



# Project X NYC. NY

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Construction Management

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# LUKE GRAY CONSTRUCTION MANAGEMENT

## PROJECT X NEW YORK

### MECHANICAL, ELECTRICAL, LIGHTING

MECHANICAL-AHU'S RANGING FROM 8650-6300CFM ON EACH FLOOR, SUPPLEMENTARY HYDRONIC FIN TUBE BASEBOARD RADIATION ALONG THE PERIMETER

ELECTRICAL-POWER IS DISTRIBUTED WITH 208/120V, 3-PHASE, 4 WIRE PANELS ON EACH FLOOR; DRY TYPE TRANSFORMER

LIGHTING-THERE ARE MANY TYPES LAMPS USED WITHIN THE BUILDING INCLUDING FLUORESCENT, INCANDESCENT, METAL HALIDE, H.I.D. FIXTURES. THE EMERGENCY LIGHTING FOR THE BUILDING IS SUPPLIED BY FLUORESCENT FIXTURES WITH A 90 MINUTE EMERGENCY BATTERY PACK.

### ARCHITECTURAL & STRUCTURAL

FOUNDATION-REINFORCED MAT SLAB

10" DEEP TWO-WAY FLOOR SLAB

COLUMN LAYOUT 24' X 24'

THE EXTERIOR WALLS NATURAL BRICK WITH THREE CURTAIN WALL SLOTS TO BREAK UP THE BRICK FACADE THAT BLENDS SEAMLESSLY INTO THE SURROUNDING HISTORICALLY RICH TOWN-HOUSES

THERE ARE THREE LEVELS OF 12" INTENSIVE GREEN ROOFS

CM-SKANSKA

ARCHITECT-MA ARCHITECTS

STRUCTURAL-ROBERT SILMAN

MECHANICAL-FMC ASSOCIATES

LIGHTING-RS LIGHTING DESIGN

DURATION-AUGUST 2008-JULY 2010

SIZE-54,640SF

BUILDING USE-OFFICES & THEATRE

[HTTP://WWW.ENGR.PSU.EDU/AE/THESIS/PORTFOLIOS/2011/LAG290/INDEX.HTML](http://www.engr.psu.edu/ae/thesis/portfolios/2011/LAG290/index.html)



## A. Executive Summary

After thoroughly going through the provided drawings, specifications, and pictures I realized that there are many issues that still need to be address. Recently, I went on a site visit to the site where the Project Manager gave me a walkthrough of the site. There I became aware of the complexities and engineering feats of the project. Among them is the underpinning of adjacent buildings, a green roof terrace, and historical preservation and restoration of an 100 year theatre.

The building will serve the community as a playhouse, office support space, as well as university office space. The site rests in a community with a rich historical brick building encroaching all around. To restore the historical features of the building the entrance doors, entrance canopy, masonry facade, signage, and lighting at the playhouse special measures are taken. Understanding the historical requirements upheld by the Greenwich District community was vital to ensuring successful project completion.

The existing four story 33,000SF building consists of four separate townhouses that were merged together during the 1940's. The building has historical and cultural significance in that it houses a 4,400SF playhouse on the ground and basement levels which is scheduled to remain. As part of the project, the interior of the theater will be demolished and rebuilt. Collaboration between the construction manager, architect, surveyor, and engineers was very important to the conservation of the existing walls.

This project shows the benefits of a project team working in unison. This project study exposes readers to the complexities of working in an urban environment; including subsurface conditions, urban construction logistics, construction practices, and methods.

In comparing the cost data of actual cost the GMP costs were used; costs don't not reflect the lump sum costs of the subcontractor. Due to shared savings method implement in the contractual agreement the Construction Management cost could be over prices or under prices. Since, the construction is in progress the final actual total costs are unclear. Over viewing historical data for project specific details is very important. No two projects are the same, so it is not easy to derive a finalized conceptual estimate from historical data and RS Means comparisons.

The project team must have expansive sustainable goals at the onset of the project in order to accomplish a sustainable building in the end. Having the construction manager, owner, architects, and engineers working is unparalleled to achieve the sustainable initiative.

## Table of Contents

<b>A. Executive Summary</b> .....	3
<b>B. Project Summary Schedule</b> .....	6
<b>C. Building Systems Summary</b> .....	8
Demolition .....	9
Structural Steel Frame .....	10
Cast-in-Place Concrete .....	11
Foundation .....	12
Mechanical System .....	13
Fire Protection .....	14
Electrical System .....	14
Masonry/Precast Lintels .....	15
Curtain Wall .....	16
Support of Excavation .....	18
Sustainability .....	19
<b>D. Project Cost Evaluation</b> .....	20
<b>E. Site Plan of Existing Conditions</b> .....	21
<b>F. Client Information</b> .....	25
<b>G. Local Conditions</b> .....	26
<b>H. Project Delivery System</b> .....	29

Table 1: Shows Building Systems Summary..... 8

Table 2: Shows Actual Project Costs ..... 41

Figure 1: Shows an Excavator in the Demolition Phase..... 9

Figure 2: Shows Hand Demolition method being utilized ..... 9

Figure 3: Shows Temporary Structural Steel Bracing..... 10

Figure 4: Shows Congested Site Due to Structural Steel Bracing ..... 10

Figure 5: Pump Truck Placement Method ..... 11

Figure 6: Shows the Addition of Shoring to the Steel Bracing ..... 11

Figure 7: Shows the Sheeting (Lagging) and Piles on the East Side (Mac Dougal Street)..... 12

Figure 8: Show the Sheeting (Lagging) and Piles on the West Side (Mac Dougal Street)..... 12

Figure 9: Illustrates the Heat Exchanger in the Neighboring Building Possessed by the Owner..... 13

Figure 10: Shows the Lintel Connection to the 8” CMU ..... 15

Figure 11: Shows the Three Curtain Walls Slots, Granite Base, Existing Wall to remain, and the Terracotta Cornice ..... 16

Figure 12: Shows a Typical Curtain Wall Connection..... 17

Figure 13: Illustrates the Connection Detail to the Concrete Slab ..... 17

Figure 14: Display the Dewatering System ..... 18

Figure 15: Demonstrates a Typical Green Roof Provided by Hydrotech ..... 19

Figure 16: Demonstrates the Existing Conditions Site Plan ..... 22

Figure 17: Illustrates the Site Utilities..... 23

Figure 18: Shows 3D Map of Site from Google Earth (This Illustrates the Height of the Surrounding Structures, as well as the Property Line in Red) ..... 24

Figure 19: Illustrates the Vicinity of Discounted Parking Colored in Red ..... 26

Figure 20: Shows the Traffic Route In and Out of New York City, NY from Google Maps..... 27

Figure 21: Shows the Directions to the Closest Hospital in Case of an Medical Emergency ..... 28

Figure 22: Shows the Project Team and Contract Types ..... 30

Figure 23: Show Staffing Plan for the Construction Manager Skanska ..... 31

Figure 24: Briefly Describes the Structure of the Project Management and Supervision Staff ..... 32

Figure 25: Shows the LEED Goals Set at the Beginning of the Project ..... 33

Figure 26: Shows Typical Structural Floor Plan..... 34

Figure 27: Illustrates the Minetta Creek Which at One Time Ran Directly Underneath the Site from Langan..... 35

Figure 28: Shows Boring Cores and Test Pits Used to Determine Foundation Types..... 36

Figure 29: Shows the Water Table..... 37



## B. Project Summary Schedule

The procurement phase consists of a variety of activities. Since, design decisions were ongoing during the construction project. Procurement phase of construction of is extended because the project is a fast-track project. The procurement stages includes: prepare bidders list, review of bid documents, owner review, finalize bidders, bid period, evaluation of bidder, owner approval of bidders, and awarding subcontractor. In addition, procurement includes the submittal, fabrication and develop, and mobilization of trades.

Throughout the construction process there were many complicated huddles to overcome. For example, the demotion phase which lasted duration of 31 weeks. This phase was extensive, because there were many requirements by New York City Department of Building, Department of Transportation, protective measures taken to protect adjacent structures, protective walkway, and scaffold for the Alley way. The demolition progressed linearly from the Roof Parapet to the 1<sup>st</sup> floor with duration of 60 days. The longest phase was the demolition of the 2<sup>nd</sup> floor, which compiled of 26 days. This was needed to allow the tradesmen time to demo the around theatres walls by hand demolition, which remained in place. In addition, the south and north adjacent buildings needed to be braced.

Excavation and foundations were a great engineering feat. Underpinning and footing heel blocks were needed to ensure there was no settlement of the playhouse's existing brick walls. Other measures included: sheeting and tie backs, addition underpinning of adjacent structures, and installation of a dewatering system. The primary foundation system is a matt slab. From the foundation stage the project progressed into the building frame and exterior frame.

Cast-in-place concrete frame supports the 10" 2-way concrete slab. The concrete columns and concrete slab was constructed with duration of 5 days per floor. The masonry perimeter walls were laid with at a rate of eight days per floor. The concrete superstructure is on the critical path to completion. Since, the superstructure was poured from October to February 24-7 temporary heat was needed to ensure a timely curing of the concrete. Temporary heat was also needed for the building finishes. Following the superstructure on the critical path to completion is the MEP and interior fit out.

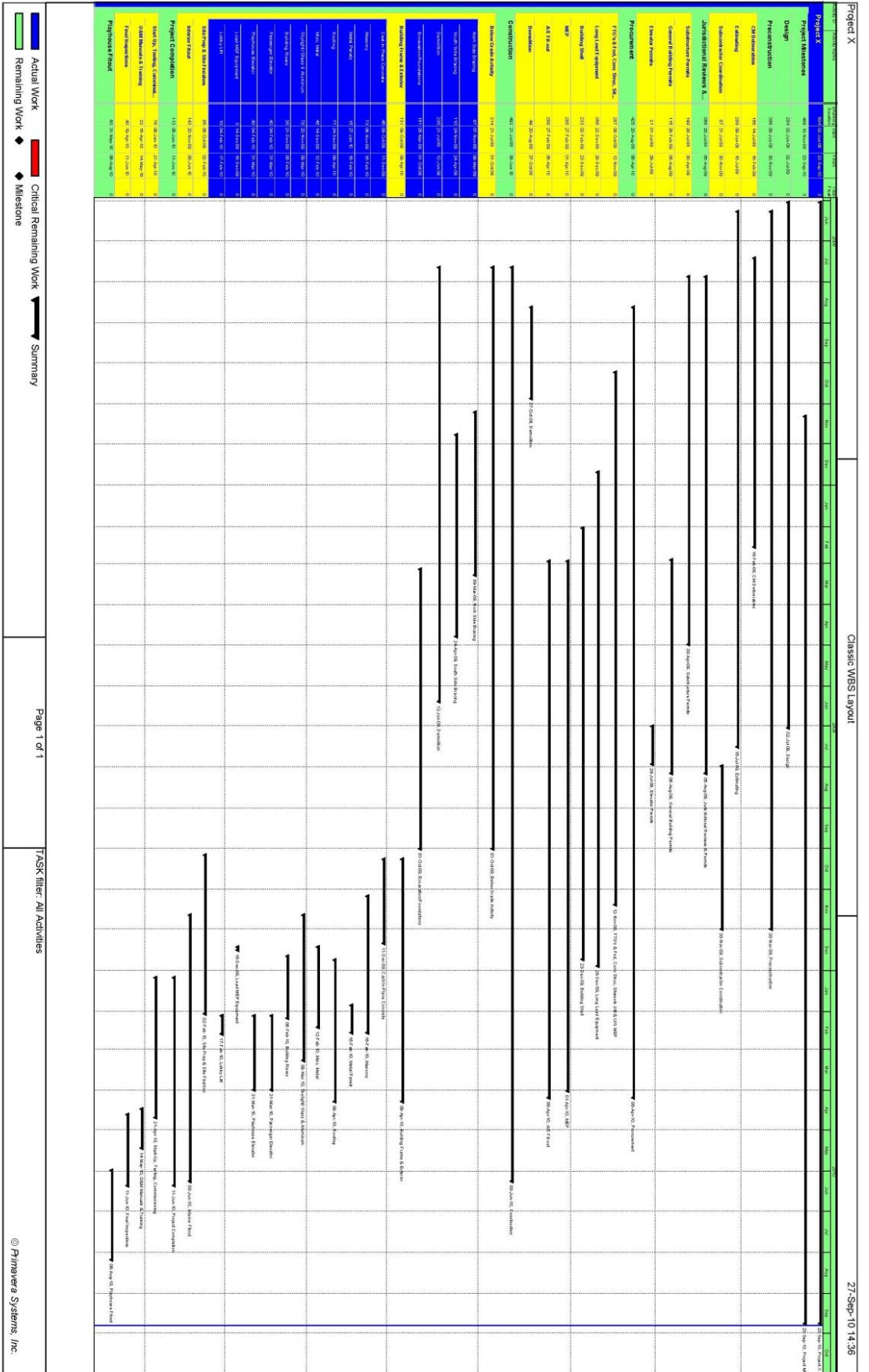


Figure 1: Project Summary Schedule

## C. Building Systems Summary

Material used same day as delivered, because there was no room for material storage. Long lead time items were needed to be coordinated prematurely to ensure a timely delivery. In addition safety nets were used along the perimeter walls to protect adjacent structure, one being a neighbor's greenhouse.

<b>BUILDING SYSTEMS SUMMARY</b>		
<b>YES</b>	<b>NO</b>	<b>WORK SCOPE</b>
X		DEMOLITION REQUIRED
X		STRUCTURAL STEEL FRAME
X		CAST-IN-PLACE CONCRETE
	X	PRECAST CONCRETE
X		MECHANICAL SYSTEM
X		ELECTRICAL SYSTEM
X		MASONRY
X		CURTAIN WALL
X		SUPPORT OF EXCAVATION

Table 1: Shows Building Systems Summary



## Demolition

The demolition of the existing building started with the removal of the hvac units from the roof. From there the Con Edison power and gas, Verizon services were cut off. Before demolition could start, an existing conditions survey of adjacent building was conducted. Through construction vibration monitoring was used. Asbestos Abatement was performed by owner. A protective sidewalk bridge was used to permit pedestrians flow during non-working hours. The demolition of the existing 33,000SF building consists of four separate townhouses that were merged together during the 1940's. The existing building is compiled of brick and mortar, which has been primarily demold by excavators. While, the playhouse required hand demolition method The building has historical and cultural significance in that it houses a 4,400SF playhouse on the ground and basement levels which is scheduled to remain. As part of the project, the interior of the theater will be demolished and rebuilt. The playhouse portion of the building is located at the southern end of the site's 8,430 SF footprint. Four walls of the original theatre which is located on the basement and ground floor level will remain throughout construction.

These four walls mortared together with various stone and brick will be temporarily preserved by shoring the walls with steel beam structural system. This is a very challenging task because there is a dentist office on the south side. In addition there are restaurants adjacent to the building which lends to daily delivery. Also there are apartments on the north and west side and a small one way street on the east side. The playhouse portion of the building is located in the southern end of the site



Figure 2: Shows an Excavator in the Demolition Phase



Figure 3: Shows Hand Demolition method being utilized

## Structural Steel Frame

A temporary steel frame was used to preserve the existing theatre walls and the adjacent building. This made construction activity very difficult due to the structural bracing. The steel bracing was anchored to the adjacent building's masonry wall. Double l-angle steel welded together was used for vertical members and round hollow structural sections (hss) steel tubing was used for the lateral members shown in Figures 3 and Figure 4. The existing adjacent structure required additional c-channel to reinforce the neighboring structure by tying into the floor wood trusses of the neighboring structure; because the wall was not load bearing wall it was only two courses thick. One lane of traffic was closed during construction to allow for a crawler crane to be used.



Figure 4: Shows Temporary Structural Steel Bracing



Figure 5: Shows Congested Site Due to Structural Steel Bracing

## Cast-in-Place Concrete

Conventional concrete two-way plate structure construction is utilized throughout the building with reinforcement specified by middle strip and column strip details. All of the concrete is 5000psi concrete. The floor construction is a 10” deep flat plate slab. The columns’ sizes range from 12”x24” to 18”x36”. The anticipated columns loads at cellar level for the new structure are about 1,000 kips (dead plus live load). The column layout is 24-feet on center. At the exterior column in the slabs stud rails by Decon are used to enhance the shear capacity of the floors along the eastern side of building. 12”x12” and 12”x13” beams are used to brace the slab along the east and west sides of the elevator. The cast-in-place concrete construction presented the construction team with many obstacles.

The concrete slabs and columns were poured at a rate of one floor per week, with a crew of 25 men. This progress was hindered by the complexities of the regulations for the new cast-in-place scissor stairs. The construction crew laid out the formwork to accommodate the conduct and water holes ahead of time before the pour, so that the penetrations did not weaken the structural integrity of the slab. One of the challenges encountered was pouring the 2<sup>st</sup> floor above the theatre. 26 feet of scaffolding was used to support the formwork and concrete; this logistical nightmare was intensified due to the steel structural bracing as shown in the Figure 6. Simon forms were used for the vertical formwork of the foundation walls and the load bearing wall in the theatre. A pump truck was used to place the cast-in-place concrete. Power trowel were used to finish the elevated slab.

Throughout construction vibration monitoring has been used to guarantee none of the adjacent buildings are disturbed. Despite the precautions taken to preserve the walls of the playhouse, the north wall had to be removed because of it’s the structural integrity.



Figure 6: Pump Truck Placement Method



Figure 7: Shows the Addition of Shoring to the Steel Bracing



## Foundation

The Foundation is a 30" thick matt slab on top of a 3" concrete mud slab. New 1' 4" thick foundation walls are used to support the office portion of the building. The playhouses existing walls support the 2<sup>nd</sup> through 6<sup>th</sup>. Buttresses laterally brace the existing masonry walls of the playhouse. In addition, there are Tie beams that span the playhouse in the north and south direction within the matt slab. Underneath the playhouse's tie beams is a new concrete footing. As addressed in the existing conditions new underpinning was added under the adjacent buildings along the north south and eastern sides of the building.



Figure 8: Shows the Sheeting (Lagging) and Piles on the East Side (Mac Dougal Street)

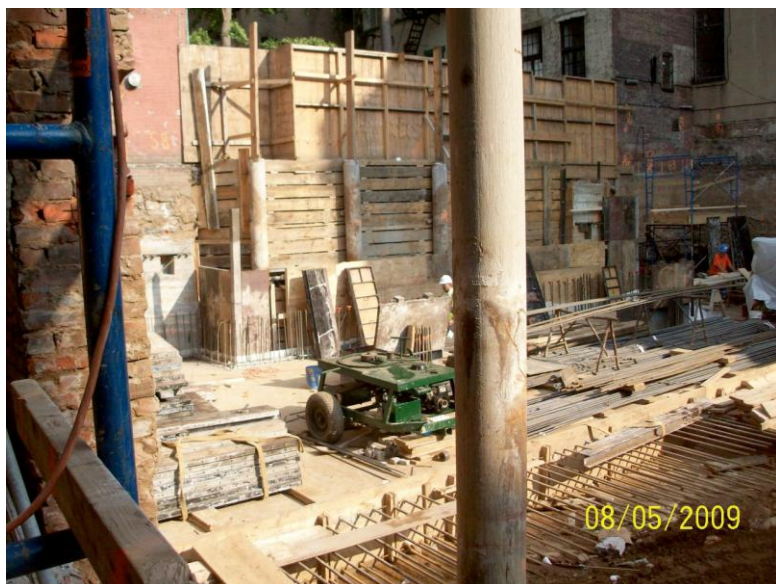


Figure 9: Show the Sheeting (Lagging) and Piles on the West Side (Mac Dougal Street)

## Mechanical System

The primary hvac system is constant air volume with vav boxes to regulate the temperature within the office building. Sound lining is installed in all of the ductwork. There are two air handling units in the theater both are 8650CFM located on the basement floor. Also, electric cabinet heaters are provided in the vestibule of the theatre and the office building in order to supplement for the excess of loads contributed by the entrance doors on the first floor. The basement of the office building is 4700CFM. The first floor has two 6000CFM air handling units. The office building air handling units are 6300cfm on the second to the fifth floor. The University's central plant will provide chilled water and hot water for cooling and heating via new underground source piping. The on campus Cogeneration Plant will allow for future utility tie-in. The hot water will come from this neighbor building through an underground tunnel; this caused the street separating the two buildings to be closed while the tunnel was excavated.

This building is unique in that the heat exchanger and the water pumps are located across the street. The heat exchanger is located on the cellar floor is 200GPM on the primary side and 40GPM on the secondary side. The hot water is supplied by a 200GPM pump and the chilled water is supplied with a 360GPM pump. These pumps are equipped with variable frequency drives. Electric unit heaters are provided in the mechanical and electrical rooms. Hydronic fin tub baseboard radiation is provided behind the windows of the building to compensate for the additional infiltration loads. This building is unique in that the heat exchanger and the water pumps are located across the street. Hence the coordination was very difficult.



Figure 10: Illustrates the Heat Exchanger in the Neighboring Building Possessed by the Owner

## Fire Protection

The main supply for the sprinkler system is a 6" pipe, which will be connected to an existing supply. In addition, there is a 3" x 3" x 4" Siamese connection for the sprinkler system. Each floor is equipped with a new floor control valve assembly. Also the building has a water flow detector on each floor. In the Lobby and corridor areas there are concealed sprinkler head with quick response. Open areas with no ceilings, closets, and steam/boiler rooms have upright sprinkler. Soffit areas and perimeter offices have a quick response head extended coverage with horizontal sidewall in order to reach a broader area. The minimum pressure at each sprinkler head is 7 psi. The design criterion is a wet pipe system. The light hazard office areas were designed for 0.10 gpm/sq.ft. The light hazard areas are designed for a maximum coverage per sprinkler head of 225 sq. ft. The ordinary hazard storage areas were designed for 0.16 gpm/sq.ft. Ordinary hazard areas are designed for a 225 sq.ft. maximum coverage per sprinkler head. Fire protection is supplied by a 400gpm 20hp electric fire pump and a jockey pump which is 9gpm 3/4hp.

## Electrical System

The existing play house service has been completely removed. The new service includes both the theatre and the office building. The new Con Edison service is split at the basement entrance one 3 sets of 4#500MCM, 1#1/0GND in (3) 3-1/2" C to the theatre. Alternatively, the office building's service is (8) sets of 4 #500MCM 1#1/0GND in (3) 3-1/2" C passes through a 2500A service switch then into the office building's switchboard No.1 1200A 120/208V, 3 phase 4 wire 60Hz. Each of the floors of the building is equipped with a lighting panel and receptacle panel. This allowed for easier coordination between the trades because only one 4 #500MCM-1#1/0GND-3-1/2" C feeder is supplied for each set of panel boards between floors.



## Masonry/Precast Lintels

The all natural brick veneer is non-bearing will seamlessly blend into the neighboring buildings. The 4" brick veneer is a running bond. Windows will be double hung with 4"x8"x4'-4" precast concrete lintels and 4"x4"x4' window sill lintels to accent the windows. Concrete lintels and the brick veneer are attached with a steel L-angle that is fastened to the 8" concrete masonry units. The expansion bolts anchor the angles. Cmu that have anchors going into mortar joint between them are grouted. The base of the building features a 70sf granite base at Mac Dougal Street. First through sixth floor features a brick facade. While, the sixth floor features 18" foot high terracotta cornice crown. Because the brick facade was laid in the winter temporary heat is needed for exterior masonry and building finishes. Swing scaffolding is used along the north, south, and east perimeter; while steel tubular masonry scaffolding is used for the west perimeter.

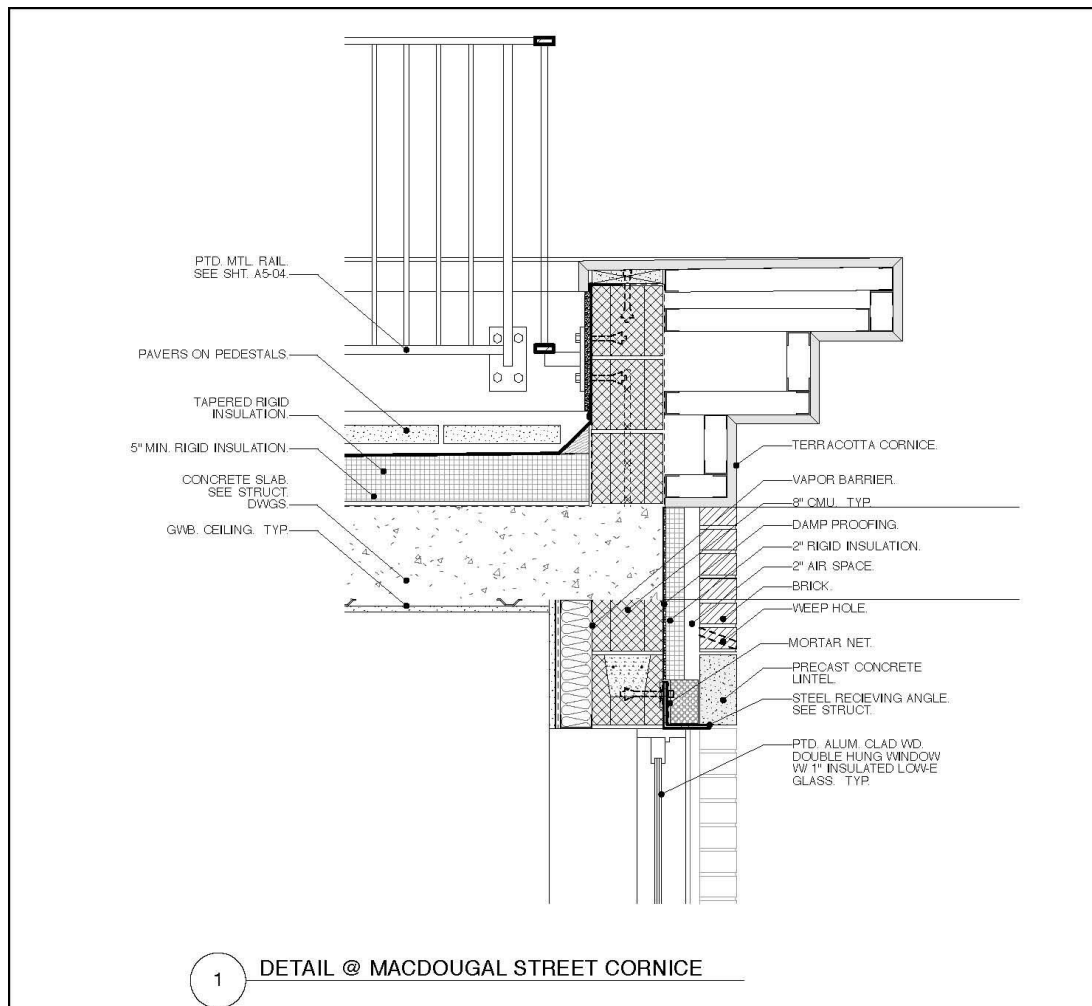


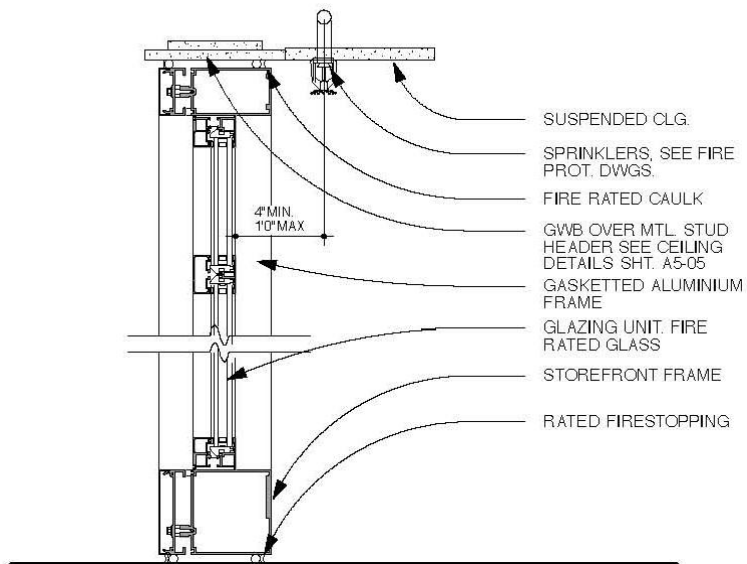
Figure 11: Shows the Lintel Connection to the 8" CMU

## Curtain Wall

Three curtain wall slots were chosen to break up the brick façade to blend in with the surrounding townhouse buildings. The curtain wall system type of glazing is the Kawneer powder coated aluminum. This curtain wall configuration is dry glazed gaskets. The glass features fire rated  $\frac{3}{4}$ " 2 ply glass. There is 2 Layers of  $\frac{1}{2}$ " fire rated gypsum board separating the curtain wall frame and metal stud which is mounted with a powder actuator fastener.

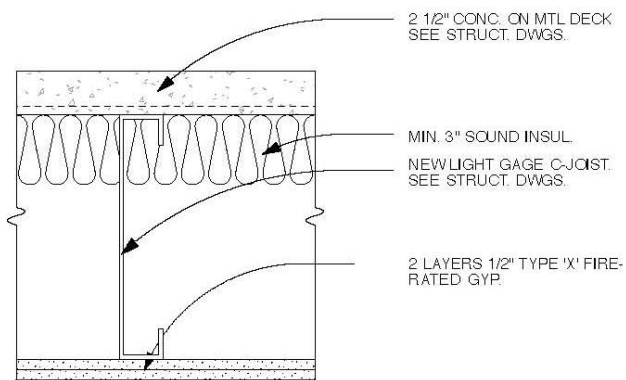


Figure 12: Shows the Three Curtain Walls Slots, Granite Base, Existing Wall to remain, and the Terracotta Cornice



**A2c** FIRE RATED GLASS WALL

Figure 13: Shows a Typical Curtain Wall Connection



**2 HR. - UL SYSTEM #S L505 OR L511**  
**FIRE/SMOKE DAMPERS APPLY HERE**

**G2f** FIRE RATED FLOOR/CEILING ASSEMBLY  
 ALTERNATE TO 'C2f' AT NEW FLOORS

Figure 14: Illustrates the Connection Detail to the Concrete Slab

## Support of Excavation

The site resides in an Metropolitan area. There are no streams or natural water courses visible on premises. Neither are there any vaults located below the sidewalk level. The premise does not lie within any flood hazard area designated by the federal emergency management agency. The site will be dug down an additional 12 feet requiring sheeting at the west side, east side, and north wall. During the excavation stage under pinning was necessary for the existing apartments which are abut to the north and west wall in order to start foundation work. Also underpinning is required at the wall of the existing playhouse which will be the common wall for the office and play house. Piles were then drilled at the east property line to strengthen and stabilize existing soil and foundations of adjacent buildings. In addition to the piles drilled sheeting was installed. Then the 16 foot high construction fence was erected. Next the reinforced mat foundation slab is poured on top of the piles. Ground water is expected at 15' 8" therefore a dewatering system is used. De watering the pumping of water from below ground level is then utilized. Well points were installed and the dewatering system ran 24/7 for 22 weeks.



Figure 15: Display the Dewatering System



## Sustainability

The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving LEED Silver Certification. Specific project goals that may impact this area of work include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; construction waste recycling; and the implementation of a construction indoor air quality management plan. The west side roof features two 5'x14' sky lights which will be used to day light the office suite below.

The Green roof not only adds aesthetic appeal to the building and reduces the amount of rain water runoff. The green roof is a 12" Intensive American Hydrotech Lite Top. This type of roofing system was chosen to accommodate plants, shrubs, and trees. There are three sets of green roofs the second floor, the sixth floor, and roof.

The design and construction team has worked with Kinetix LEED AP team members to ensure that every sustainable alternative was addressed from start to finish. This pursuit of sustainable building was lead by the client's active role. The client recently completed a cogeneration plant which will provide heat and power to the site throughout the year. The owner also utilizes a wind power contract.

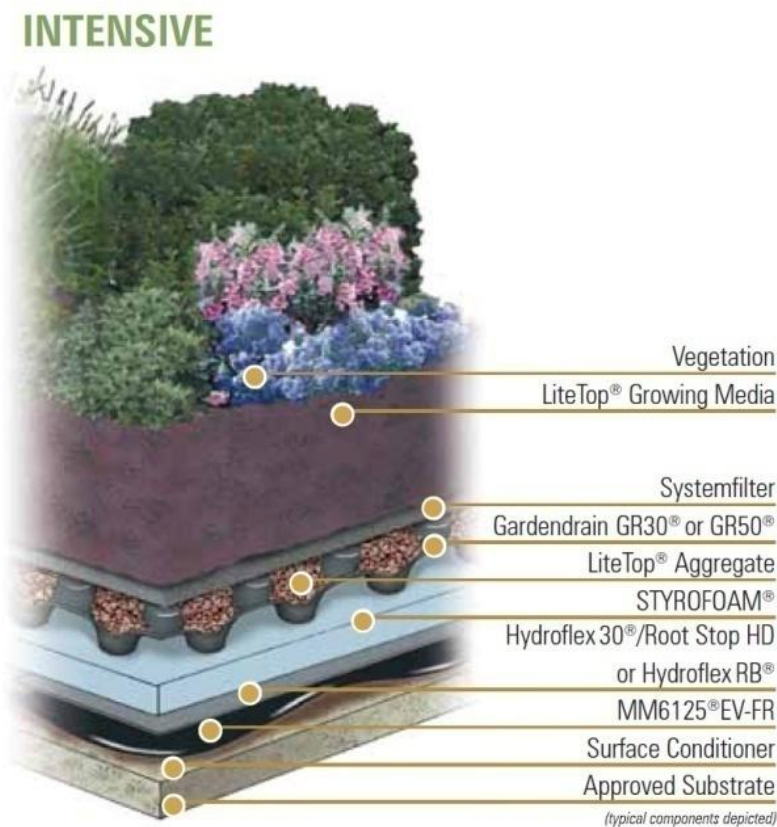


Figure 16: Demonstrates a Typical Green Roof Provided by Hydrotech

## D. Project Cost Evaluation

While estimating through RS Means, careful considerations must be made to ensure the assumptions in the square foot estimate reflect the actual building. Due to the adjacent structures underpinning requirements and structural bracing of the existing to remain brick wall the, a direct comparison of foundations can't be achieved. Another difference is historical requirements of the restoration of the existing doors, seats, walls, entrance canopy these must be considered separately as an allowance. The site preparation and Utilities is another thing that is not included in the comparison of the buildings. Green roofs are not included neither the RS Means and D4 Estimates.

Therefore in order to consider the RS Means and D4 Estimates, additional assemblies would need to be added including: underpinning, shoring and bracing, allowances added, green roof, skylights, staging, curtain for theatre, permitting, insurance, swing scaffolding, temporary heat,

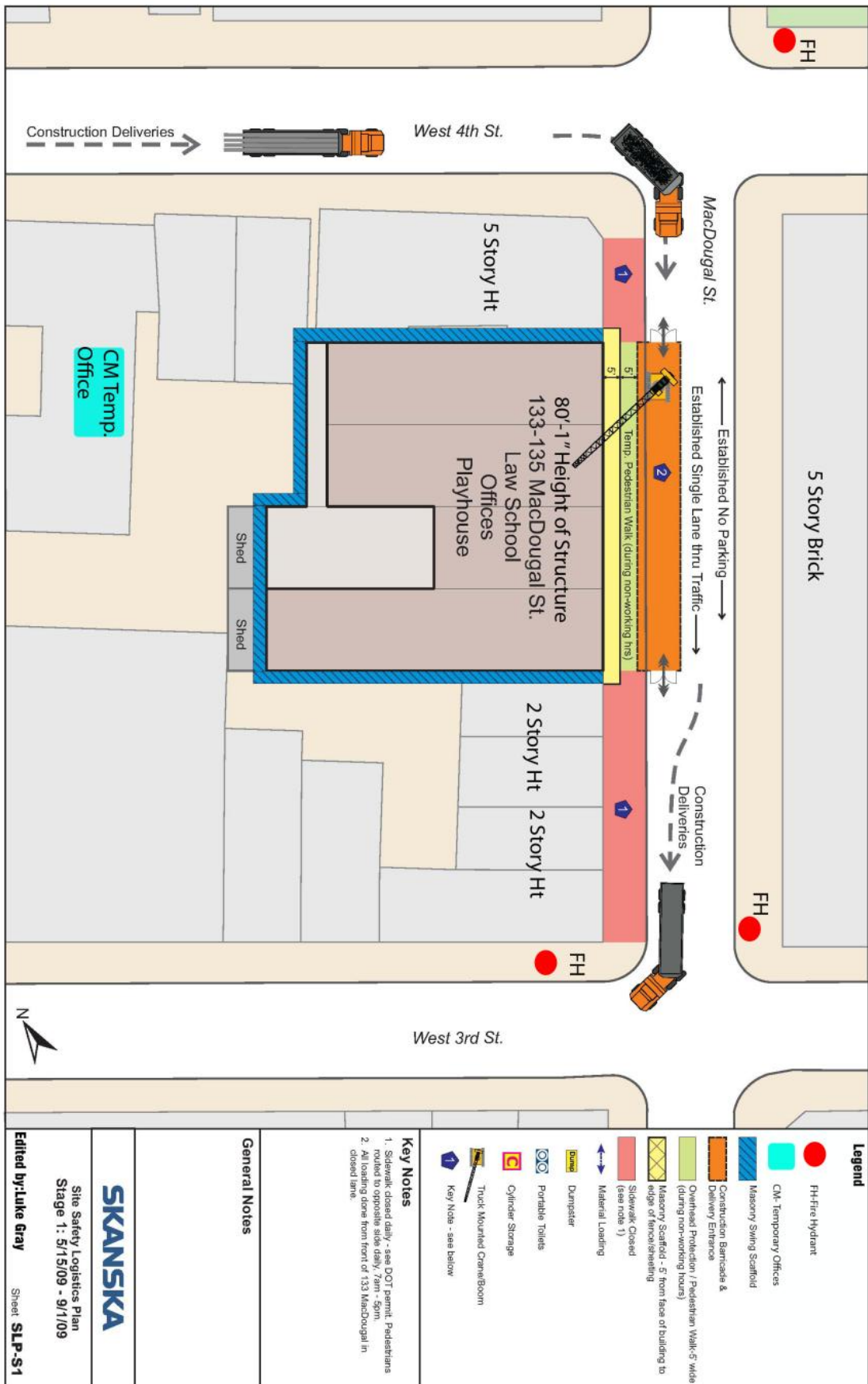
Careful measures were implemented in the RS Means estimate. Monitor speakers, surveillance cameras, intercom outlets, smoke-ceiling detectors, smoke duct detectors, auditorium seats, and elevators/elevator stops were added to the initial estimate. In order to assess the Theatre building systems separately another RS Means estimate was conducted.

New York City, Ny location factor and the project time factors were added to both the RS Means and D4 estimates to the current. Computer analysis is provided in the Appendix.



## **E. Site Plan of Existing Conditions**

One of the lanes on a two way street has been closed during the construction to allow for deliveries to be made on a daily basis. Throughout the duration of the construction a crawler crane was used extensively. This crawler crane was placed on the closed traffic lane. The crawler crane was used from the start of construction until the interior finishes activities started. This required a construction barricade to be constructed to allow for construction deliveries and a path for the crane to move. During nonworking hours a pedestrian walk with overhead protection passed in between the barricade and the building footprint.



**Legend**

- FH Fire Hydrant
- CM Temporary Offices
- Masonry Siding Scaffold
- Construction Barricade & Delivery Entrance
- Overhead Protection / Pedestrian Walk-5' wide (during non-working hours)
- Masonry Scaffold - 5' from face of building to edge of excavation
- Sidewalk Closed (see note 1)
- Material Loading
- Dumpster
- Portable Toilets
- Cylinder Storage
- Truck Mounted Crane/Boom
- ↔ Key Note - see below

**Key Notes**

1. Sidewalk closed daily - see DOT permit. Pedestrians routed to opposite side daily, 7am - 5pm.
2. All loading done from front of 133 MacDougal in closed lane.

**General Notes**

**SKANSKA**

Site Safety Logistics Plan  
Stage 1: 5/15/09 - 9/1/09

Edited by: Luke Gray    Sheet **SLP-S1**

Figure 17: Demonstrates the Existing Conditions Site Plan





Figure 19: Shows 3D Map of Site from Google Earth (This Illustrates the Height of the Surrounding Structures, as well as the Property Line in Red)



## F. Client Information

The building is the final building in the Law School's master plan. In addition to the new Provincetown Playhouse, the building will house the Law School's new and existing Research Centers which outgrown their current space and are awaiting a permanent home. The conversion of this building into an academic one is important as one of the only available academic sites for the Law School. Previously 133-139 MacDougal was a residential building with some office space as well as the home of the Provincetown Playhouse. The Playhouse is a working theatre for the client's Steinhardt music and performing arts department.

The owner chose to fast track the project to accommodate the move-in date of July 1, 2010. An early start of demolition phase and excavation has been planned while designs were being finalized. This approach enabled the construction manager to value engineer and schedule the project. Safety, coordination and logistical issues in an active and operating campus located in the urban area will be a key issue in the successful implementation of this Project. Skanska, the construction manager, has hired a full time Project Manager, full time Project Engineer and full time Project Superintendent along with the assistance of a Safety Manager assigned to the Project to ensure the safety of the students, faculty, and surrounding community.

To fulfill the initiative in the community to preserve the playhouse many measures are being taken to preserve its intrinsic features. The main criterion for owner satisfaction of quality is to conserve the physical space of the Playhouse Theatre including its four walls, doors, and seats. The new building is of low-scale with a new façade only a few feet higher than the current building height and is designed and detailed to be harmonious with the existing streetscape

## G. Local Conditions

The preferred method of construction is concrete in the NYC area, because of the lack of space for steel shake out. The allowable work hours are 7:00am-6:00pm Monday through Friday. Skanska, aware of the LEED certification, contracted off-site construction waste recycling.

Note that the Project Datum Elevation 0.0 feet corresponds to the sidewalk grade at 139 MacDougal Street. The subsurface investigation consisted of seven geotechnical borings and ten test pits. The general subsurface profile consists of a layer of uncontrolled fill material underlain by natural fine sand, a layer of silt and clay, decomposed rock, and bedrock. From these findings the Langan's engineers decided on the mat slab foundation type. The historical topographic Atlas of the City of New York (Viele, 1865) indicates that a former water course Minetta Creek, passed diagonally in the northeast-southwest direction beneath the site. The silt and clay layer above the bedrock is likely associated with this former stream. Ground water is expected at 15' 8" and the lowest site elevation is 23' below grade; therefore a dewatering system was used.

Located near Washington Square Park in Greenwich Village, the site is accessible from 6<sup>th</sup> Avenue, Broadway, and West 3<sup>rd</sup> and 4<sup>th</sup> Streets. Parking is available at w 3<sup>rd</sup> Street for a discounted price by the client.



Figure 20: Illustrates the Vicinity of Discounted Parking Colored in Red



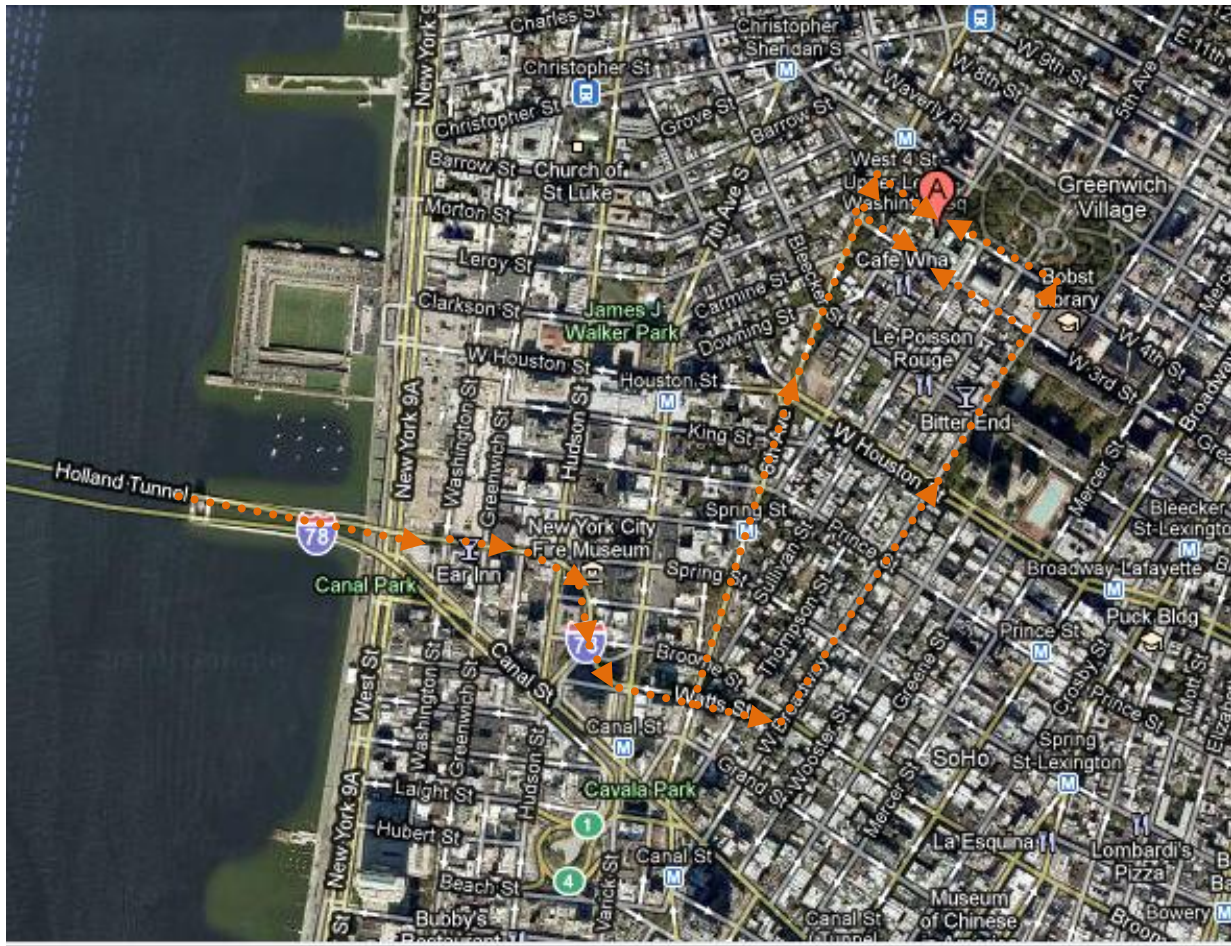
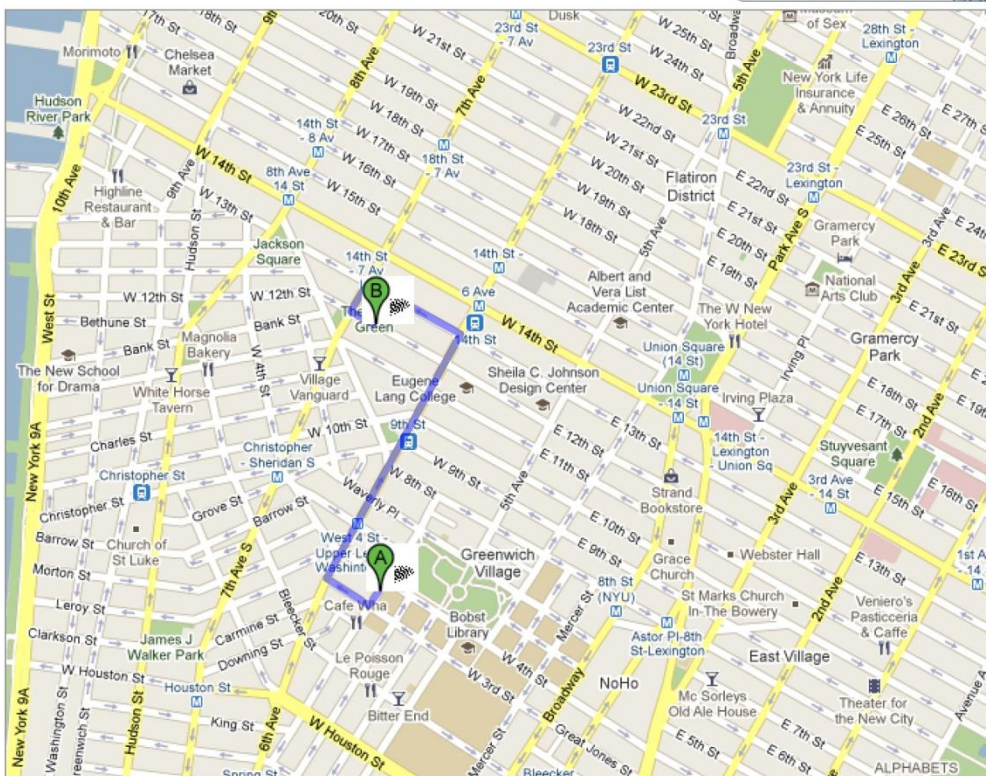


Figure 21: Shows the Traffic Route In and Out of New York City, NY from Google Maps



**Directions to Saint Vincents Catholic Medical Centers of New York: For Information On Additional Services**  
 170 West 12th Street, New York, NY 10011 - (212) 604-7000  
 0.8 mi – about 3 mins



**A** 133 MacDougal St, New York, NY 10012

1. Head **southwest** on **MacDougal St** toward **W 3rd St** go 141 ft  
total 141 ft
2. Take the 1st **right** onto **W 3rd St** go 427 ft  
total 0.1 mi
3. Turn **right** at **6th Ave/Avenue of the Americas**  
About 1 min go 0.4 mi  
total 0.6 mi
4. Turn **left** at **W 13th St**  
About 1 min go 0.2 mi  
total 0.7 mi
5. Take the 1st **left** onto **7th Ave** go 272 ft  
total 0.8 mi
6. Take the 1st **left** onto **W 12th St**  
Destination will be on the right go 220 ft  
total 0.8 mi

**B** Saint Vincents Catholic Medical Centers of New York: For Information On Additional Services  
 170 West 12th Street, New York, NY 10011 - (212) 604-7000

Figure 22: Shows the Directions to the Closest Hospital in Case of an Medical Emergency



## H. Project Delivery System

The construction project is a fast-tracked project with construction management. This arrangement allows phasing because the design and construction people are able to get together early and develop the necessary coordination schedules. The construction manager was brought in at the inception of the project.

The contract type is a typical Architectural engineering contract with the owner. There is only a communication relationship between the contractor and the architecture engineer. The owner hired both the design firms and the construction manager firm early in the preconstruction phase of the project. Skanska was brought in to work with the designers in the design selection, as well as overseeing the construction phase. This type of delivery method is program management delivery method; although, Skanska holds the contracts with subcontractors and suppliers.

The major advantages of the program management delivery method are open communication, cost savings, and shortened schedule. This type of contract enabled excellent communication to be established early in the design and build process among the project team and continues through the completion of the project.

This method was chosen in order to accelerate the schedule. By choosing this type of construction method the excavation phase and demolition was enabled to start before the actual construction documents were finished. This also helped to give the owner price checks along the way. The construction management company Skanska has contributed feasibility, constructability, and cost studies throughout the design phases.

Subguard is utilized for subcontractor bonds. This type of bonding is far superior to the traditional performance and payment bonds for the experienced construction manager. Subguard brings cost savings to the construction manager. Subguard is initiated at the onset of subcontractor default; unlike traditional bonds which can take months to come into effect. This puts the Skanska in the position to enact a remedy for the problem and Subguard pays the costs. The construction manager takes on higher risks including: rental agreements, bodily injury claims, and purchase orders. Therefore, Skanska implements extensive procurement and purchasing prequalification. In addition, Skanska implements its Injury Free Environment program to ensure the New York and OSHA safety rules are withheld.

The project has been contracted in a phase procurement manner. The bid package 1 is footings/foundations and interior U/G utilities-MEP, superstructure concrete, and site work/perimeter utilities. Bid package 2 is the long lead equipment including air handling units, elevators, substation, and skylights. Bid package 3 is the building shell package. Bid package 4 is the mep system fit-out. Bid package 5 is the A/E office fit-out.

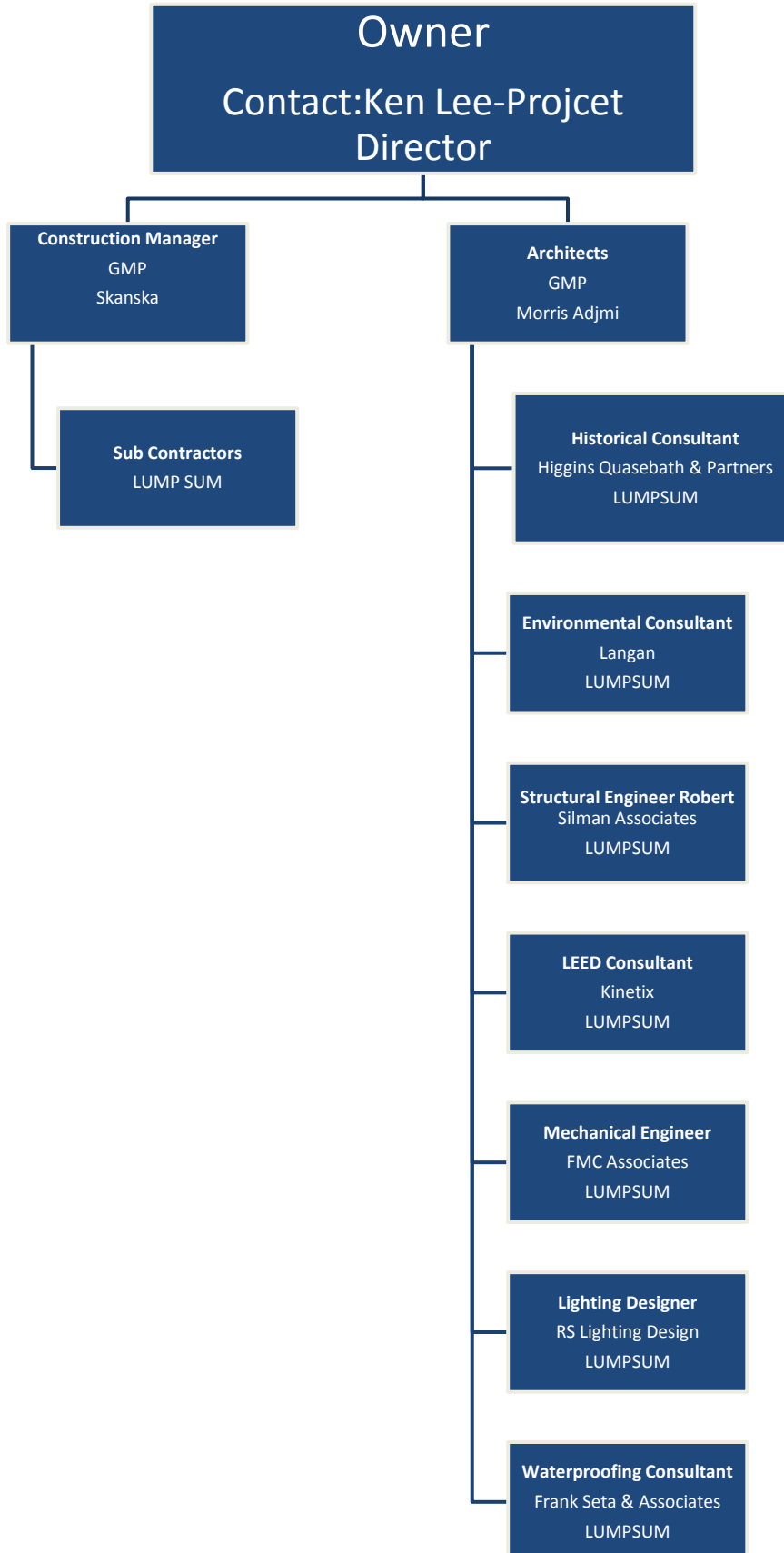


Figure 23: Shows the Project Team and Contract Types

### Staffing Plan

Construction management services will be provided by Skanska USA Building Inc. and will also provide expertise related to the commissioning and qualification of the facility and is illustrated in Figure 23. The position descriptions are summarized in the Figure 24 due to the various tasks of the project team.



Figure 24: Show Staffing Plan for the Construction Manager Skanska

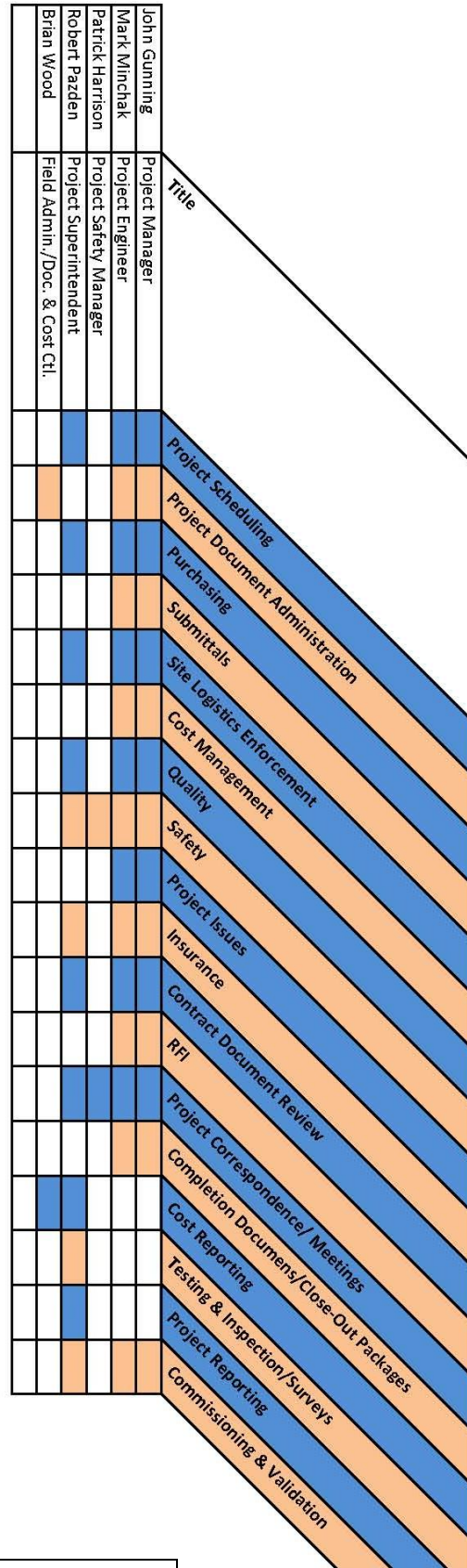


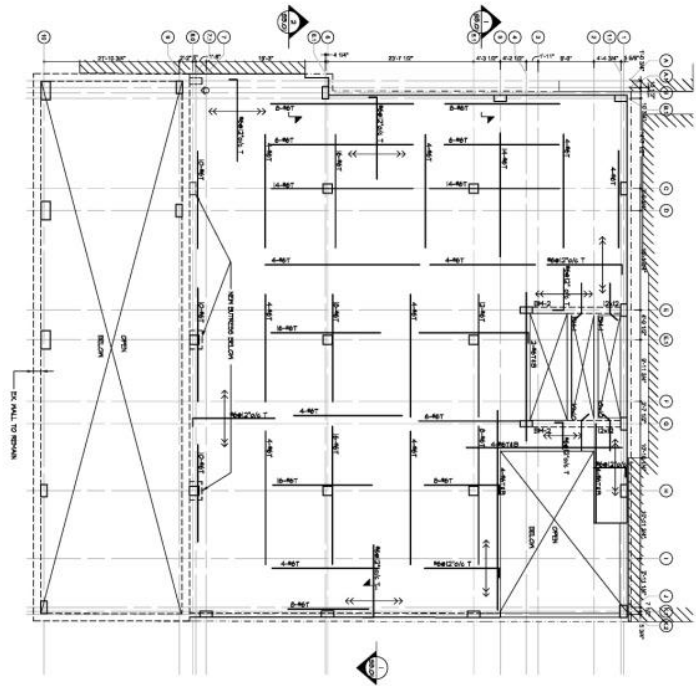
Figure 25: Briefly Describes the Structure of the Project Management and Supervision Staff



# I. Appendix

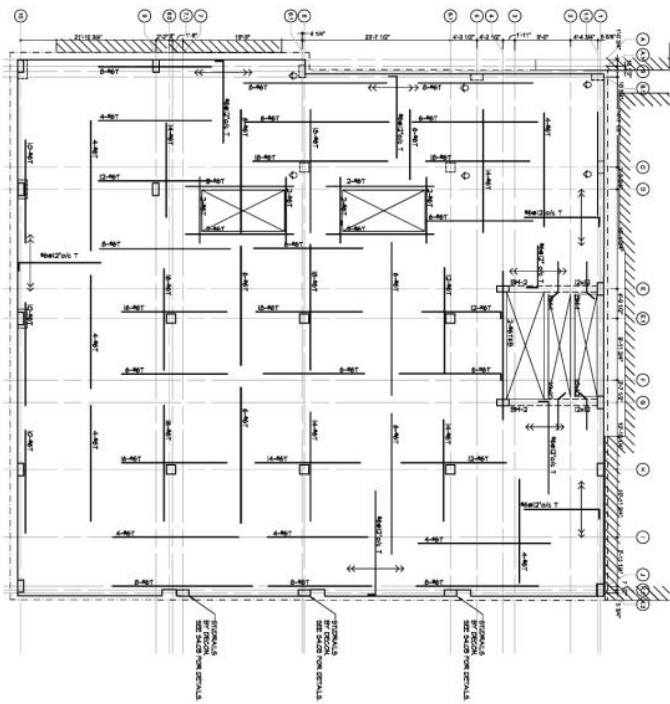
US Green Building Council		LEED-NC Version 2.2		Project Points List for Wilf Hall, NYU		kinetix business ecology	
						Design Phase Credit Construction Phase Credit More information required to confirm status	
Yes	?	No					
13	1	1	<b>Sustainable Sites</b>		<b>14 Points</b>		
Y			Prereq 1	<b>Construction Activity Pollution Prevention</b>	Req.	Control erosion, sedimentation, air pollution during construction	
1			Credit 1	<b>Site Selection</b>	1	Location parameters	
1			Credit 2	<b>Development Density &amp; Community Connectivity</b>	1	Neighborhood density	
1			Credit 3	<b>Brownfield Redevelopment</b>	1	Asbestos abatement (ACPS)	
1			Credit 4.1	<b>Alternative Transportation, Public Transportation</b>	1	1/4 Mile of 2 bus routes OR 0.5 mile of subway	
1			Credit 4.2	<b>Alternative Transportation, Bicycle Storage</b>	1	(379 Peak) 15 bike racks (260 FTE) 2 showers	
		1	Credit 4.3	<b>Alternative Transportation, Hybrid/Electric/Ethanol/Biodiesel</b>	1	N/A	
1			Credit 4.4	<b>Alternative Transportation, Parking Capacity, Carpool parking</b>	1	No parking, 5% parking for carpool, vanpool vehicles/ zipcars	
1			Credit 5.1	<b>Site Development, Protect or Restore Habitat</b>	1	50% green roof area with native/adaptive vegetation	
1			Credit 5.2	<b>Site Development, Maximize Open Space</b>	1	Green roof area is 20% of the site area	
1			Credit 6.1	<b>Stormwater Design, Quantity Control</b>	1	25% decrease in stormwater, storage and reuse	
1			Credit 6.2	<b>Stormwater Design, Quality Control</b>	1	Remove 80% TSS from 90% of stormwater	
1			Credit 7.1	<b>Landscape &amp; Exterior Design- Reduce Heat Islands (Non-Roof)</b>	1	50% shade and/or sidewalk material, SRI >29	
1			Credit 7.2	<b>Landscape &amp; Exterior Design- Reduce Heat Islands (Roof)</b>	1	Roof material SRI-79 or vegetated roof. 50% of roof area	
1			Credit 8	<b>Light Pollution Reduction</b>	1	Reduce sky glow, light doesn't leave site	
4		1	<b>Water Efficiency</b>		<b>5 Points</b>		
1			Credit 1.1	<b>Water Efficient Landscaping, Reduce by 50%</b>	1	Reduced irrigation requirements for green roof plants	
1			Credit 1.2	<b>Water Efficient Landscaping, No Potable Use or No Irrigation</b>	1	Use stored rainwater for irrigation	
		1	Credit 2	<b>Innovative Wastewater Technologies, Reduce by 50%</b>	1	Grey/rainwater reuse in addition to low flow fixtures	
1			Credit 3.1	<b>Water Use Reduction, 20% Reduction</b>	1	Ex: dual flush toilets, low-flow faucets, showerheads	
1			Credit 3.2	<b>Water Use Reduction, 30% Reduction</b>	1	Ex: waterless utinals, Aqus and other grey/rainwater reuse	
13		4	<b>Energy &amp; Atmosphere</b>		<b>17 Points</b>		
Y			Prereq 1	<b>Fundamental Commissioning of the Building Energy System</b>	Req.	Commissioning agent (CxA) to review systems	
Y			Prereq 2	<b>Minimum Energy Performance</b>	Req.	Meet requirements of ASHRAE 90.1-2004	
Y			Prereq 3	<b>Fundamental Refrigerant Management</b>	Req.	Non-CFC refrigerants	
10		3	Credit 1	<b>Optimize Energy Performance- 14-42% improvement</b>	2to10	2 points, 14% above ASHRAE 90.1 2004.	
1			Credit 2	<b>On-Site Renewable Energy: 2.5% to 12.5%</b>	1to3	Solar domestic hot water; PV	
1			Credit 3	<b>Enhanced Commissioning</b>	1	Additional commissioning by Commissioning Agent	
1			Credit 4	<b>Enhanced Refrigerant Management</b>	1	Non-HCFC refrigerants	
1		1	Credit 5	<b>Measurement &amp; Verification</b>	1	System sub-metering, controls (BMS) and follow up	
1			Credit 6	<b>Green Power Renewable Energy Credit for 35% of electricity</b>	1	NYU Wind Power Contract	
7		4	<b>Materials &amp; Resources</b>		<b>13 Points</b>		
Y			Prereq 1	<b>Storage &amp; Collection of Recyclables(NYC code)</b>	Req.	Designated recycling room for cardboard, paper, etc.	
		1	Credit 1.1	<b>Building Reuse, Maintain 75% of Existing Walls, Floors &amp; Roof</b>	1	N/A	
		1	Credit 1.2	<b>Building Reuse, Maintain 100% of Existing Walls, Floors &amp; Roof</b>	1	N/A	
		1	Credit 1.3	<b>Building Reuse, Maintain 50% of Interior Non-Structural Elements</b>	1	N/A	
7		4	<b>Materials &amp; Resources</b>		<b>13 Points</b>		
1			Credit 2.1	<b>Construction Waste Management, Divert 50% from Disposal</b>	1	Contract off-site construction waste recycling	
1			Credit 2.2	<b>Construction Waste Management, Divert 75% from Disposal</b>	1	GC waste management plan and documentation	
		1	Credit 3.1	<b>Materials Reuse, 5% by cost</b>	1	Procure salvaged, refurbished or reused material	
1			Credit 3.2	<b>Materials Reuse, 10%</b>	1	Procure salvaged, refurbished or reused material	
1			Credit 4.1	<b>Recycled Content, 10% (post-consumer + 1/2 pre-consumer)</b>	1	Procure material with recycled content	
1			Credit 4.2	<b>Recycled Content, 20% (post-consumer + 1/2 pre-consumer)</b>	1	Procure material with recycled content	
1			Credit 5.1	<b>Regional Materials, 10%</b>	1	Extracted, processed & manufactured within 500 miles	
1			Credit 5.2	<b>Regional Materials, 20%</b>	1	Extracted, processed & manufactured 500 miles	
		1	Credit 6	<b>Rapidly Renewable Materials, 2.5% total materials value</b>	1	Ex: wheatboard, cork floors, strawboard, bamboo	
1			Credit 7	<b>Certified Wood</b>	1	Specify >50% FSC wood	
10		4	<b>Indoor Environmental Quality</b>		<b>15 Points</b>		
Y			Prereq 1	<b>Minimum IAQ Performance</b>	Req.	ASHRAE 62.1-2004 Section 4-7	
Y			Prereq 2	<b>Environmental Tobacco Smoke (ETS) Control</b>	Req.	No smoking	
		1	Credit 1	<b>Outdoor Air Delivery Monitoring</b>	1	Install monitoring systems, CO2 sensors	
1			Credit 2	<b>Increased Ventilation</b>	1	30% more outdoor air than required by ASHRAE	
1			Credit 3.1	<b>Construction IAQ Management Plan, During Construction</b>	1	SMACNA provisions	
1			Credit 3.2	<b>Construction IAQ Management Plan, Before Occupancy</b>	1	Building flush out	
1			Credit 4.1	<b>Low-Emitting Materials, Adhesives &amp; sealants</b>	1	Air contaminant reduction, VOC limits	
1			Credit 4.2	<b>Low-Emitting Materials, Paints &amp; Coatings</b>	1	GreenSeal VOC limits	
1			Credit 4.3	<b>Low-Emitting Materials, Carpet Systems</b>	1	CRI Green Label Plus certified	
1			Credit 4.4	<b>Low-Emitting Materials, Composite Wood &amp; Agrifiber Products</b>	1	Urea-formaldehyde resin free	
		1	Credit 5	<b>Indoor Chemical &amp; Pollutant Source Control</b>	1	N/A	
1			Credit 6.1	<b>Controllability of Systems, Lighting</b>	1	Lighting controls for 90% occupants	
1		1	Credit 6.2	<b>Controllability of Systems, Thermal Comfort</b>	1	Comfort controls / operable windows for 50% occupants	
1			Credit 7.1	<b>Thermal Comfort, Design</b>	1	Comfort criteria of ASHRAE Standard 55-2004	
1			Credit 7.2	<b>Thermal Comfort, Verification</b>	1	Comfort survey at one year post-occupancy milestone	
		1	Credit 8.1	<b>Daylight &amp; Views, Daylight 75% of Spaces</b>	1	2% glazing factor for 75% of building	
		1	Credit 8.2	<b>Daylight &amp; Views, Views for 90% of Spaces</b>	1	Direct views for 90% occupants	
5			<b>Innovation &amp; Design Process</b>		<b>5 Points</b>		
1			Credit 1.1	<b>Innovation in Design: Exemplary Performance</b>	1	Double density over SS 2 Dev density	
1			Credit 1.2	<b>Innovation in Design: Cleaning Systems</b>	1	Green cleaning contract	
1			Credit 1.3	<b>Innovation in Design: Exemplary Performance</b>	1	MR Pre 1: Near 90% diversion of waste through recycling	
1			Credit 1.4	<b>Innovation in Design: Environmental Management</b>	1	Contractor ISO 14001 certified	
			(alt)	<b>Innovation in Design: Furniture</b>	1	SCS Certified Steeacase furniture	
			(alt)	<b>Innovation in Design: Green Power</b>	1	100% wind power contract	
1			Credit 2	<b>LEED Accredited Professional</b>	1	Kinetix LEED AP team member	
52	3	14	<b>Project Totals (provisional)</b>		<b>69 Points</b>		
						Certified 26-32 points Silver 33-38 points Gold 39-51 points Platinum 52-69 points	

Figure 26: Shows the LEED Goals Set at the Beginning of the Project



FIRST FLOOR FRAMING PLAN

NOTES:  
1/8" OF SCALE B.L. = 4'-0"



SECOND FLOOR FRAMING PLAN

NOTES:  
1/8" OF SCALE B.L. = 4'-0"

- LEGEND:**
- 1. BEAMS WITH PLATE REINFORCEMENT
  - 2. BEAMS WITH ADDITIONAL BOTTOM BARS
  - 3. BEAMS WITH ADDITIONAL TOP BARS
  - 4. COLUMNS WITH FORM
  - 5. BEAMS WITH SHEAR CONSTRUCTION DETAIL
  - 6. BEAMS WITH STIRRUPS



133 McDougall Street  
NEW YORK, NY 10012

11-03-2008 FOR INFORMATION SET  
12-24-2008 DESIGN DEVELOPMENT  
12-10-2008 PROGRESS SET

**REVISIONS:**

NO.	DATE	DESCRIPTION
1	11-03-2008	FOR INFORMATION SET
2	12-24-2008	DESIGN DEVELOPMENT
3	12-10-2008	PROGRESS SET

**DESIGNER:** [Name]  
**CHECKER:** [Name]  
**APPROVER:** [Name]

**CONSTRUCTION PLANS**

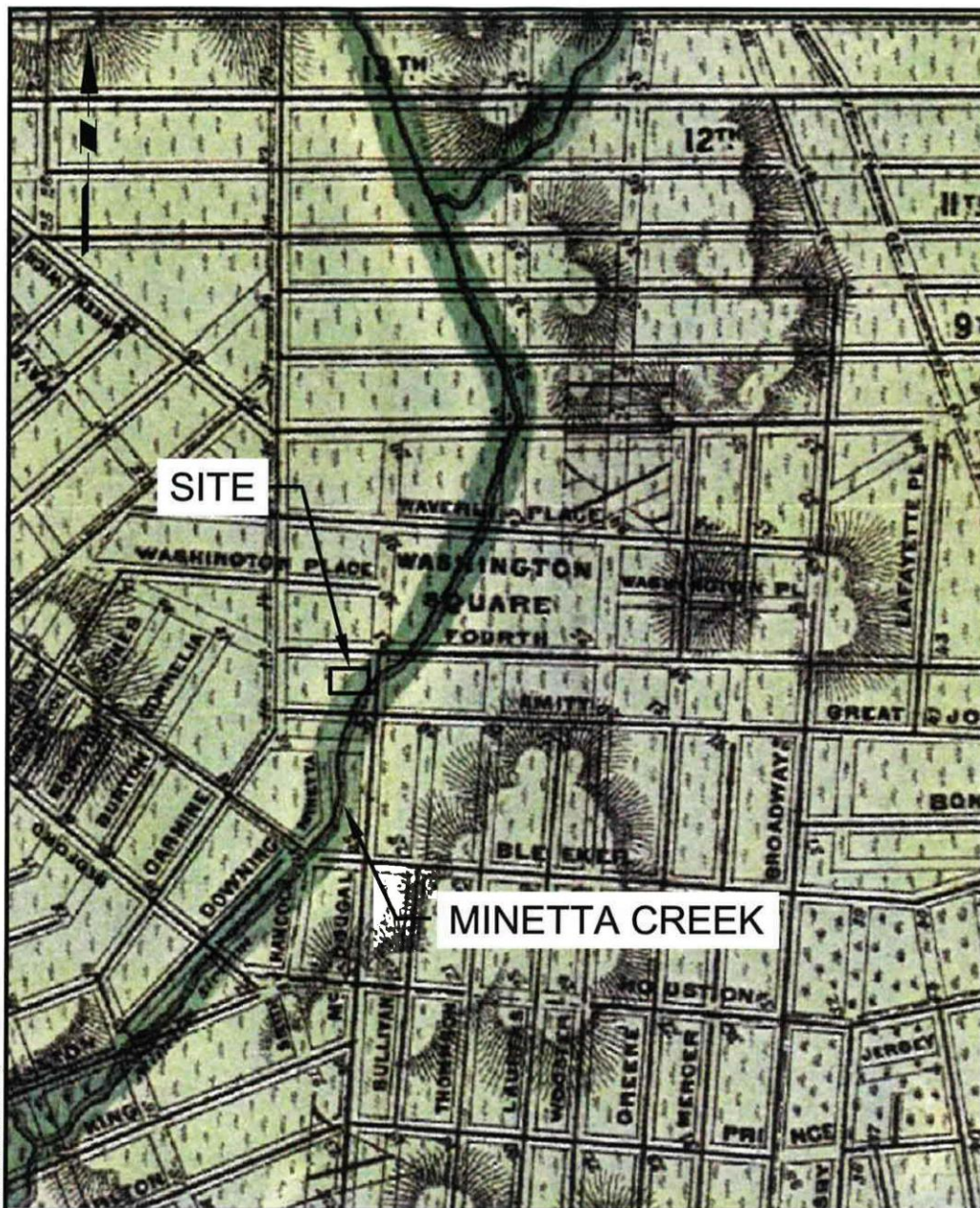
DATE: OCTOBER 24, 2008  
SCALE: 1/8"=1'-0"

**S1.02**

© MAY 2008  
RSA #11826.03

Figure 27: Shows Typical Structural Floor Plan





SOURCE: SOUTH MANHATTAN SANITARY AND TOPOGRAPHICAL MAP BY EGBERT L. VIELE (1865)

© 2006 Langan Engineering and Environmental Services, Inc.

		133-139 MACDOUGAL STREET	
21 Penn Plaza, 8th Floor New York, NY 10001		<b>VIELE MAP</b>	
P: 212.479.5400 F: 212.479.5444		NEW YORK	NEW YORK
www.langan.com		Project No.	Date
NEW JERSEY PENNSYLVANIA NEW YORK CONNECTICUT FLORIDA NEVADA		5694801	9/9/08
NJ Certificate of Authorization No: 24GA27996400		Scale	Dwg. No.
		NTS	3

Filename: U:\Data\5694801\Cadd Data - 5694801\Dwg\Report Figures\Final Report Figures\5694801\_Dwg 3\_Viele.dwg Date: 9/9/2008 Time: 11:06 User: calzamora Style Table: Langan.atb Layout: 3

Figure 28: Illustrates the Minetta Creek Which at One Time Ran Directly Underneath the Site from Langan

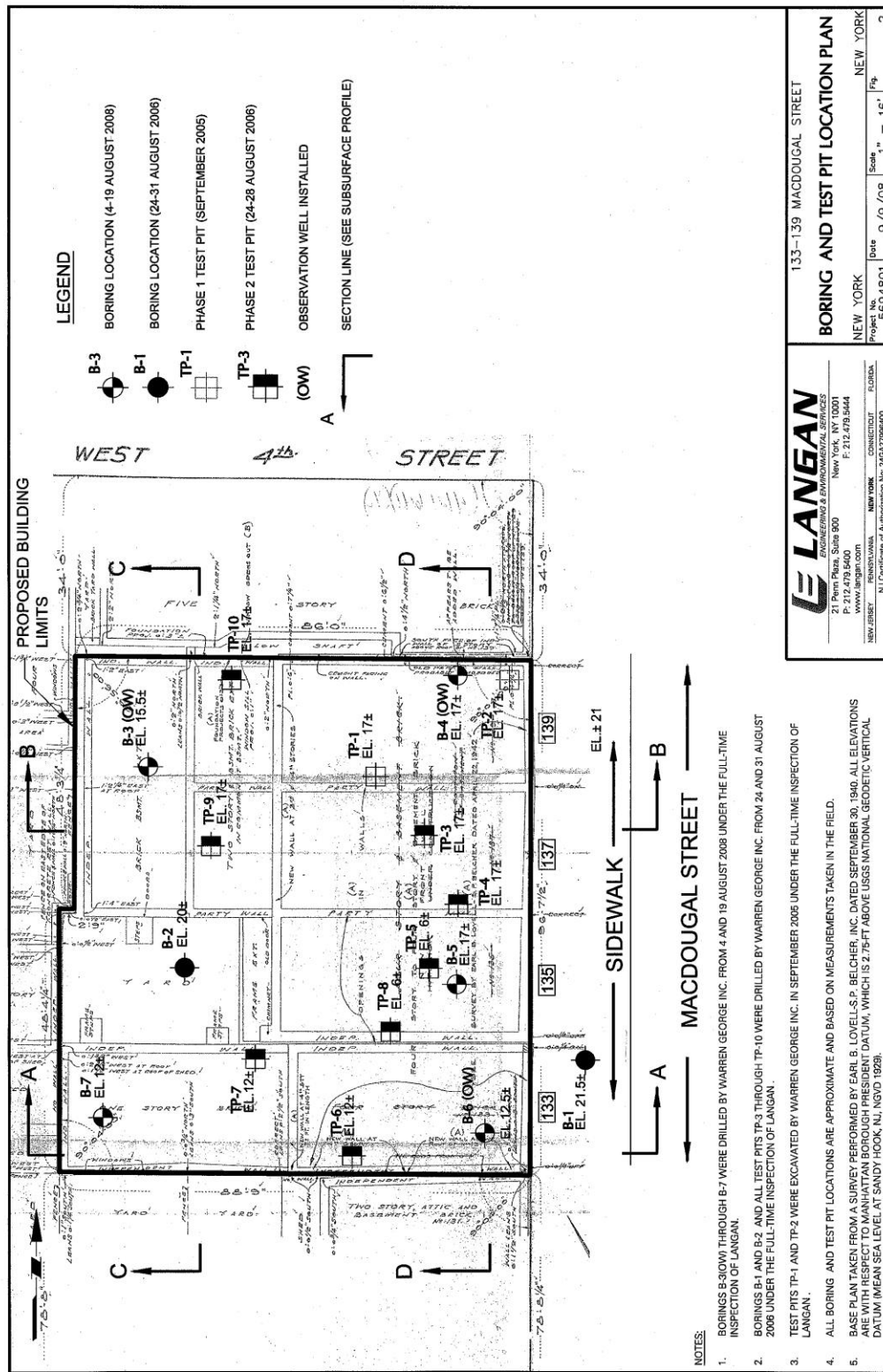


Figure 29: Shows Boring Cores and Test Pits Used to Determine Foundation Types



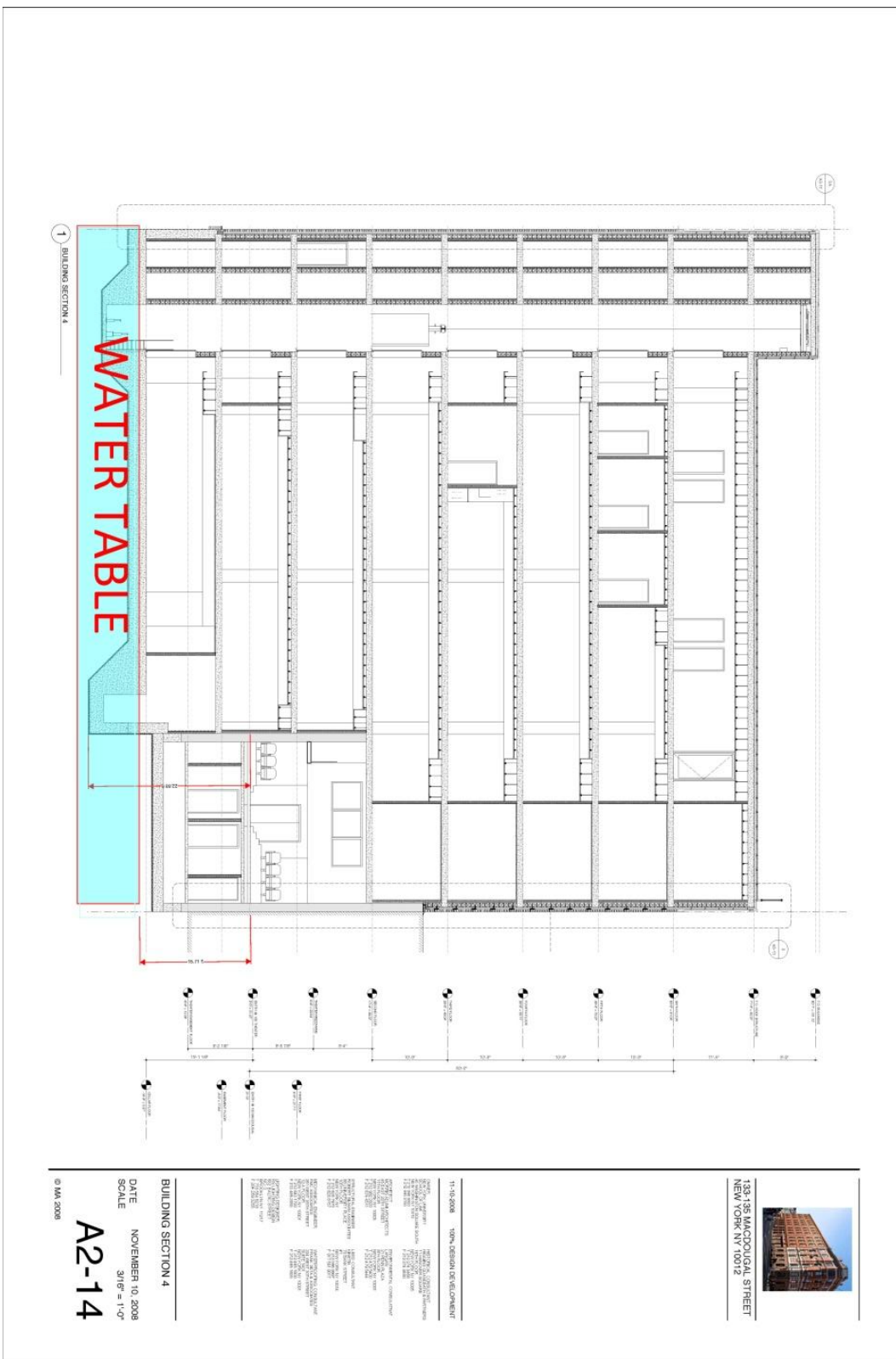


Figure 30: Shows the Water Table

## Actual Project Costs

**Actual Building and Site Costs**

		<u>Total Cost</u>	<u>Cost/SF</u>
<b>Building and Site Costs</b>			
1	<b>Site Development</b>		55,130
2	Site Preparation.....	\$45,240	\$0.82
3	Utilities.....	\$846,633	\$15.36
4			
5	<b>Site Development Total:</b>	\$891,873	\$16.18
6			
7	<b>Building</b>		
8	Demolition.....	\$939,500	\$17.04
9	Foundation.....	\$3,895,572	\$70.66
10	Office .....	\$2,389,042	
11	Playhouse .....	\$1,506,530	
12	Cast In Place Concrete Structure.....	\$4,310,000	\$78.18
13	Thermal and Moisture Protection.....	\$414,540	\$7.52
14	Roofing:.....	\$198,600	
15	Waterproofing:.....	\$215,940	
16	Exterior Wall.....	\$2,494,380	\$45.25
17	Masonry:.....	\$1,863,249	
18	Gypsum Board Partitions:.....	\$487,760	
19	Specialty Partition.....	\$131,371	
20	Ceilings:.....	\$12,000	
21	Interior Partitions and Finishes.....	\$1,979,160	\$35.90
22	Masonry.....	\$191,700	
23	Gypsum Board Partitions:.....	\$861,591	
24	Specialty Partition.....	\$0	
25	Ceilings:.....	\$508,757	
26	Door and Hardware.....	\$210,005	
27	Playhouse Walls and Doors.....	\$207,107	
28	Interior Finishes.....	\$1,059,522	\$19.22
29	Miscellaneous Metals.....	\$356,623	
30	Rough Carpentry and Finish Carpentry.....	\$164,867	
31	Floor and Wall Finishes:.....	\$266,165	
32	Main Lobby:.....	\$34,605	
33	Painting:.....	\$139,293	
34	Playhouse Finishes:.....	\$97,969	
35	Soffits at Office Ceilings.....	\$76,032	\$1.38
36	Specialties.....	\$634,796	\$11.51
37	Offices.....	\$145,020	
38	Playhouse:.....	\$489,776	

**Actual Building and Site Costs**

Building and Site Costs		<u>Total Cost</u>	<u>Cost/SF</u>
39	Vertical Transportation.....	\$704,500	\$12.78
40	Offices.....	\$661,500	
41	Playhouse.....	\$43,000	
42	Plumbing.....	\$535,951	\$9.72
43	Office Building.....	\$496,202	
44	Playhouse.....	\$39,749	
45	Fire Protection.....	\$586,213	\$10.63
46	Office Building.....	\$500,067	
47	Playhouse.....	\$86,146	
48	H.V.A.C.....	\$2,839,736	\$51.51
49	Office Building.....	\$2,776,025	
50	Playhouse.....	\$63,711	
51	Electrical .....	\$2,777,906	\$50.39
52	Offices.....	\$2,616,000	
53	Playhouse.....	\$161,906	
54			
55	<b>Building Total:</b>	\$23,247,808	\$421.69
56			
57	<b><u>Trade Requirements</u></b>		
58	Trade Requirements.....	\$1,674,992	\$30.38
59			
60	<b>Trade Requirements Total:</b>	\$1,674,992	\$30.38
61			
62	<b><u>Allowances</u></b>		
63	Allowances.....	\$415,000	\$7.53
64			
65	<b>Allowances Total:</b>	\$415,000	\$7.53
66			
67			
68	<b>Site, Building, Trade Requirements and Allowances Cost:</b>	\$26,229,673	\$475.78
	<b>Total Cost minus site:</b>	\$25,337,800	\$459.60



**Actual Total Project Costs**

<u>Total Project cost</u>	<u>%</u>	<u>Total Cost</u>	<u>Cost/SF</u>
			55,130
<b>Site Development</b>			
Site Preparation.....	0.17%	\$45,240	\$0.82
Utilities.....	3.23%	\$846,633	\$15.36
<b>Site Development Total:</b>	<b>3.40%</b>	<b>\$891,873</b>	<b>\$16.18</b>
<b>Building</b>			
Demolition.....	3.58%	\$939,500	\$17.04
Foundation.....	14.85%	\$3,895,572	\$70.66
Cast In Place Concrete Structure.....	16.43%	\$4,310,000	\$78.18
Thermal and Moisture Protection.....	1.58%	\$414,540	\$7.52
Exterior Wall.....	9.51%	\$2,494,380	\$45.25
Interior Partitions and Finishes.....	7.55%	\$1,979,160	\$35.90
Interior Finishes.....	4.04%	\$1,059,522	\$19.22
Soffits at Office Ceilings.....	0.29%	\$76,032	\$1.38
Specialties.....	2.42%	\$634,796	\$11.51
Vertical Transportation.....	2.69%	\$704,500	\$12.78
Plumbing.....	2.04%	\$535,951	\$9.72
Fire Protection.....	2.23%	\$586,213	\$10.63
H.V.A.C.....	10.83%	\$2,839,736	\$51.51
Electrical .....	10.59%	\$2,777,906	\$50.39
<b>Total Building Cost:</b>	<b>88.63%</b>	<b>\$23,247,808</b>	<b>\$421.69</b>
<b>Trade Requirements</b>			
Trade Requirements.....	6.39%	\$1,674,992	\$30.38
<b>Trade Requirements Total:</b>	<b>6.39%</b>	<b>\$1,674,992</b>	<b>\$30.38</b>
<b>Allowances</b>			
Allowances.....	1.58%	\$415,000	\$7.53
<b>Allowances Total:</b>	<b>1.58%</b>	<b>\$415,000</b>	<b>\$7.53</b>
<b>Site, Building, Trade Requirements and Allowances Cost:</b>	<b>100.00%</b>	<b>\$26,229,673</b>	<b>\$475.78</b>
<b>Total Cost minus site:</b>		<b>\$25,337,800</b>	<b>\$459.60</b>
<b>Contractor Fees (General Conditions, Overhead, Profit:)</b>	<b>6.60%</b>	<b>\$1,731,544</b>	<b>\$31.41</b>
<b>Architectural Fees:</b>	<b>7.00%</b>	<b>\$1,836,077</b>	<b>\$33.30</b>
<b>Total Project Cost:</b>		<b>\$29,797,294</b>	<b>\$540.49</b>

Table 2: Shows Actual Project Costs

## D4 Cost Estimating Software

D4Cost Southern Arkansas University Adjusted

Sunday, October 3, 2010

Statement of Probable Cost

Page 1

Southern Arkansas University Adjuste - Aug 2010 - NY - N.Y.C.

Prepared By:	Cromwell Architects Engineers 101 Spring Street Little Rock, AR 72201 Fax:	Prepared For:	
Building Sq. Size:	55130	Site Sq. Size:	170000
Bid Date:	1/1/1992	Building use:	Educational
No. of floors:	3	Foundation:	MAT
No. of buildings:	1	Exterior Walls:	MAS
Project Height:	70	Interior Walls:	GYP
1st Floor Height:	14	Roof Type:	BIT
1st Floor Size:	15789	Floor Type:	VCT
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
<b>00</b>	<b>Bidding Requirements</b>	<b>6.50</b>	<b>13.74</b>	<b>757,354</b>
	Bonds & Certificates	1.10	2.32	127,909
	General Conditions	5.40	11.42	629,445
<b>01</b>	<b>General Requirements</b>	<b>0.47</b>	<b>0.99</b>	<b>54,314</b>
	Constr. Fac. & Temp. Controls	0.47	0.99	54,314
<b>03</b>	<b>Concrete</b>	<b>6.15</b>	<b>13.00</b>	<b>716,836</b>
	Cast-In-Place	2.77	5.86	322,878
	Curing	0.07	0.14	7,966
	Formwork	1.47	3.10	170,908
	Precast	1.01	2.13	117,300
	Reinforcement	0.84	1.77	97,783
<b>04</b>	<b>Masonry</b>	<b>13.11</b>	<b>27.72</b>	<b>1,527,979</b>
	Unit	13.11	27.72	1,527,979
<b>05</b>	<b>Metals</b>	<b>12.33</b>	<b>26.06</b>	<b>1,436,786</b>
	Decking	1.76	3.73	205,669
	Joists	3.73	7.88	434,512
	Structural Framing	6.84	14.45	796,605
<b>06</b>	<b>Wood &amp; Plastics</b>	<b>3.14</b>	<b>6.64</b>	<b>366,196</b>
	Finish Carpentry	1.86	3.94	217,256
	Rough Carpentry	1.28	2.70	148,940
<b>07</b>	<b>Thermal &amp; Moisture Protection</b>	<b>5.24</b>	<b>11.08</b>	<b>610,674</b>
	Dampproofing	0.16	0.34	18,829
	Exterior Wall Assemblies	0.32	0.67	36,934
	Fireproofing	2.17	4.60	253,465
	Firestopping	0.17	0.35	19,553
	Insulation	0.24	0.51	28,243
	Membrane Roofing	1.96	4.14	228,303
	Skylights	0.22	0.46	25,347
<b>08</b>	<b>Doors &amp; Windows</b>	<b>4.25</b>	<b>8.99</b>	<b>495,419</b>
	Glazing	2.67	5.65	311,726
	Hardware	0.75	1.58	87,348
	Metal Doors & Frames	0.83	1.75	96,346
<b>09</b>	<b>Finishes</b>	<b>12.03</b>	<b>25.44</b>	<b>1,402,383</b>
	Acoustical Treatment	1.31	2.76	152,133
	Carpet	1.09	2.31	127,182
	Gypsum Board	1.99	4.21	232,011
	Metal Support Systems	2.52	5.33	293,940
	Painting	1.37	2.89	159,364
	Resilient Flooring	1.71	3.61	199,151
	Tile	0.80	1.70	93,764
	Wall Coverings	1.24	2.63	144,837
<b>10</b>	<b>Specialties</b>	<b>0.86</b>	<b>1.81</b>	<b>100,003</b>
	Louvers & Vents	0.10	0.20	11,247
	Toilet & Bath Accessories	0.37	0.79	43,451

**D4Cost Southern Arkansas University Adjusted**

Sunday, October 3, 2010

Page 2

	Visual Display Board	0.33	0.69	38,020
	Wall & Corner Guards	0.06	0.13	7,285
<b>14</b>	<b>Conveying Systems</b>	<b>0.92</b>	<b>1.95</b>	<b>107,491</b>
	Elevators	0.92	1.95	107,491
<b>15</b>	<b>Mechanical</b>	<b>22.74</b>	<b>48.07</b>	<b>2,649,924</b>
	Air Distribution	1.30	2.76	152,079
	Controls	2.61	5.52	304,158
	Fire Protection	1.51	3.19	176,079
	HVAC	13.49	28.51	1,571,832
	Insulation	1.18	2.50	137,595
	Plumbing	2.42	5.11	281,973
	Testing, Adjusting & Balancing	0.22	0.48	26,208
<b>16</b>	<b>Electrical</b>	<b>12.26</b>	<b>25.91</b>	<b>1,428,457</b>
	Communications	0.78	1.64	90,523
	Lighting	2.24	4.73	260,707
	Service & Distribution	9.04	19.11	1,053,691
	Special Systems	0.20	0.43	23,536
<b>Total Building Costs</b>		<b>100.00</b>	<b>211.39</b>	<b>11,653,816</b>
<b>02</b>	<b>Site Work</b>	<b>100.00</b>	<b>5.93</b>	<b>1,007,707</b>
	Demolition	19.10	1.13	192,516
	Earthwork	21.01	1.25	211,706
	Landscaping	11.14	0.66	112,301
	Paving & Surfacing	8.28	0.49	83,423
	Preparation	15.86	0.94	159,823
	Sewerage & Drainage	14.65	0.87	147,595
	Water Distribution	9.96	0.59	100,342
<b>Total Non-Building Costs</b>		<b>100.00</b>	<b>5.93</b>	<b>1,007,707</b>
<b>Total Project Costs</b>		<b>--</b>	<b>--</b>	<b>12,661,523</b>



D4Cost American Music Theatre Adjusted

Sunday, October 3, 2010

Statement of Probable Cost

Page 1

American Music Theatre Adjusted - Aug 2010 - NY - N.Y.C.

Prepared By:	Cornerstone Design Architects 320 Granite Run Drive Lancaster, PA 17604-3310 Fax:	Prepared For:	
Building Sq. Size:	55294	Site Sq. Size:	116270
Bid Date:	8/1/1996	Building use:	Recreational
No. of floors:	2	Foundation:	CMU
No. of buildings:	1	Exterior Walls:	MAS
Project Height:	64	Interior Walls:	DRY
1st Floor Height:	16	Roof Type:	MEM
1st Floor Size:	31900	Floor Type:	CAR
		Project Type:	NEW

Division		Percent	Sq. Cost	Amount
00	<b>Bidding Requirements</b>	<b>0.18</b>	<b>0.68</b>	<b>37,593</b>
	Bonds & Certificates	0.18	0.68	37,593
01	<b>General Requirements</b>	<b>7.22</b>	<b>27.16</b>	<b>1,501,536</b>
	Constr. Fac. & Temp. Controls	0.93	3.51	194,028
	Contract Closeout	0.12	0.44	24,254
	Coordination	0.29	1.10	60,634
	Facility Startup/Commissioning	0.17	0.66	36,380
	Field Engineering	0.24	0.90	49,720
	Identification Systems	0.02	0.07	3,881
	Maintenance	0.05	0.18	9,701
	Material & Equipment	1.05	3.95	218,282
	Project Development & Mgt.	1.98	7.46	412,310
	Project Meetings	0.12	0.44	24,254
	Quality Control	0.20	0.75	41,231
	Regulatory Requirements	0.19	0.70	38,806
	Supervision	1.87	7.02	388,057
03	<b>Concrete</b>	<b>3.60</b>	<b>13.55</b>	<b>749,434</b>
	Cast-In-Place	3.09	11.62	642,719
	Precast	0.51	1.93	106,716
04	<b>Masonry</b>	<b>6.07</b>	<b>22.81</b>	<b>1,261,184</b>
	Masonry	6.07	22.81	1,261,184
05	<b>Metals</b>	<b>12.34</b>	<b>46.41</b>	<b>2,566,024</b>
	Metals	12.34	46.41	2,566,024
06	<b>Wood &amp; Plastics</b>	<b>6.71</b>	<b>25.22</b>	<b>1,394,578</b>
	Wood & Plastics	6.71	25.22	1,394,578
07	<b>Thermal &amp; Moisture Protection</b>	<b>7.40</b>	<b>27.81</b>	<b>1,537,674</b>
	EIFS	1.11	4.17	230,409
	Joint Sealers	0.16	0.59	32,742
	Manufactured Roofing & Siding	1.16	4.36	241,323
	Membrane Roofing	4.72	17.76	982,268
	Waterproofing	0.24	0.92	50,932
08	<b>Doors &amp; Windows</b>	<b>2.16</b>	<b>8.11</b>	<b>448,690</b>
	Doors & Windows	2.16	8.11	448,690
09	<b>Finishes</b>	<b>11.43</b>	<b>42.99</b>	<b>2,376,847</b>
	Acoustical Treatment	0.59	2.24	123,693
	Carpet	1.77	6.67	368,654
	Gypsum Board	6.42	24.12	1,333,944
	Metal Support Systems	0.00	0.00	0
	Painting	2.01	7.54	417,161
	Special Ceiling Surfaces	0.00	0.00	0
	Tile	0.64	2.41	133,394
	Wall Covering	0.00	0.00	0
10	<b>Specialties</b>	<b>0.46</b>	<b>1.72</b>	<b>95,316</b>
	Fire Protection	0.05	0.20	10,914

## D4Cost American Music Theatre Adjusted

Sunday, October 3, 2010

Page 2

	Identifying Devices	0.10	0.39	21,828
	Telephone	0.02	0.08	4,366
	Toilet & Bath Accessories	0.28	1.05	58,208
<b>11</b>	<b>Equipment</b>	<b>17.51</b>	<b>65.85</b>	<b>3,641,176</b>
	Theatre & Stage	17.51	65.85	3,641,176
<b>14</b>	<b>Conveying Systems</b>	<b>0.95</b>	<b>3.57</b>	<b>197,666</b>
	Elevators	0.82	3.07	169,775
	Lifts	0.13	0.50	27,892
<b>15</b>	<b>Mechanical</b>	<b>13.00</b>	<b>48.86</b>	<b>2,701,844</b>
	Fire Protection	0.98	3.68	203,730
	HVAC	9.27	34.87	1,928,156
	Plumbing	2.74	10.31	569,958
<b>16</b>	<b>Electrical</b>	<b>10.97</b>	<b>41.23</b>	<b>2,279,832</b>
	Electrical	10.97	41.23	2,279,832
<b>Total Building Costs</b>		<b>100.00</b>	<b>375.98</b>	<b>20,789,396</b>
<b>02</b>	<b>Site Work</b>	<b>100.00</b>	<b>35.46</b>	<b>4,123,101</b>
	Site Work	100.00	35.46	4,123,101
<b>Total Non-Building Costs</b>		<b>100.00</b>	<b>35.46</b>	<b>4,123,101</b>
<b>Total Project Costs</b>		<b>--</b>	<b>--</b>	<b>24,912,497</b>

RS Means Costworks  
Data

**RS Means Office Building**

**Square Foot Cost Estimate Report**

Estimate Name: **Untitled**

Building Type: **Office, 5-10 Story with Face Brick with Concrete Block Back-up / R/Conc. Frame**  
 Location: **NEW YORK, NY**  
 Stories Count (L.F.): **8.00**  
 Stories Height: **12.00**  
 Floor Area (S.F.): **80,000.00**  
 Labor Type: **Union**  
 Basement Included: **No**  
 Data Release: **Year 2010 Quarter 3**  
 Cost Per Square Foot: **\$221.43**  
 Total Building Cost: **\$17,714,000**



Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly.

		% of Total	Cost Per SF	Cost
<b>A Substructure</b>		2.6%	4.28	\$342,000
<b>A1010</b>	<b>Standard Foundations</b>		2.58	\$206,000
	Strip footing, concrete, reinforced, load 11.1 KLF, soil bearing capacity 6 KSF, 12" deep x 24" wide			
	Spread footings, 3000 PSI concrete, load 800K, soil bearing capacity 6 KSF, 12' - 0" square x 37" deep			
<b>A1030</b>	<b>Slab on Grade</b>		0.87	\$69,500
	Slab on grade, 4" thick, non industrial, reinforced			
<b>A2010</b>	<b>Basement Excavation</b>		0.07	\$5,500
	Excavate and fill, 10,000 SF, 4' deep, sand gravel, or common earth, on site storage			
<b>A2020</b>	<b>Basement Walls</b>		0.76	\$61,000
	Foundation wall, CIP, 4' wall height, direct chute, .148 CY/LF, 7.2 PLF, 12" thick			
<b>B Shell</b>		31.6%	52.28	\$4,182,500
<b>B1010</b>	<b>Floor Construction</b>		24.74	\$1,979,000
	Cast-in-place concrete column, 20" square, tied, 800K load, 12' story height, 394 lbs/LF, 6000 PSI			
	Cast-in-place concrete column, 20" square, tied, 900K load, 12' story height, 394 lbs/LF, 6000 PSI			
	Cast-in-place concrete column, 20", square, tied, minimum reinforcing, 500K load, 10'-14' story height, 375 lbs/LF, 4k			
	Flat plate, concrete, 9" slab, 20" column, 20'x25' bay, 75 PSF superimposed load, 188 PSF total load			
<b>B1020</b>	<b>Roof Construction</b>		2.51	\$200,500
	Floor, concrete, beam and slab, 20'x25' bay, 40 PSF superimposed load, 18" deep beam, 8.5" slab, 146 PSF total lo			
<b>B2010</b>	<b>Exterior Walls</b>		18.99	\$1,519,500
	Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, perlite core fill			
<b>B2020</b>	<b>Exterior Windows</b>		4.76	\$380,500
	Windows, aluminum, sliding, insulated glass, 5' x 3'			
<b>B2030</b>	<b>Exterior Doors</b>		0.32	\$25,500
	Door, aluminum & glass, with transom, narrow stile, double door, hardware, 6'-0" x 10'-0" opening			
	Door, steel 18 gauge, hollow metal, 1 door with frame, no label, 3'-0" x 7'-0" opening			
<b>B3010</b>	<b>Roof Coverings</b>		0.97	\$77,500
	Roofing, asphalt flood coat, gravel, base sheet, 3 plies 15# asphalt felt, mopped			
	Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite			



**RS Means Office Building**

		<b>% of Total</b>	<b>Cost Per SF</b>	<b>Cost</b>
	Roof edges, aluminum, duranodic, .050" thick, 6" face			
	Flashing, aluminum, no backing sides, .019"			
<b>C Interiors</b>		<b>19.5%</b>	<b>32.28</b>	<b>\$2,582,500</b>
<b>C1010</b>	<b>Partitions</b>		<b>4.97</b>	<b>\$397,500</b>
	Metal partition, 5/8" water resistant gypsum board face, no base layer, 3-5/8" @ 24" OC framing, same opposite face			
	1/2" fire rated gypsum board, taped & finished, painted on metal furring			
<b>C1020</b>	<b>Interior Doors</b>		<b>2.98</b>	<b>\$238,000</b>
	Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8"			
<b>C1030</b>	<b>Fittings</b>		<b>0.89</b>	<b>\$71,000</b>
	Toilet partitions, cubicles, ceiling hung, plastic laminate			
<b>C2010</b>	<b>Stair Construction</b>		<b>3.02</b>	<b>\$242,000</b>
	Stairs, steel, cement filled metal pan & picket rail, 16 risers, with landing			
<b>C3010</b>	<b>Wall Finishes</b>		<b>1.39</b>	<b>\$111,000</b>
	Painting, interior on plaster and drywall, walls & ceilings, roller work, primer & 2 coats			
	Vinyl wall covering, fabric back, medium weight			
<b>C3020</b>	<b>Floor Finishes</b>		<b>9.04</b>	<b>\$723,000</b>
	Carpet, tufted, nylon, roll goods, 12' wide, 36 oz			
	Carpet, padding, add to above, minimum			
	Vinyl, composition tile, maximum			
	Tile, ceramic natural clay			
<b>C3030</b>	<b>Ceiling Finishes</b>		<b>10.00</b>	<b>\$800,000</b>
	Acoustic ceilings, 3/4" mineral fiber, 12" x 12" tile, concealed 2" bar & channel grid, suspended support			
<b>D Services</b>		<b>46.3%</b>	<b>76.71</b>	<b>\$6,137,000</b>
<b>D1010</b>	<b>Elevators and Lifts</b>		<b>17.08</b>	<b>\$1,366,000</b>
	Traction, geared passenger, 3500 lb, 8 floors, 12' story height, 2 car group, 200 FPM			
<b>D2010</b>	<b>Plumbing Fixtures</b>		<b>2.88</b>	<b>\$230,000</b>
	Water closet, vitreous china, bowl only with flush valve, wall hung			
	Urinal, vitreous china, wall hung			
	Lavatory w/trim, vanity top, PE on CI, 20" x 18"			
	Service sink w/trim, PE on CI, wall hung w/rim guard, 24" x 20"			
	Water cooler, electric, wall hung, 8.2 GPH			
	Water cooler, electric, wall hung, wheelchair type, 7.5 GPH			
<b>D2020</b>	<b>Domestic Water Distribution</b>		<b>0.56</b>	<b>\$45,000</b>
	Gas fired water heater, commercial, 100< F rise, 200 MBH input, 192 GPH			
<b>D2040</b>	<b>Rain Water Drainage</b>		<b>0.34</b>	<b>\$27,500</b>
	Roof drain, CI, soil, single hub, 5" diam, 10' high			
	Roof drain, CI, soil, single hub, 5" diam, for each additional foot add			
<b>D3050</b>	<b>Terminal &amp; Package Units</b>		<b>21.19</b>	<b>\$1,695,500</b>
	Rooftop, multizone, air conditioner, offices, 25,000 SF, 79.16 ton			
<b>D4010</b>	<b>Sprinklers</b>		<b>3.93</b>	<b>\$314,500</b>
	Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF			
	Wet pipe sprinkler systems, steel, light hazard, each additional floor, 10,000 SF			
	Standard High Rise Accessory Package 8 story			
<b>D4020</b>	<b>Standpipes</b>		<b>1.14</b>	<b>\$91,500</b>
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, 1 floor			
	Wet standpipe risers, class III, steel, black, sch 40, 4" diam pipe, additional floors			
	Fire pump, electric, with controller, 5" pump, 100 HP, 1000 GPM			
	Fire pump, electric, for jockey pump system, add			
<b>D5010</b>	<b>Electrical Service/Distribution</b>		<b>2.46</b>	<b>\$197,000</b>
	Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 1600 A			

**RS Means Office Building**

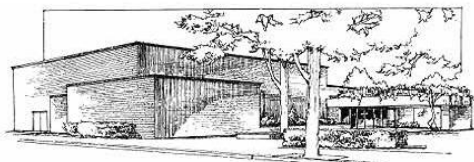
	% of Total	Cost Per SF	Cost
Feeder installation 600 V, including RGS conduit and XHHW wire, 60 A			
Feeder installation 600 V, including RGS conduit and XHHW wire, 200 A			
Feeder installation 600 V, including RGS conduit and XHHW wire, 1600 A			
Switchgear installation, incl switchboard, panels & circuit breaker, 1600 A			
<b>D5020 Lighting and Branch Wiring</b>	<b>17.71</b>		<b>\$1,417,000</b>
Receptacles incl plate, box, conduit, wire, 16.5 per 1000 SF, 2.0 W per SF, with transformer			
Miscellaneous power, 1.2 watts			
Central air conditioning power, 4 watts			
Motor installation, three phase, 460 V, 15 HP motor size			
Motor feeder systems, three phase, feed to 200 V 5 HP, 230 V 7.5 HP, 460 V 15 HP, 575 V 20 HP			
Motor connections, three phase, 200/230/460/575 V, up to 5 HP			
Motor connections, three phase, 200/230/460/575 V, up to 100 HP			
Fluorescent fixtures recess mounted in ceiling, 1.6 watt per SF, 40 FC, 10 fixtures @32watt per 1000 SF			
<b>D5030 Communications and Security</b>	<b>8.12</b>		<b>\$650,000</b>
Telephone wiring for offices & laboratories, 8 jacks/MSF			
Communication and alarm systems, fire detection, addressable, 100 detectors, includes outlets, boxes, conduit and			
Fire alarm command center, addressable with voice, excl. wire & conduit			
Internet wiring, 8 data/voice outlets per 1000 S.F.			
<b>D5090 Other Electrical Systems</b>	<b>1.29</b>		<b>\$103,000</b>
Generator sets, w/battery, charger, muffler and transfer switch, diesel engine with fuel tank, 100 kW			
Uninterruptible power supply with standard battery pack, 15 kVA/12.75 kW			
<b>E Equipment &amp; Furnishings</b>	<b>0.0%</b>	<b>0.00</b>	<b>\$0</b>
<b>E1090 Other Equipment</b>		<b>0.00</b>	<b>\$0</b>
<b>F Special Construction</b>	<b>0.0%</b>	<b>0.00</b>	<b>\$0</b>
<b>G Building Sitework</b>	<b>0.0%</b>	<b>0.00</b>	<b>\$0</b>
<b>Sub Total</b>	<b>100%</b>	<b>\$165.55</b>	<b>\$13,244,000</b>
<b>Contractor's Overhead &amp; Profit</b>	<b>25.0%</b>	<b>\$41.39</b>	<b>\$3,311,000</b>
<b>Architectural Fees</b>	<b>7.0%</b>	<b>\$14.49</b>	<b>\$1,159,000</b>
<b>User Fees</b>	<b>0.0%</b>	<b>\$0.00</b>	<b>\$0</b>
<b>Total Building Cost</b>		<b>\$221.43</b>	<b>\$17,714,000</b>

**RS Means Auditorium**

**Square Foot Cost Estimate Report**

Estimate Name: **Untitled**

Building Type: **Auditorium with Face Brick with Concrete Block Back-up / Bearing Wall**  
 Location: **NEW YORK, NY**  
 Stories Count (L.F.): **2.00**  
 Stories Height: **16.00**  
 Floor Area (S.F.): **3,944.00**  
 Labor Type: **Union**  
 Basement Included: **No**  
 Data Release: **Year 2010 Quarter 3**  
 Cost Per Square Foot: **\$457.28**  
 Total Building Cost: **\$1,803,500**



Costs are derived from a building model with basic components. Scope differences and market conditions can cause costs to vary significantly. Parameters are not within the ranges recommended by RSMMeans.

		<b>% of Total</b>	<b>Cost Per SF</b>	<b>Cost</b>
<b>A Substructure</b>		<b>7.3%</b>	<b>24.85</b>	<b>\$98,000</b>
<b>A1010</b>	<b>Standard Foundations</b>		<b>6.85</b>	<b>\$27,000</b>
	Strip footing, concrete, reinforced, load 6.8 KLF, soil bearing capacity 3 KSF, 12" deep x 32" wide			
	spread footings, 3000 PSI concrete, load 50K, soil bearing capacity 6 KSF, 3' - 0" square x 12" deep			
	Spread footings, 3000 PSI concrete, load 100K, soil bearing capacity 6 KSF, 4' - 6" square x 15" deep			
<b>A1030</b>	<b>Slab on Grade</b>		<b>4.06</b>	<b>\$16,000</b>
	Slab on grade, 6" thick, non industrial, reinforced			
<b>A2010</b>	<b>Basement Excavation</b>		<b>0.13</b>	<b>\$500</b>
	Excavate and fill, 30,000 SF, 4' deep, sand, gravel, or common earth, on site storage			
<b>A2020</b>	<b>Basement Walls</b>		<b>13.82</b>	<b>\$54,500</b>
	Foundation wall, CIP, 4' wall height, direct chute, .197 CY/LF, 9.44 PLF, 16" thick			
<b>B Shell</b>		<b>56.3%</b>	<b>192.44</b>	<b>\$759,000</b>
<b>B1010</b>	<b>Floor Construction</b>		<b>2.79</b>	<b>\$11,000</b>
	Steel column, W8, 100 KIPS, 20' unsupported height, 40 PLF			
	Floor, concrete, slab form, open web bar joist @ 2' OC, on bearing wall, 30' span, 24.5" deep, 125 PSF superimpose			
<b>B1020</b>	<b>Roof Construction</b>		<b>4.82</b>	<b>\$19,000</b>
	Roof, steel joists, 1.5" 22 ga metal deck, on bearing walls, 30' bay, 23.5" deep, 40 PSF superimposed load, 60 PSF i			
	Roof, steel joists, 1.5" 22 ga metal deck, on bearing walls, 100' bay, 57.5" deep, 40 PSF superimposed load, 65 PSF			
	Roof joist, light gauge, 12 ga			
	Roof joist, light gauge, 14 ga			
<b>B2010</b>	<b>Exterior Walls</b>		<b>134.51</b>	<b>\$530,500</b>
	Brick wall, composite double wythe, standard face/CMU back-up, 8" thick, perlite core fill			
<b>B2020</b>	<b>Exterior Windows</b>		<b>38.79</b>	<b>\$153,000</b>
	Aluminum flush tube frame, for insulating glass, 2" x 4-1/2", 5'x20' opening, 3 intermediate horizontals			
	Glazing panel, plate glass, 1/4" thick, tempered			
<b>B2030</b>	<b>Exterior Doors</b>		<b>2.41</b>	<b>\$9,500</b>
	Door, aluminum & glass, without transom, narrow stile, double door, hardware, 6'-0" x 7'-0" opening			
	Door, steel 18 gauge, hollow metal, 2 doors with frame, no label, 6'-0" x 7'-0" opening			

**RS Means Auditorium**

		<b>% of Total</b>	<b>Cost Per SF</b>	<b>Cost</b>
<b>B3010</b>	<b>Roof Coverings</b> Roofing, asphalt flood coat, gravel, base sheet, 3 plies 15# asphalt felt, mopped Insulation, rigid, roof deck, composite with 2" EPS, 1" perlite Roof edges, aluminum, duranodic, .050" thick, 6" face Flashing, aluminum, no backing sides, .019" Gravel stop, aluminum, extruded, 4", mill finish, .050" thick		8.87	\$35,000
<b>B3020</b>	<b>Roof Openings</b> Roof hatch, with curb, 1" fiberglass insulation, 2'-6" x 3'-0", aluminum		0.25	\$1,000
<b>C Interiors</b>		13.6%	46.40	\$183,000
<b>C1010</b>	<b>Partitions</b> Concrere block (CMU) partition, light weight, hollow, 6" thick, no finish		5.58	\$22,000
<b>C1020</b>	<b>Interior Doors</b> Door, single leaf, kd steel frame, hollow metal, commercial quality, flush, 3'-0" x 7'-0" x 1-3/8"		2.92	\$11,500
<b>C2010</b>	<b>Stair Construction</b> Stairs, steel, cement filled metal pan & picket rail, 20 risers, with landing		2.16	\$8,500
<b>C3010</b>	<b>Wall Finishes</b> 2 coats paint on masonry with block filler Painting, masonry or concrete, latex, brushwork, primer & 2 coats Painting, masonry or concrete, latex, brushwork, addition for block filler Wall coatings, epoxy coatings, maximum		18.64	\$73,500
<b>C3020</b>	<b>Floor Finishes</b> Carpet, tufted, nylon, roll goods, 12' wide, 36 oz Carpet, padding, add to above, maximum Vinyl tile, maximum Add for sleepers on concrete, treated, 24" OC, 1"x2" Underlayment, plywood, 5/8" thick		11.41	\$45,000
<b>C3030</b>	<b>Ceiling Finishes</b> Acoustic ceilings, 3/4" fiberglass board, 24" x 48" tile, tee grid, suspended support		5.70	\$22,500
<b>D Services</b>		20.4%	69.85	\$275,500
<b>D1010</b>	<b>Elevators and Lifts</b> Hydraulic passenger elevator, 4500 lb., 2 floor, 125 FPM		4.06	\$16,000
<b>D2010</b>	<b>Plumbing Fixtures</b> Water closet, vitreous china, bowl only with flush valve, wall hung Urinal, vitreous china, stall type Lavatory w/trim, wall hung, PE on CI, 18" x 15" Service sink w/trim, PE on CI, comer floor, 28" x 28", w/rim guard Shower, stall, fiberglass 1 piece, three walls, 36" square Water cooler, electric, wall hung, wheelchair type, 7.5 GPH		6.09	\$24,000
<b>D2020</b>	<b>Domestic Water Distribution</b> Gas fired water heater, commercial, 100< F rise, 75.5 MBH input, 63 GPH		2.79	\$11,000
<b>D2040</b>	<b>Rain Water Drainage</b> Roof drain, DWW PVC, 4" diam, diam, 10' high Roof drain, DWW PVC, 4" diam, for each additional foot add		8.37	\$33,000
<b>D3050</b>	<b>Terminal &amp; Package Units</b> Rooftop, single zone, air conditioner, restaurants, 10,000 SF, 50.00 ton		16.73	\$66,000
<b>D4010</b>	<b>Sprinklers</b> Wet pipe sprinkler systems, steel, light hazard, 1 floor, 10,000 SF		4.44	\$17,500
<b>D5010</b>	<b>Electrical Service/Distribution</b> Service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4 wire, 120/208 V, 800 A Feeder installation 600 V, including RGS conduit and XHHW wire, 800 A		3.04	\$12,000



**RS Means Auditorium**

		% of Total	Cost Per SF	Cost
	Switchgear installation, incl switchboard, panels & circuit breaker, 800 A			
<b>D5020</b>	<b>Lighting and Branch Wiring</b>		17.88	\$70,500
	Receptacles incl plate, box, conduit, wire, 8 per 1000 SF, .9 watts per SF			
	Wall switches, 2.0 per 1000 SF			
	Miscellaneous power, 1 watt			
	Central air conditioning power, 3 watts			
	Motor installation, three phase, 200 V, 15 HP motor size			
	Motor feeder systems, three phase, feed to 200 V 15 HP, 230 V 15 HP, 460 V 40 HP, 575 V 50 HP			
	Fluorescent fixtures recess mounted in ceiling, 3 watt per SF, 60 FC, 15 fixtures @40 watt per 1000 SF			
<b>D5030</b>	<b>Communications and Security</b>		4.94	\$19,500
	Communication and alarm systems, includes outlets, boxes, conduit and wire, sound systems, 30 outlets			
	Communication and alarm systems, fire detection, non-addressable, 25 detectors, includes outlets, boxes, conduit a			
<b>D5090</b>	<b>Other Electrical Systems</b>		1.52	\$6,000
	Generator sets, w/battery, charger, muffler and transfer switch, gas/gasoline operated, 3 phase, 4 wire, 277/480 V, 1			
<b>E Equipment &amp; Furnishings</b>		2.5%	8.37	\$33,000
<b>E1090</b>	<b>Other Equipment</b>		8.37	\$33,000
	102 - Auditorium chair, fully upholstered, spring seat			
<b>F Special Construction</b>		0.0%	0.00	\$0
<b>G Building Sitework</b>		0.0%	0.00	\$0
<b>Sub Total</b>		<b>100%</b>	<b>\$341.91</b>	<b>\$1,348,500</b>
<b>Contractor's Overhead &amp; Profit</b>		<b>25.0%</b>	<b>\$85.45</b>	<b>\$337,000</b>
<b>Architectural Fees</b>		<b>7.0%</b>	<b>\$29.92</b>	<b>\$118,000</b>
<b>User Fees</b>		<b>0.0%</b>	<b>\$0.00</b>	<b>\$0</b>
<b>Total Building Cost</b>			<b>\$457.28</b>	<b>\$1,803,500</b>