F. Floor	17.11	17.11	15.6%	
030	Communications & Security	Alarm systems, internet wiring, communications system, emergency lighting	S.F. Floor	1.75	1.75		
090	Other Electrical Systems	Emergency generator, 800 kW with fuel tank, uninterruptible power supply	S.F. Floor	4.11	4.11		
EQUIPMENT & FURNISHINGS							
010	Commercial Equipment	N/A	—	—	—		
020	Institutional Equipment	Medical gases, curtain partitions	S.F. Floor	11.85	11.85	9.0%	
030	Vehicular Equipment	N/A	—	—	—		
020	Other Equipment	Patient wall systems	S.F. Floor	3.65	3.65		
SPECIAL CONSTRUCTION							
020	Integrated Construction	N/A	—	—	—	0.0%	
040	Special Facilities	N/A	—	—	—		
F. BUILDING SITWORK N/A							



PILE CAPACITY ZONES

Zones are based on the thickness/density of the upper gravelly sand layer

PHL Philadelphia Airport System
Terminal E Expansion: Terminal D/E Area

Table 1A - Summary of CPT Borings

Boring No.	Date	Depth (feet)	Pavement Thickness (inches)	Water Table Depth (feet)
B-1	10/22/04	77.3	18	n/a
B-3	10/22/04	77.6	10	n/a
B-4	10/20/04	36.4	6 (asphalt)	14.9
B-6	10/22/04	44.0	10	n/a
B-8	10/21/04	40.7	6 (asphalt)	n/a
B-11	10/20/04	81.2	6 (asphalt)	14.3
B-13	10/20/04	42.0	6	15.7
B-14	10/20/04	44.6	6	n/a
Total	8 borings	288.9		

Table 1B - Summary of SPT Borings

Boring No.	Date	Depth (feet)	Pavement Thickness (inches)	Jar Samples	Shelby Tubes	Water Table Depth (feet)
B-2	11/8/04	84.8	14	20		16.3
B-5	11/9/04	44.8	18	13		9.8
B-7	11/10/04	93.8	15	22		n/a
B-9	11/10/04	44.7	4 (asphalt)	12		10.0
B-10	11/11/04	84.0	3 (asphalt)	20	1	12.3
B-12	11/11/04	89.8	6 (asphalt)	21	1	15.3
Total	6 borings	441.9		108	2	

Note: Pavement consisted of concrete unless noted.

PHL Philadelphia Airport System
Terminal E Expansion: Terminal D/E Area

Table 2A - Summary of Laboratory Testing of Jar Samples

Boring No.	Sample No.	Depth - feet	Water Content %	% < #200	Liquid Limit	Plastic Limit	Plasticity Index	Classification (USCS)
B-2	S-3	5.2-7.2	6.3	11				SP-SM
	S-9	29-30.5	43.8	98	50	24	26	CH or OH
	S-11	39.0-40.5	19.7	11				SP-SM
B-5	S-15	59-60.5	28.2	7				SP-SM
	S-6	11.5-13	14.7	13				SM
	S-10	29-30.5	17.8	1				SP
B-7	S-8	23.5-25	33.1	85	48	22	26	CL or OL
	S-15	58.5-60	24.7	21				SM
	S-20	83.5-85	21.5	6				SP-SM
B-10	S-6	13.5-15	35.5	98	45	23	22	CL or OL
	S-14	53.5-55	21.6	18				SM
	S-18	73.5-75	28.3	6				SP-SM
B-12	S-4	8-10	4.8	8				SW-SM
	S-14	54-55.5	26.3	23				SM
	S-17	69-70.5	25.1	22				SM
Total	15							

PHL Philadelphia Airport System
 Terminal E Expansion: Terminal D/E Area

Table 2B - Summary of Laboratory Test of Undisturbed Samples

Boring No.	Sample No.	Depth - feet	Water Content %	% < #200	Unit Weight (pcf)	Atterberg Limits		Cohesion (psf)		Classification (USCS)	
						Liquid Limit	Plastic Limit	Unconfined Comp.	UU Tests		
B-10	U-1	23.8	67.4	95	90.5	-	-	310	-	OH	
		26.6	40.6	95	111.7	44	22	-	730	CL or OL	
B-12	U-1	27.3	43.1	95	109.9	-	-	920	-	CL or OL	
		20.7	59.2	95	100.5	85	37	-	1420	CH or OH	
B-20*	U-1	21.4	57.3	95	101.7	-	-	312	-	CH or OH	
		20.8	72.8	95	95.2	101	44	1200	-	MH or OH	
								Average		685.5	1075

* B-15 and B-20, samples are from the east end of Terminal E somewhat outside the area of this report, have been included to enhance the statistical significance of the shear strength parameters.