50 Connell Drive
Berkeley Heights, NJ

About the Building:

Owner: The Connell Company
CM: Turner Construction
Architect: HLW International

General Data:
- 4 Story High End Office Building with Cafeteria
- 185,000 Total Square Feet
- Pursuing LEED Gold Certification

Mechanical Systems:
- Concealed Mechanical Penthouse
- 2 pipe direct return air/water system
- (4) McQuay Destiny Air Handling Units
- Floor by Floor VAV Heating and Cooling Units
- (2) Closed Circuit Induced Draft 432 Ton Cooling Towers

Architectural:
- Granite Panel Facade with Curtain Wall Sections
- Reflective Roof with Fully Adhered Membrane

Construction:
- Schedule July 2007 – Jan. 2009
- Clearing of a Wooded 16 Acre Site
- Erected in Bays with 150 Ton Crawler Crane

Electrical/Lighting:
- 13.2 KV Main Power Feed
- (2) 15 KV Switchgears
- TP-1 Transformers Step Power from 480V to 277V
- Natural Gas Powered Emergency Generator
- Fluorescent lighting with multiple fixture types

Structural:
- Concrete Footings and Grade Beams
- Structural Steel Frame
- Composite Metal Deck Floor Slabs
- Vertical Steel Cross Bracing

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Construction Management
http://www.engr.psu.edu/ae/thesis/portfolios/2009/jcs5018/

Technical Report #1
Construction Project Management

50 Connell Drive Office Building
Berkeley Heights, NJ

Submitted 9/29/08
By: Jason Salyer
Option: Construction Management
Thesis Advisor: Dr. Messner

Table of Contents

Executive Summary

The Connell Real Estate and Development Company is having a new office building built as part of a contractual arrangement that they have with L'Oreal USA. The finished product will be a 4 story Class A commercial office building. Turner Construction was chosen as the construction manager at risk. Turner is responsible for the core and shell of the building. They started coordinating work in October of 2007 and construction of the core and shell is scheduled to be completed on December 1, 2008. Turner has completed projects for the owner in the past and because of this pre-existing relationship they were chosen to manage this project. Turner has a cost plus a fee contract with the owner.

The team is aiming to achieve a LEED Gold certification from the USGBC. The building will have waterless urinals, highly efficient glazing, preferred parking for fuel efficient vehicles and the landscaping will consist of native plants that do not require the use of irrigation. Another distinguishing feature of the building is its façade. The exterior wall is a panelized system. This system consists of Indiana limestone and granite with curtain wall sections. Another feature that adds to the aesthetics of the building is the mechanical penthouse located on the roof that conceals the mechanical equipment from viewers on the outside.

The building's structural system consists of concrete spread footings and concrete foundation walls. The superstructure consists of a structural steel frame with composite metal decking. The frame was erected in bays with a 150 ton crawler crane. This sequence began on the north side of the building. When the northern bays were completed the crane repositioned to the south side. The rest of the trades followed in a similar order.

The majority of the mechanical equipment is located inside the penthouse. The indoor environment is controlled by a two pipe direct return air/water system. There are a total of four air handling units in the building, three of which are inside the penthouse. Each floor has self contained heating/cooling units with fan powered VAV terminal unit boxes, electric unit heaters and self contained AC units.

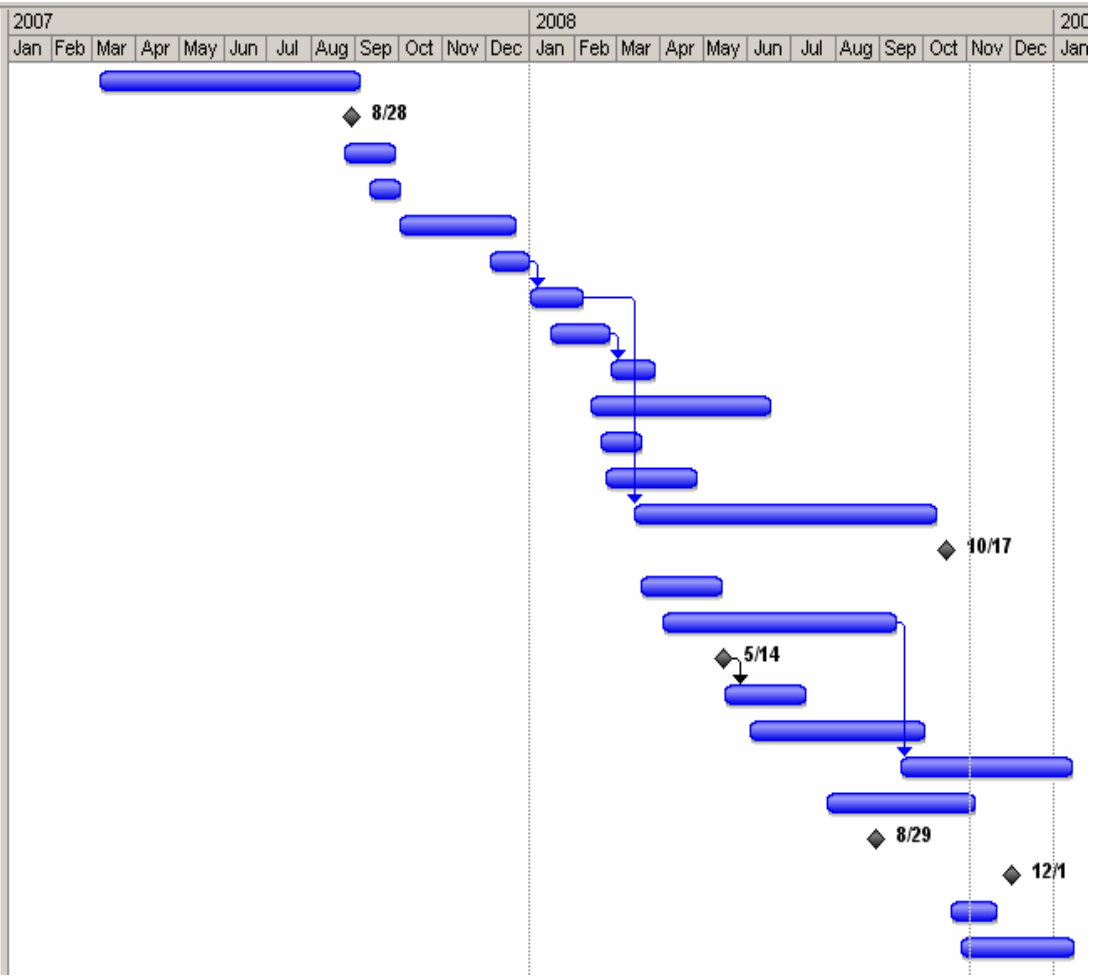
A. Project Schedule Summary

The following page shows a major activity schedule for the construction of 50 Connell Drive. Foundations were the first item of work for Turner to manage in their scope. To begin excavating for the foundations the site must be cleared and ready for construction. Early in the project this was a concern to the CM, Turner Construction, because the owner was responsible for clearing the site. Turner feared that the owner would not have the site ready for turnover and the project would be delayed.

The erection of the steel was sequenced in bays. Work began on the north side of the building. When all the bays on the north side were erected the crawler crane repositioned to the south side of the building. The rest of the trades who worked on the structure, bolters, welders, steel decking, and concrete workers followed in a "parade of trades". The project team decided to start erecting steel on the north side of the building because there is an electrical room and a mechanical room on the north side. Since these activities are on the critical path it was determined it would be wise to have that area completed as soon as possible. Work on the curtain wall and exterior stone panels began on the south elevation of the building and proceeded in a clockwise pattern all the way around the building.

The original project schedule called for the finishes to proceed in a top-down sequence. However this is not what the construction team decided to do. Instead of using the traditional top-down or bottom-up approach they decided to finish the floors in the following order: $2^{nd} \rightarrow 3^{rd} \rightarrow 1^{st} \rightarrow 4^{th}$. The team decided that this would be the most efficient order to follow. The team did not want to do a traditional top-down sequence because the roof above the 4^{th} floor is composed entirely of long span bar joists. This means that in order for the 4^{th} floor to be ready for interior work they would need to wait for the spray on fire proofing to be completely installed. This meant the team had to wait for the bar joists that support the roof to be completely installed. The team did not want to follow a bottom-up sequence because the 1^{st} floor has a lot of mechanical equipment, a kitchen and cafeteria. By jumping floors they were able to sequence efficiently and actually managed to get ahead of schedule.

	Task Name	Duration	Start	Finish
1	Design Phase	130 days	Tue 3/6/07	Mon 9/3/07
2	Procurement of CM Services	1 day	Tue 8/28/07	Tue 8/28/07
3	Strip Site	27 days	Thu 8/23/07	Fri 9/28/07
4	Excavation for Foundations	16 days	Mon 9/10/07	Mon 10/1/07
5	Pour and Backfill Foundations	60 days	Mon 10/1/07	Fri 12/21/07
6	Install Underground Ductbank for Elec/Tele/Cc	21 days	Mon 12/3/07	Mon 12/31/07
7	Erect Structural Steel	27 days	Tue 1/1/08	Wed 2/6/08
8	Install Decking and Studs	31 days	Mon 1/14/08	Mon 2/25/08
9	Pour Slabs on Deck	23 days	Tue 2/26/08	Thu 3/27/08
10	MEP Rough In and Framing	91 days	Mon 2/11/08	Mon 6/16/08
11	Spray on fireproofing	21 days	Tue 2/19/08	Tue 3/18/08
12	Install Roofing - Main Roof	46 days	Fri 2/22/08	Fri 4/25/08
13	Install Stone Panels and Spandrel Glass	152 days	Thu 3/13/08	Fri 10/10/08
14	Weather Tight	1 day	Fri 10/17/08	Fri 10/17/08
15	Install Roofing - Penthouse Roof	41 days	Tue 3/18/08	Tue 5/13/08
16	MEP Equipment and Risers	118 days	Wed 4/2/08	Fri 9/12/08
17	Suffiencently Water Tight for GWB	1 day	Wed 5/14/08	Wed 5/14/08
18	Hang and Finish Drywall	42 days	Thu 5/15/08	Fri 7/11/08
19	Site Work - Parking Lot, Sidewalks, Landscap	89 days	Mon 6/2/08	Thu 10/2/08
20	MEP Testing & Inspections	86 days	Mon 9/15/08	Mon 1/12/09
21	Core Finishes	75 days	Fri 7/25/08	Thu 11/6/08
22	Start of Owner Fit Out	1 day	Fri 8/29/08	Fri 8/29/08
23	Core and Shell Complete	1 day	Mon 12/1/08	Mon 12/1/08
24	Punchlist	25 days	Mon 10/20/08	Fri 11/21/08
25	Project Closeout	58 days	Mon 10/27/08	Wed 1/14/09



B. Building Systems Summary

Demolition

- A one story brick and masonry building was removed to make space for the new project
- An existing parking lot of approximately 200 parking spaces was also removed
- The owner has no knowledge of any hazardous materials that needed to be removed from the structure

Structural Steel Frame

- Erected in bays from west to east along the north side of the building and then from east to west along the south side of the building
- 150 ton crawler crane used to erect steel
- Crane paths on both the north side and south side of the building
- Composite metal deck floor slabs with normal weight concrete topping
- Vertically braced moment frame to resist lateral forces

Cast in Place Concrete

- All concrete was placed with a pump
- Jump forms were used for vertical sections
- Steel frame with plywood Simon Forms were used for grade beams and footings

Precast Concrete

- There are a series of small architectural precast panels on the exterior of the building along the north and south elevation

Mechanical System

- Combination air/water system with a two pipe direct return
- Mechanical penthouse located on roof
- Total of four air handling units
- Two main air handling units located inside the penthouse do the bulk of the work. They are capable of supplying 15,500 CFM and 18,400 CFM with a capacity of 710 MBU and 841 MBU respectively.
- A 2000 CFM, 180 MBU unit is also located in the penthouse
- A 6000 CFM unit located at the loading dock on the ground floor
- Ductwork carries air to fan powered VAV terminal unit boxes where an electric unit heaters and self contained AC units are used to control the air temperature in each room
- Boils located within the penthouse heat the water that is circulated through the building

- Cooling towers inside the penthouse remove heat from the return water supply that is used for cooling the building
- Water supply and fire pump room located on the 1st floor adjacent to loading docks
- Combination dry pipe and wet pipe sprinkler system. However the majority of the building is protected by the wet system that is set up in a loop configuration around the building.

Electrical System

- 13.2 KV service feed into building
- Electrical room located on ground floor
- Two 15 KV Medium Voltage switchgears
- 480 volt 3 phase power for heavy equipment
- TP-1 dry type 15 KV transformers step power down to 208Y/120V for light equipment and office use
- A 2900 MBU natural gas powered backup generator located within a below grade vault
- Battery powered emergency lighting

Masonry

- The only masonry is 8" lightweight CMU partition walls that enclose the loading dock

Curtain Wall

- Prefabricated panelized ribbon window curtain wall sections
- The Trainor Glass Company was in charge of design and installation of the glass curtain wall
- Exterior wall panels of Indiana limestone and granite make up the facade

Support of Excavation

- A sloped cut was used on this project during the foundation work. Due to the soil quality and shallow depth of excavation there was no need to engineer any type of temporary soil retention structure.
- Adjacent to the building there is a 10 foot high keystone retaining wall
- A series of well points with 2 foot corrugated pipe was used as a dewatering system
- Water was pumped out as needed

C. Project Cost Evaluation

- Actual building Construction Cost (with contractor fee) is $41,984,00 Million
- Construction Cost is $227.48 per square foot
- Total Cost is $46.2 Million
- Total Cost is $250 per square foot
- See **Figure 2** for a systems cost breakdown

Project: 50 Connell Drive			
Building Systems Cost			
Division	**Description**	**Cost**	**Cost/sf (184,541 sf)**
1	General Requirements	$1,162,613	$ 6.30
2	Site Construction	$4,546,222	$ 24.64
3	Concrete	$3,451,598	$ 18.70
4	Masonry	$3,171,231	$ 17.18
5	Metals	$6,679,805	$ 36.19
6	Wood and Plastics	$2,001,169	$ 10.84
7	Thermal and Moisture Protection	$1,611,126	$ 8.73
8	Doors and Windows	$3,924,899	$ 21.27
9	Finishes	$1,159,080	$ 6.28
10	Specialties	$320,726	$ 1.74
11	Equipment	$858,187	$ 4.65
12	Furnishings	$158,646	$ 0.86
14	Conveying Systems	$980,245	$ 5.31
15	Mechanical	$7,845,063	$ 42.51
16	Electrical	$4,113,458	$ 22.29
	Total	**$41,984,068**	**$ 227.48**

Figure 2- Building System Cost

RS Means Cost Estimate

The reference page for RS Means 2007 can be found in Appendix B.

The following RS Means square foot cost estimate was obtained from Commercial/Industrial/Institutional 2-4 Story Office building with 12ft story height. A Glass and Metal Curtain Wall with a Steel Frame was assumed.

50 Connell Drive:
14 ft floor to floor story height
46,000 SF/Floor
900 LF perimeter

Through interpolation basic unit cost = $143.23/SF
Perimeter adjustment add $3.62 per 100LF
Adjusted unit cost = (423/100)($3.62) + $143.23 = $158.54

Adjustment for story height add $1.29/ft
Adjusted unit cost = (14ft-12ft)($1.29) + $158.54 = $161.12/SF

Additives:
4 elevators = 4($60,400+ 2($875))= $248,600 = $1.35 add on per SF
Adjusted unit cost = $162.47

Assemblies adjustment - Exterior walls – Stone veneer
Indiana limestone 2” thick = additional $42.40/SF
Adjusted unit cost = $204.87/SF

Location factor for Newark, NJ = 1.10
Adjusted unit cost = $225.36/SF

RS Means produced a square foot estimate of $225.36/SF. This is very close to the actual construction cost of $227.48/SF. RS Means provides an average cost for union labor. The workforce on this project is entirely union labor and MS Means proved to be accurate.

D4 Cost 2002 estimating Software

D4 Cost Estimating is a database of buildings that have a known cost. To make an estimate you must choose buildings of similar size and function to the one you are using and the program will average their costs together to give you an estimate. This was a challenge because there weren’t any buildings that were a close match. The three

buildings that I used were all commercial buildings. However buildings that had a square footage similar to 50 Connell Drive had the wrong number of stories or vice versa. Some structures on the list were of similar size but they were parking garages and would not give an accurate measurement of cost. The software produced an estimate of $58,781,714. This estimate is approximately $19.9 Million higher than the actual building construction cost. It was expected that D4 would produce an estimate that is not very close to the actual cost since the software is only as good as the buildings in the database. See Appendix B for the D4 cost statement.

D. Site Plan

Figures 3, 4 and 5 below illustrate the site utilization plan for the project.

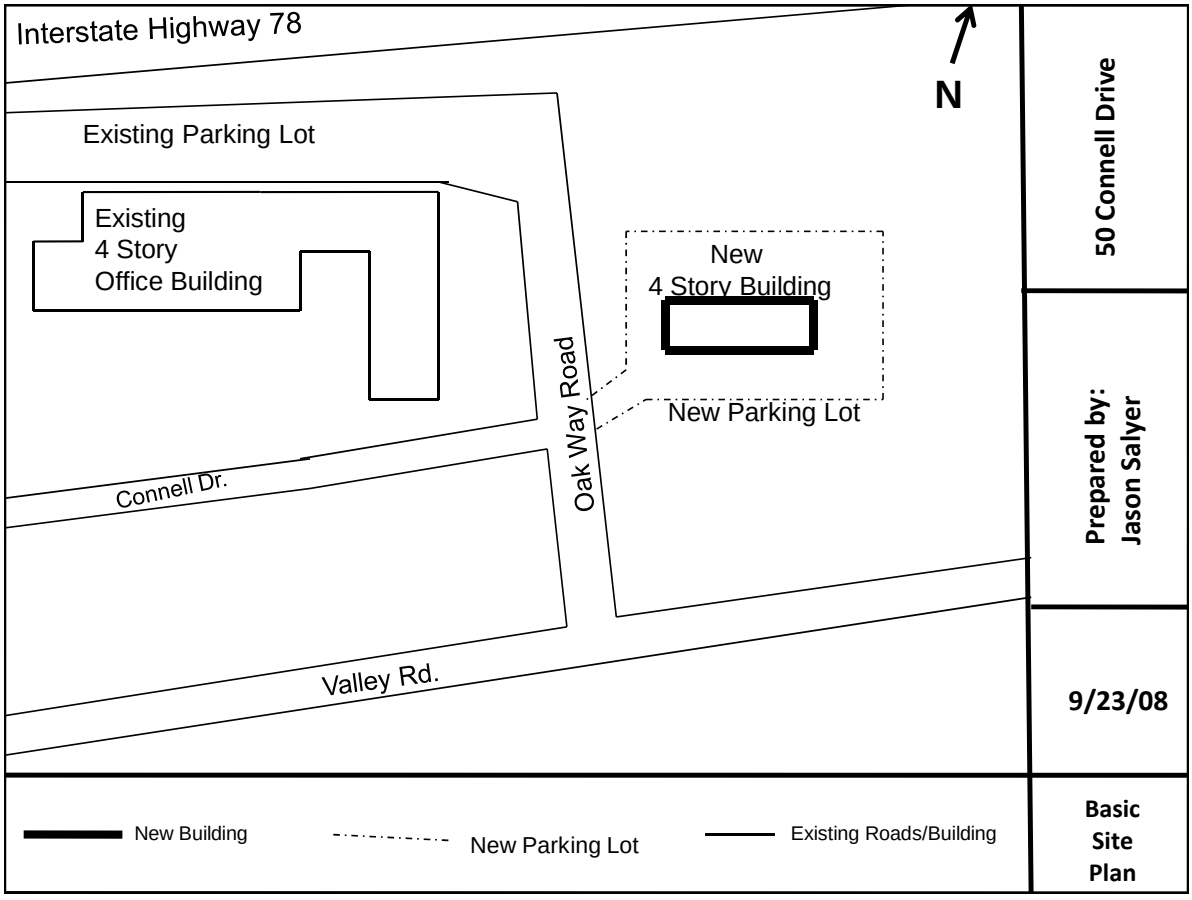


Figure 3 – Site Plan

Figure 3 shows the basic relationship between the new building and the surrounding area. For more detail see enlarged site plans below.

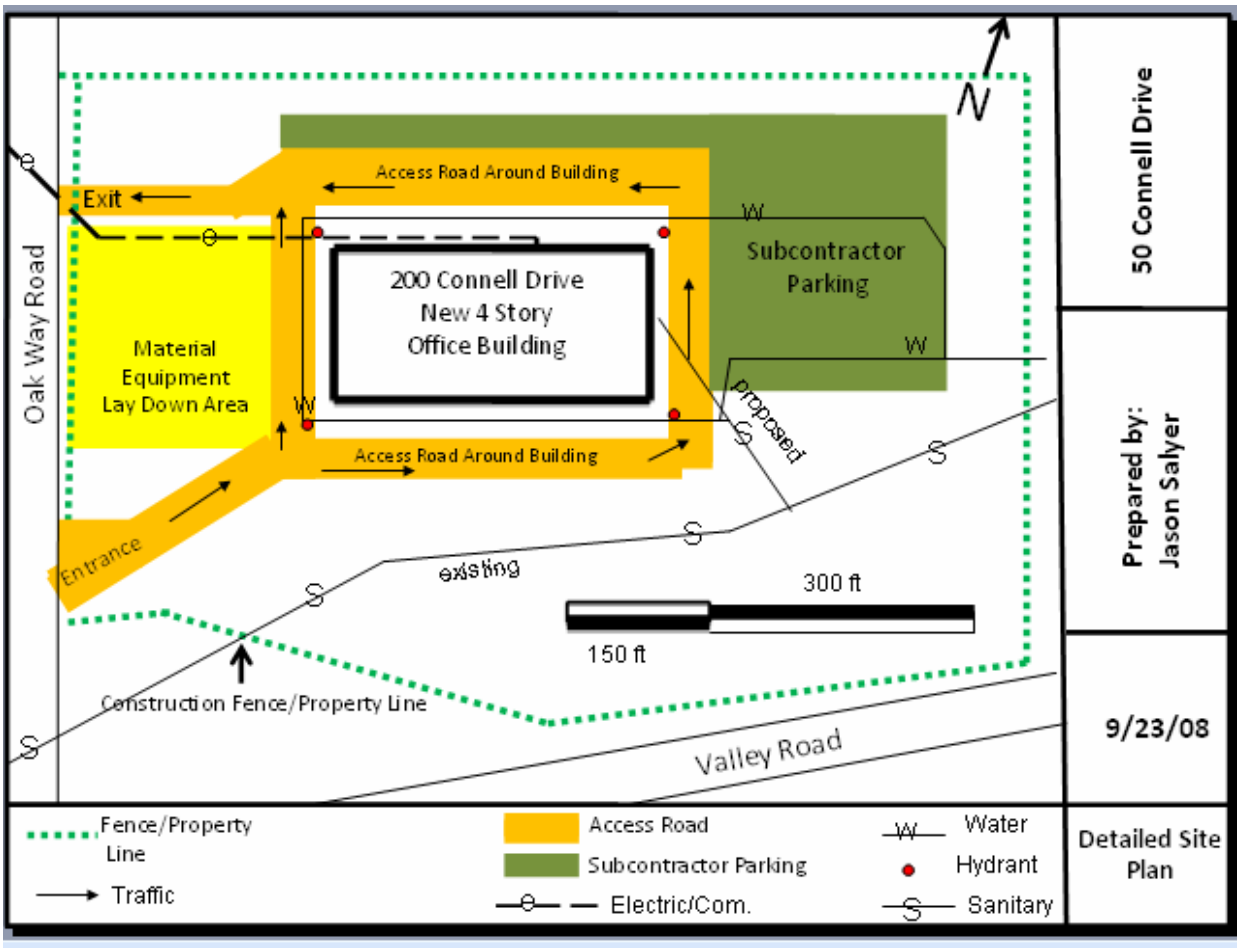


Figure 4 – Enlarged Site Plan

Figure 4 is an enlarged site plan. It shows the location of the utilities and the flow of traffic

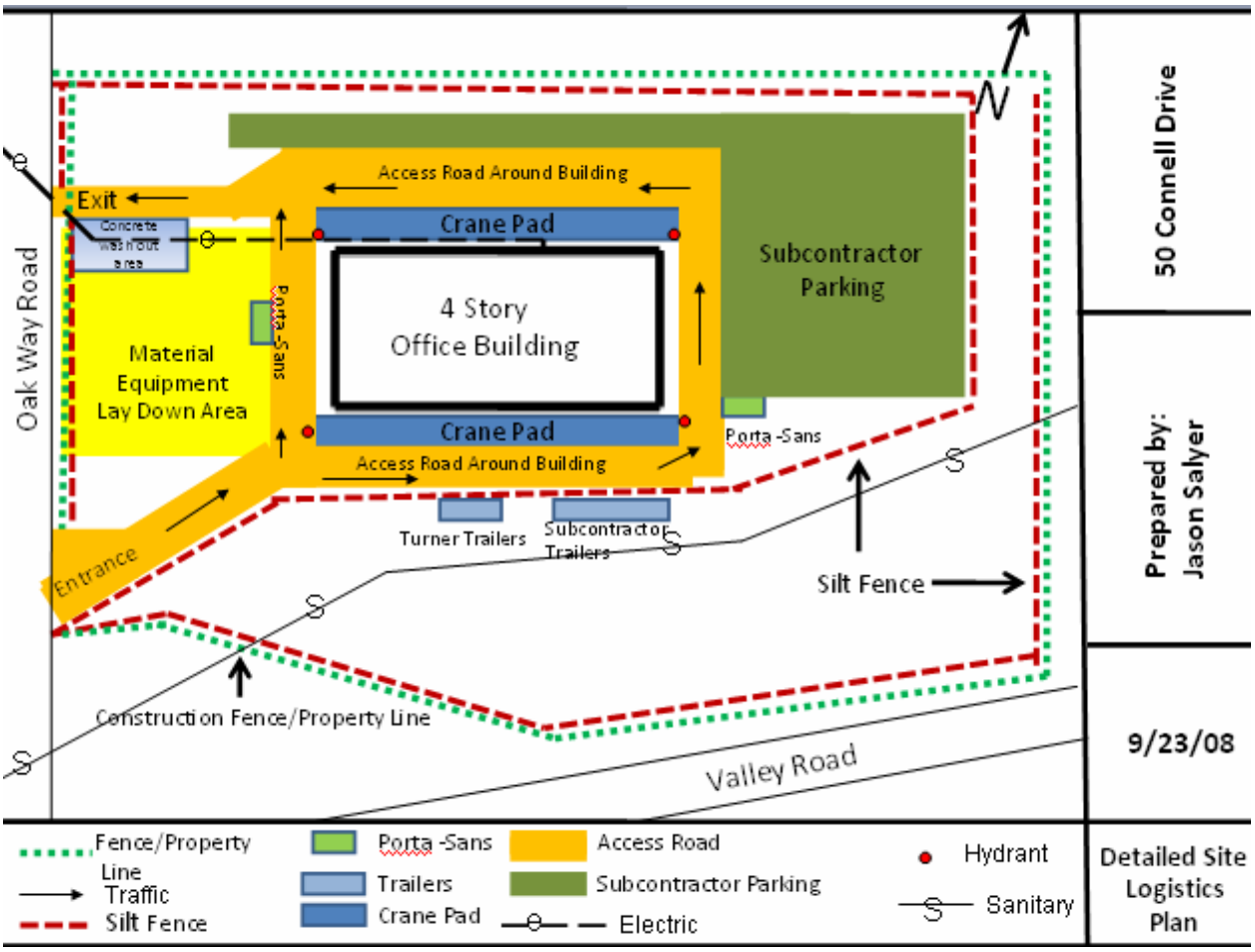


Figure 5 –Detailed Site Logistics Plan

Figure 5 shows general conditions items that are provided by the contractor. It also shows the relationship between the utilities and traffic flow on the site.

E. Local Conditions

This project is being built in Berkeley Heights, an area located in northern New Jersey. This area is in close proximity to New York City but is not an overly congested urban environment. Since it is near New York City the area has the infrastructure, materials and workforce to support a medium size building project. Steel construction is generally favored in this part of the country. That makes it readily available and the region has a workforce that is experienced with this type of construction.

The climate of this area can vary dramatically depending on the time of year. This region typically has hot summers and cold winters. The cold winters necessitate the use of cold weather concrete. The project team would ideally want to avoid pouring concrete in the winter months to avoid paying the premium price for a cold weather mix.

The site is composed of granular soil. Unlike a fine clay, granular soils do not retain a lot of water. This is beneficial to the construction team. Drainage was not a major problem on the site. Water was pumped out as needed during the excavations phase of the project.

Tipping fees are relatively expensive in this area. According to the waste industry New Jersey's average tipping fee was $73 per ton in 2007 [Solid Waste Digest, Year 17, Report #1. 2007]. Since this project is pursuing a LEED Gold Certification there is a plan to recycle building materials and divert as much waste as possible from landfills. By recycling materials the contractor can potentially profit from their disposal and help offset the cost of the material that does require a tipping fee.

The actual building site is a fairly large area of approximately 12 acres. This gives the project team some flexibility in laying out their staging areas. These staging areas are critical especially because this is a steel building and steel structures require a lot of space for material staging. Erection of the steel also requires the use of a 150 ton crawler crane. There will also be multiple trucks entering and exiting the site on a daily basis to deliver steel. Fortunately this is not a major concern for the team and they will not be required to schedule their deliveries to the nearest minute as is required in some congested downtown construction sites. Since the site is not congested there is enough parking available on site for all the workers.

F. Client Information

The owner of this project is The Connell Company. They are a large privately owned corporation with several subsidiary companies. This building is being built by their Real Estate and Development division. The company develops and manages Class A commercial office buildings. This project is being constructed as part of a contractual agreement with L'Oreal USA Incorporated, one of Connell's existing tenants. L'Oréal USA is based in New York City and has expanded into nearby Berkeley Heights, NJ. The company develops and manufactures haircare, haircolor, skincare, color cosmetics and fragrances for the consumer market. Since Connell is developing this building for a cosmetic company they are putting an effort into making the building as aesthetically attractive as possible. This is accomplished by using a high quality exterior façade made of granite and limestone. It seems fitting to the owner that a company who specializes in beauty has a beautiful building to work in.

The Connell Real Estate and Development Company expect the overall building costs to be under $50 Million. This includes design, construction, land costs, permitting, etc. The company expects the construction costs to be under $40 Million. Connell has a long time working relationship with the contractor. If the job is completed within budget and to their satisfaction there is a good chance that the owner will hire the contractor for future building projects. This is a motivating factor for the project team to meet the budget restraints of the project.

The owner expects a safe working environment on the construction site. However, Connell was not directly involved with the safety plan. Turner, as the construction manager at risk, is responsible for safety on the project.

Connell expects Turner to have the building ready for turnover in December of 2008. Once the building has been turned over tenant fit out of the space will begin. It has yet to be determined which contractor will be selected for the interior fit out work. The owner expects to have occupancy in July of 2009. They do not expect to have any phased occupancies for the building.

The key to completing the project to the owner's satisfaction is simply to finish the job on time, within budget and have a high quality finished product that satisfies their tenant. If the contractor can complete the job to their satisfaction Connell would like to work with them on future projects that are in the planning stages.

G. Project Delivery System

This project is CM at Risk. This path was chosen because the owner believed that it was the best delivery method given the market conditions at the time. Turner Construction was chosen as the construction manager for the core and shell of the project.

Turner was chosen by the Connell Company to work on this project because of a pre-existing relationship that the two parties had. Turner has successfully completed past jobs for them and as a result the Connell Company has a lot of trust that Turner will deliver the project to their satisfaction. The owner chose not to release detailed information regarding the essence of the contract terms but did indicate that there is a cost plus a fee contractual agreement. They also have an OCIP insurance policy on the project. The OCIP insurance policy also covers payment and performance bonds between parties. See **Figure 6** for other contractual relationships.

Turner holds lump sum contracts with all of their subcontractors. This is a standard practice within the industry. This method makes it easier to handle change orders and the affect that they have on the project's budget.

The project delivery system was appropriate for this project. As part of the owner's contractual agreement with their tenant they must provide a new building by a certain date. This agreement was reached well in advance of that date. This allowed plenty of time to complete the design phase, bid the job and build it in time for the tenant to move in. An advantage of design-bid-build is the design is complete before the contractor bids the job and begins work in the field. This means there is less uncertainty for the contractor and he knows exactly what he is buying. That can potentially result in a lower contingency fee. However there is a drawback to this delivery system. Work in the field can only begin once the design has been completed. This can be a lengthy period of time. If the owner is trying to open the building ahead of schedule it would have been better to use design-build.

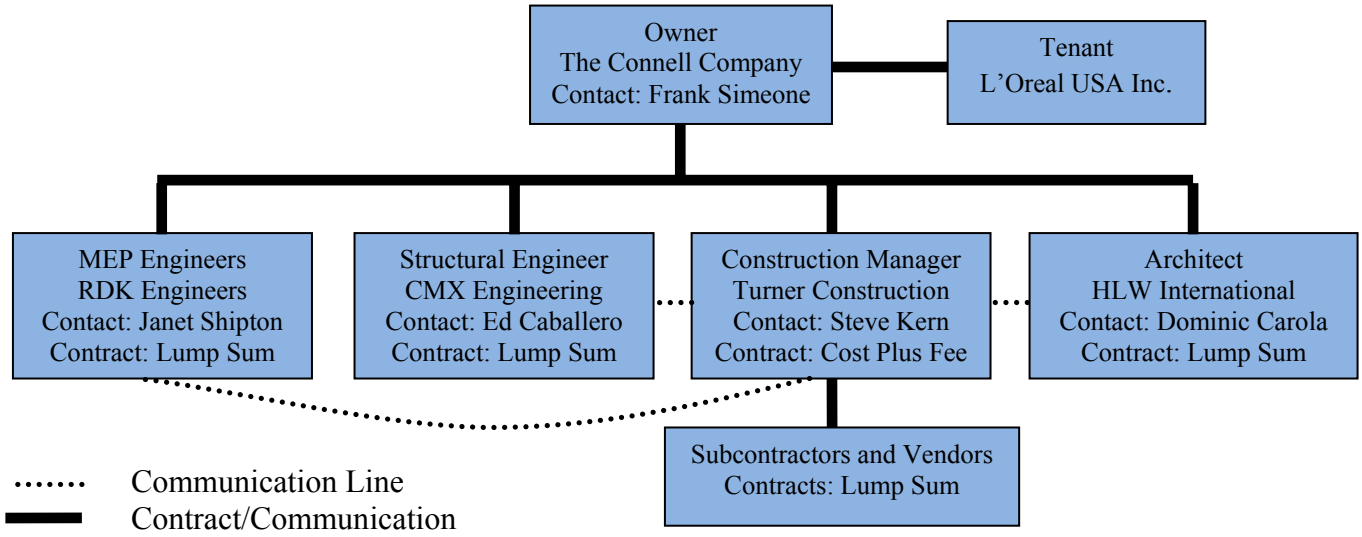


Figure 6 – Project Delivery

H. Staffing Plan of CM

On the next page **Figure 7** shows how the construction team is arranged. It is the typical arrangement for a Turner project. The vice president is in charge of finding and pursuing jobs for the company. The vice president reports directly to the general manager who is the head of Turner's regional office. Once the work has been procured we move on to the project level with the project executive. The executive is responsible for the overall success of the job. He has many people from several different departments within the company that report to him. These departments include Engineering, Purchasing, Cost and Superintendents. The senior engineer and superintendent both work on the jobsite and they are in charge of preparing the job on paper before field work can begin and supervision of field work respectively. The two field engineers spend the majority of their time walking the construction site and solving problems in the field as they arise. They report to the superintendent. The project engineer and assistant engineer spend the majority of their time working out of the job trailer. The engineers and superintendents work very closely with one another to accomplish the job successfully. The purchasing engineer and cost engineer communicate with one another to track the dollars on the job and determine how to allocate money. Unlike the engineers and superintendents they work on multiple projects at a time and are based out of the main office rather than the jobsite.

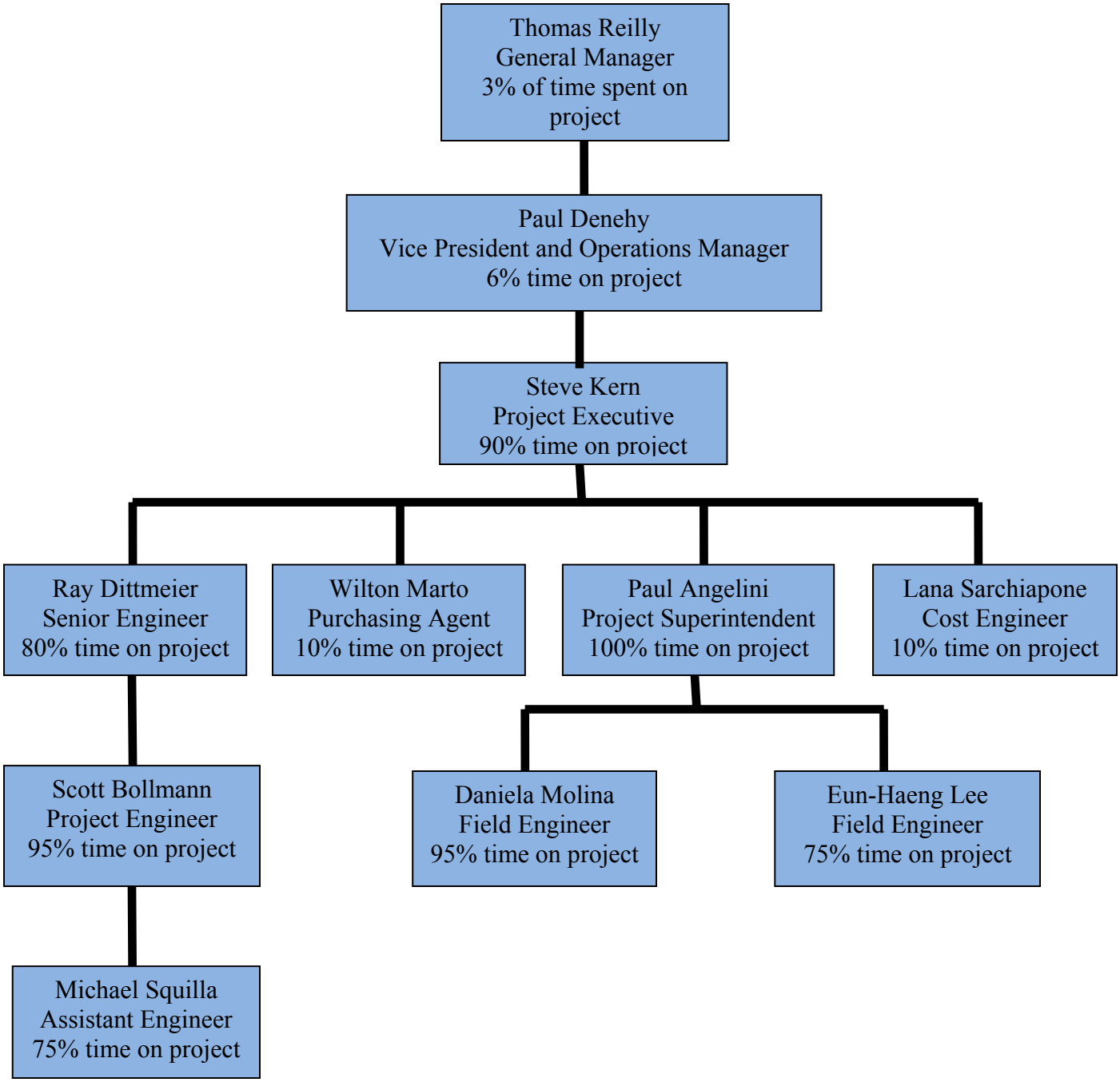


Figure 7 – Staffing Chart

Appendix A – RS Means Data

COMMERCIAL/INDUSTRIAL/ INSTITUTIONAL | **M.460** | **Office, 2-4 Story**

Costs per square foot of floor area

Exterior Wall	S.F. Area		8000	12000	16000	20000	35000 *	50000	65000	
	LF. Perimeter	220	260	310	330	360	440	490	548	580
Face Brick with Concrete Block Back-up	Wood Joists	207.70	177.60	160.45	148.75	142.60	130.55	124.75	121.85	119.45
	Steel Joists	212.65	182.55	165.35	153.70	147.50	135.45	129.65	126.80	124.40
Glass and Metal Curtain Wall	Steel Frame	248.40	210.10	188.25	172.65	164.80	148.95	141.15	137.35	134.10
	R/Conc. Frame	246.15	207.90	186.00	170.70	162.65	146.75	139.00	135.10	131.95
Wood Siding	Wood Frame	171.00	147.70	134.50	125.95	121.30	112.50	108.30	106.25	104.60
Brick Veneer	Wood Frame	187.55	160.00	144.25	133.75	128.10	117.25	112.05	109.40	107.30
Perimeter Adj., Add or Deduct	Per 100 L.F.	32.50	20.25	13.50	10.15	8.10	4.65	3.25	2.45	2.00
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	5.30	3.90	3.10	2.60	2.15	1.55	1.20	.95	.80

For Basement, add $ 29.60 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 $65.15 to $ 226.20 per S.F.

Common additives

Description	Unit	$ Cost
Clock System		
20 room	Each	15,000
50 room	Each	36,400
Closed Circuit Surveillance, One station		
Camera and monitor	Each	1675
For additional camera stations, add	Each	910
Directory Boards, Plastic, glass covered		
30" x 20"	Each	570
36" x 48"	Each	1375
Aluminum, 24" x 18"	Each	555
36" x 24"	Each	635
48" x 32"	Each	885
48" x 60"	Each	1850
Elevators, Hydraulic passenger, 2 stops		
1500# capacity	Each	53,600
2500# capacity	Each	56,200
3500# capacity	Each	60,400
Additional stop, add	Each	8750

Description	Unit	$ Cost
Smoke Detectors		
Ceiling type	Each	171
Duct type	Each	440
Sound System		
Amplifier, 250 watts	Each	2125
Speaker, ceiling or wall	Each	174
Trumpet	Each	335
TV Antenna, Master system, 12 outlet	Outlet	288
30 outlet	Outlet	185
100 outlet	Outlet	173

Statement of Probable Cost

50 Connell - May 2007 - NJ - Newark

Prepared By:		Prepared For:	
	,		,
	Fax:		Fax:
Building Sq. Size:	**164175**	Site Sq. Size:	**212531**
Bid Date:		Building use:	
No. of floors:	**3**	Foundation:	
No. of buildings:		Exterior Walls:	
Project Height:		Interior Walls:	
1st Floor Height:		Roof Type:	
1st Floor Size:		Floor Type:	
		Project Type:	

Division		Percent	Sq. Cost	Amount
00	**Bidding Requirements**	**58.81**	**214.13**	**35,154,686**
	Bidding Requirements	1.13	4.13	677,936
	50 Connell Drive	57.67	210.00	34,476,750
01	**General Requirements**	**3.58**	**13.04**	**2,140,042**
	General Requirements	3.58	13.04	2,140,042
02	**Site Work**	**3.33**	**12.12**	**1,990,596**
	Site Work	3.33	12.12	1,990,596
03	**Concrete**	**6.71**	**24.42**	**4,008,380**
	Concrete	6.71	24.42	4,008,380
04	**Masonry**	**2.50**	**9.09**	**1,491,662**
	Masonry	2.50	9.09	1,491,662
05	**Metals**	**3.68**	**13.42**	**2,202,927**
	Metals	3.68	13.42	2,202,927
06	**Wood & Plastics**	**0.80**	**2.92**	**479,548**
	Wood & Plastics	0.80	2.92	479,548
07	**Thermal & Moisture Protection**	**1.32**	**4.80**	**788,359**
	Thermal & Moisture Protection	1.32	4.80	788,359
08	**Doors & Windows**	**1.68**	**6.10**	**1,001,744**
	Doors & Windows	1.68	6.10	1,001,744
09	**Finishes**	**5.05**	**18.41**	**3,021,835**
	Finishes	5.05	18.41	3,021,835
10	**Specialties**	**0.35**	**1.28**	**210,557**
	Specialties	0.35	1.28	210,557
11	**Equipment**	**0.09**	**0.31**	**51,448**
	Equipment	0.09	0.31	51,448
12	**Furnishings**	**0.30**	**1.11**	**182,077**
	Furnishings	0.30	1.11	182,077
14	**Conveying Systems**	**0.35**	**1.28**	**210,617**
	Conveying Systems	0.35	1.28	210,617
15	**Mechanical**	**5.49**	**20.00**	**3,283,830**
	Mechanical	5.49	20.00	3,283,830
16	**Electrical**	**5.96**	**21.70**	**3,563,406**
	Electrical	5.96	21.70	3,563,406
Total Building Costs		**100.00**	**364.13**	**59,781,714**

Total Non-Building Costs	**100.00**	**0.00**	**0**
Total Project Costs	**--**	**--**	**59,781,714**

Building Division Notes

50 Connell - May 2007 - NJ - Newark

Bidding Requirements	Averaged subdivision. Used in 4 of 4
General Requirements	Averaged subdivision. Used in 3 of 4
Site Work	Averaged subdivision. Used in 4 of 4
Concrete	Averaged subdivision. Used in 4 of 4
Masonry	Averaged subdivision. Used in 3 of 4
Metals	Averaged subdivision. Used in 4 of 4
Wood & Plastics	Averaged subdivision. Used in 4 of 4
Thermal & Moisture Protection	Averaged subdivision. Used in 4 of 4
Doors & Windows	Averaged subdivision. Used in 4 of 4
Finishes	Averaged subdivision. Used in 4 of 4
Specialties	Averaged subdivision. Used in 4 of 4
Equipment	Averaged subdivision. Used in 4 of 4
Furnishings	Averaged subdivision. Used in 2 of 4
Conveying Systems	Averaged subdivision. Used in 4 of 4
Mechanical	Averaged subdivision. Used in 4 of 4
Electrical	Averaged subdivision. Used in 4 of 4

Non-Building Division Notes

50 Connell - May 2007 - NJ - Newark

Project Notes

50 Connell - May 2007 - NJ - Newark

User Defined Fields

50 Connell - May 2007 - NJ - Newark

User Defined 1:

User Defined 2:

User Defined 3:

User Defined 4:

User Defined 5:

User Defined 6:

User Defined 7:

User Defined 8: