CAMPUS SQUARE BUILDING

1426 North Third Street, Harrisburg, PA

Andrew Martin
Construction Management

Tech Assignment #1
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Dr. Chris Magent

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Executive Summary

Technical Assignment 1 describes the construction management aspects of the Campus Square building located in Harrisburg, Pennsylvania. Campus square is owned by GreenWorks Development, and is home to Harrisburg Area Community College, as well as the Green Center of Central Pennsylvania. The project was design by Ganflec Architects & Engineers, Inc. and constructed by Wohlsen Construction Company.

Within the report, information and summaries will be provided for the following: project summary schedule, building systems summary, project cost evaluations, site plan and existing conditions, local conditions, client information, project delivery, and project staffing.

From the information and summaries, many characteristics of the project were discovered and analyzed. For instance, when comparing cost estimates from RS Means and D4Cost to the actual costs of the building, it was discovered that the estimates were substantially lower than the actual costs. Costs differences were mainly as a result of the sustainable systems used in achieving a LEED Gold certification, as well as existing site conditions. Through the creation of the site plan of existing conditions, the true constraints of the building site were made more visible, and will assist in highlighting the nature of workflow and contractor coordination and cooperation to complete the project on time and on budget.

Based out of Harrisburg, GreenWorks Development strives to enhance urban communities through restoration of blighted communities, mitigating suburban sprawl. Therefore, it was important to the owner to create a highly efficient, usable space on an existing brownfield site. The project delivery system and staffing organizational charts provide allow for a better understanding of the contractual and communications structures implemented for the Campus Square project.

Throughout the research for this technical report, certain questions arose that may have bearing on the direction of future technical reports and thesis research. One such question is how the owner-architect-contractor relationship impacted the construction process. Furthermore, discovering how the LEED certification process and implementation was handled, and its' impact on construction scheduling and cost.

The Campus Square project is a unique building, different from a typical project due to its' impressive LEED Gold certification. Hosting a geothermal mechanical system, as well as a sizable photovoltaic system on the roof, this building sets itself apart from many of the buildings in the area. The owner chose to construct a building that will provide long term cost savings, as well as being environmentally conscious.

A. Project Summary Schedule

Sitework & Foundations

The Campus Square site is located on an existing gas station, and required tank removal and soil remediation before excavation began. Once the demolition of gas station and soil remediation were complete, sitework could begin for the new construction. Additionally, the building utilizes a geothermal mechanical system which required well drilling before footer excavation could take place in order to find optimum well placement. Concrete piers were poured in the same area as the geothermal well field, taking special consideration as to not disturb the geothermal wells. Foundations for the superstructure were poured in between the two well fields on either side of the mechanical basement space. Throughout construction, site utilization was very important in considering sequencing due to confined sight limitations, as well as existing utility interference

Superstructure

Structural steel would begin once underground MEP work was completed. Because the building is only 4-stories in height, a mobile crane was used in order to efficiently place the columns and beams. A 150 ton hydraulic crane was strategically placed on the south side of the site in order to hoist material deliveries efficiently, without disrupting workflow. Installation of the composite deck would begin once all overhead steel work was completed. Concrete for the slab-on-grade and metal decking would be poured once all steelwork was inspected. Enclosure work, including roof installation, exterior framing, masonry, curtain wall and windows required additional sequencing consideration due to existing power lines running along one of the sides of the building. Coordination between the General Contractor and the power company was required to sequence powering off the lines while work was being performed near them.

Finishes

Due to economic conditions, tenants were not established for the building until the core and shell portion of the project was nearly turned over to the owner. Therefore, finishes within the building did not require as long of a duration due to the open floor plan. However, a “parade-of-trades” was utilized in completing the interior work for each floor. Additionally, throughout the construction process, special documentation and coordination was needed in the LEED certification process.

Please view Appendix A of this technical assignment for the Project Schedule Summary

B. Building Systems Summary

Building Systems Summary				
Yes	**No**	**Scope of Work**	**Issues**	
X		**Demolition Required**	Materials:	Existing service station was demolished
				Existing tank removal and soil remediation
				Asbestos was removed prior to demolition (VCT flooring)
				Existing concrete and bituminous pavement removed
				Existing underground utilities were protected
				Existing utility pole and services were relocated
X		**Structural Steel Frame**	Type of Bracing:	Steel moment resisting frame, with composite beam and deck system
			SOD:	Composite beam and deck floor system
				Light weight concrete used with fly-ash admixter
			Crane Size:	150 Ton
			Crane Type:	Hydraulic Truck Crane
			Location:	Placed on the southside of the structure, and used to hoist materials as well as erect steel
X		**Cast In Place Concrete**	Formwork:	Typical wood panels and wall ties were used as formwork for foundations
				Construction joints formed at the edge of pours
			Placement:	Eco-friendly releasing agents were used to release forms
				All CIP concrete placed through the use of pump trucks
			Mech. Rm.:	Basement mechinical space
X		**Mechanical System**	Type of System	46-well, Closed Loop Hybrid Geothermal System
				Each well drilled 450 feet deep to achieve cooling/heating load for the building
				Supplemental cooling tower installed to handle the peak summer conditions
			Distribution Systems:	Fully flexible water source heat pump system with wireless automatic temperature controls and energy recovery
				Each Floor utilizes a hot and cold water loop which transfers heat through two pumps in the basement controlled by Variable Frequency Drives that pumps the water through the geothermal well field
			Fire Suppression:	Wet sprinkler system used
				Concealed sprinkler heads in common areas
				Semi-recessed heads will be installed within tenant spaces
				Sprinkler heads are all installed vertically for adequate coverage until occupied

X		**Electrical System**	Size:	47 kW Photovoltaic Solar System with battery backup for emergency power
				208Y/120V Utility Service Feeder
			Capacity:	3000A MDP. (1) 600A house panel. (2) 200A panel per floor
				Due to urban location, transformers located on the exterior, underground
				Vault requires guidelines regards to access, ADA compliance and dimensions
			Redundency:	(3) Invertors on the roof, (3) invertors in the basement, (6) batteries in the
				basement as backup emergency power
			Lighting:	2x4 lay-in florescent lighting in all core and shell spaces
				Occupancy sensors used throughout the building
				LED Lighting used on the exterior of the building
			Bearing/Veneer:	Veneer
X		**Masonry**	Connection Details	Masonry veneer connected to structural sheating backup; anchors at 16" o.c.
				Where masonry veneer dows not begin at ground level, or bear on floor slab,
				supported with steel relief angles connected to slab edges or beam members
			Scaffolding:	Adjustable scaffolding used
X		**Curtain Wall**	Materials:	High performance curtain wall and storefront systems
				Low-E glazing used
				Painted aluminum frame
			Construction & Design:	Engineered shop drawings were prepared by the subcontractor, then approved
				by the structural engineer
X		**Support of Excavation**	Type:	Steel plate shoring
			Dewatering System:	Moats and basins were constructed to divert water. Basins were pumped
				through silt bags to remove soil and contaminants. Water was then released
				into the city's stormwater system

Sustainability Efforts

As previously mentioned, Campus Square will receive a LEED Gold certification.

Please view Appendix B of this technical assignment for the LEED checklist used and implemented for the project.

C. Project Cost Evaluation

Building Construction Cost

The Building Construction Cost for the Campus Square building can be calculated through the use of the overall cost of the project. Building Construction Costs are essentially the overall costs minus costs associated with the land costs, site work packages, permitting, etc. In the case of the Campus Square project, the scope of work included the completion of the core and shell. Tenant fit-outs were not included in the project cost evaluation portion of the technical assignment.

Overall Project Cost	**$9,000,000**
Land Costs and Site Work	**$410,000**
Building Construction Cost (CC):	**$8,590,000**

Building Construction Cost per square foot can be calculated from the determined value above. Construction Cost per square foot assist the General Contractor compare current projects with historical data in order better quantify costs related to budgeting, estimating, and cost comparisons.

Building Construction Cost (CC)	**$8,859,000**
Building Square Footage (SF)	**75,000 SF**
Building Cost Per Square Foot (CC/SF)	**$115.00**

Total Project Cost and Cost Per Square Foot

The Total Construction Cost is associated with all costs associated with the project (not including tenant fit-out costs).

Total Project Cost (TC):	**$9,000,000**
Total Project Cost Per Square Foot (TC/SF):	**$120.00**

Building Systems Costs

Due to the Campus Square project attaining a LEED Gold certification, we can expect a higher initial cost in many of the MEP systems, as well as materials, used in the building. Therefore, when compared to similar building types, high unit and square foot costs may be observed. This is evident in the mechanical package and the electrical/solar package account for 14.4% and 13.3% respectively.

System	Cost	Cost / SF
Structural	**$1,300,000**	**$17.33**
Mechanical	**$1,300,000**	**$17.33**
Electrical	**$900,000**	**$12.00**
Solar	**$300,000**	**$4.00**

Parametric Estimate

In order to estimate the Campus Square building utilizing D4 Cost software, three buildings with similar attributes, such as square footage, amount of stories and project cost, were selected as reference projects. The reference buildings were then averaged together and adjusted to more specifically meet the conditions of the Campus Square project. For instance, location, size, and date of construction were modified. The three selected projects are listed below:

Use	Project Name	Size (SF)	Floors	Building Cost
Office	Twin Oaks I Office Tower	89,860	4	$5,070,859
Office	Dulles Office Building	92,444	4	$5,625,100
Office	Netplex Plaza	93,456	4	$7,648,636

Cost estimate of Campus Square using D4 is listed below:

CSI Code	Division Name	%	Sq. Cost	Projected
00	Procurement and Contracting Requirements	4.35	$8.92	$668,971
01	General Requirements	5.09	$10.43	$782,384
02	Existing Conditions	4.41	$9.04	$677,967
03	Concrete	7.15	$14.67	$1,100,196
04	Masonry	4.77	$9.78	$733,246
05	Metals	6.92	$14.19	$1,064,532
06	Wood, Plastics, and Composites	0.61	$1.24	$93,238
07	Thermal and Moisture Protection	1.61	$3.30	$247,140
08	Openings	3.38	$6.93	$519,695
09	Finishes	5.91	$12.13	$909,509
10	Specialties	1.58	$3.23	$242,248
12	Furnishings	1.12	$2.29	$172,086
13	Special Construction	0.26	$0.52	$39,350
14	Conveying Systems	1.28	$2.63	$197,088
15	Mechanical	9.17	$18.81	$1,410,586
16	Electrical	7.24	$14.84	$1,113,194
21	Fire Suppression	0.47	$0.97	$72,761
22	Plumbing	1.44	$2.94	$220,804
23	HVAC	7.69	$15.77	$1,182,630
25	Integrated Automation	0.64	$1.31	$98,084
26	Electrical	6.19	$12.70	$952,652
27	Communications	10.88	$22.30	$1,672,629
28	Electronic Safety and Security	5.12	$10.50	$787,355
31	Earthwork	0.92	$1.88	$140,776
32	Exterior Improvements	1.10	$2.26	$169,840
33	Utilities	0.71	$1.46	$109,802
Total Building Costs		100.00	$205.05	$15,378,763

Square Foot Estimate

When determining the feasibility of a construction project, it is often helpful to develop a square foot estimate based off of historical data in order to assist in budgeting and estimating costs pertaining to the building. RS Means Square Foot Costs provides costs for many types of commercial and residential projects based off of common building methods and material selection.

Campus Square is a mixed-use, 4-story structure with a partial basement used for mechanical space. When performing the square foot estimate, the M.460 Office, 2-4 Story building was selected. The exterior wall structure of the building is composed of a high performance masonry veneer system, backed with metal studs; as well as a sizable curtain wall system along one of the exterior walls. This specific wall type was not available, so an interpolated value was calculated using a brick veneer with wood frame. Adjustments to the estimate also include additions due to basement square footage and. Additives include a 2500lb passenger elevator, traveling through 5 stops. Location was also compensated for in the estimate. Below is the estimate breakdown calculated with RS Means:

RS Means Estimate				Interpolated Values
Exterior Wall	Area (SF)	65000	80000	75000
	Perimeter (LF)	548.00	580.00	n/a
Brick Veneer	Wood Frame	130.00	127.30	128.20
Story Ht. Adj +/-	Per 1 Ft.	1.15	1.00	1.05

Unit Cost through interpolation		$128.20
Adjust for additional 8' of total story height		$8.40
Estimated Building Cost without additives $136.60/SF * 75,000 SF		**$10,245,000.00**
Additives:	**Unit**	**Cost**
(2) 2500# capacity elevators, 2 stops	Each	$66,300.00
5 additional stops, add	Each	$7,825.00

Basement Cost	**Area (SF)**	**Cost**
$33.65 per square foot	1885	$63,430.25

Estimated Building Cost with additives	**$10,416,725.00**
Adjust for project location (Harrisburg, PA)	0.96
R.S. Means Estimated Building Cost	**$10,000,056.00**
R.S. Means Estimated Unit Cost (SF)	**$133.33**

Cost Estimate Comparison

When analyzing the estimated and actual costs of the Campus Square project, somewhat dramatic differences can be noted. However, when more closely observing the differences in project scope in each of the methods, a better realization of the contrasts can be seen. For instance, the largest dissimilarity between the estimated and the actual costs is the fact the actual costs include only completion up until core and shell. Therefore, when deducting costs for interior work for tenant fit-out, a more reasonable comparison would arise. Furthermore, due to the higher mechanical and electrical packages due to the geothermal and solar applications which are housed within the building, estimated figures do not compensate for these differences. Another variable that may have resulted in a less accurate output was the limited reference buildings available through D4. Most of the buildings in the program were built almost 10 years ago, and it can be assumed that LEED efforts were not applied to such structures.

Total Project Costs	Actual	D4	RS Means
Total Project Cost / SF	$120.00	$205.00	$133.33
Total Project Cost	$9,000,000.00	$15,378,763.00	$10,000,056.00

D. Site Plan of Existing Conditions

The Campus Square building is located in downtown Harrisburg, Pennsylvania. Therefore, site logistics was always an issue during construction. Construction fences were partially extended into the surrounding roadways in order to allow for parking, materials storage, and additional movement around the site. Basin Street, located on the east side of the building, was completely blocked off to the public, and used only for construction purposes. Although somewhat congested, traffic flow was still able to pass along three sides of the building, was pedestrian traffic. Additional parking, staging, and dumpsters were located offsite, on existing parking lots near the site.

One of the largest logistical and safety concerns were the existing overhead electrical lines located along Reily Street. These lines had to remain in place, and functional, throughout construction. Furthermore, coordination was required between Wohlsen and the utility company to temporarily turn off power to these lines when construction needed to take place near them.

Please view Appendix D of this technical assignment for the site plan of existing conditions.

E. Local Conditions

Preferred Methods of Construction

The area of downtown Harrisburg, Pennsylvania where the Campus Square building was constructed is in the Old Uptown Municipal Historic District. Therefore, certain aesthetics of the building had to coincide with the historic planning committee's regulations on new construction. The surrounding buildings from the site are older commercial and industrial buildings that have since been renovated for other uses. No particular construction method or type can be observed in this area other than the vast use of exterior brick masonry.

Availability for Construction Parking

Due to the urban location, and tight property lines, parking, staging, and movement onsite was always a logistical problem. In order to allow for movement within the site, construction fences were pushed out into the adjacent roads. However, public traffic was still able to pass through these areas. Additionally, a temporary parking lot for contractor parking was built, as well as a material staging and stockpiling area, two blocks away. Several dumpsters were needed to coincide with the waste management plan (wood, metal, drywall, clean fill and waste); these were stored in an empty lot adjacent to the building.

Available Recycling and Tipping Fees

A waste management program was instituted for the project, as well as being a LEED requirement for certification. In all 255 tons of waste materials were taken offsite, 76% of which were recycled. The waste management program cost was estimated at approximately $14,000.00, compared to over $21,000.00. In all, recycling efforts saved nearly $8,000.00 during construction.

Please view Appendix E of this technical assignment for the construction waste management plan.

Type of Soil/Subsurface Water Condition

Geotechnical reports of the site, performed by BL Companies Pennsylvania, Inc., show surficial layers of asphalt, concrete and fill materials to various depths below grade. The surficial layers were underlain by native soils that primarily consisted of brown to dark-brown clayey silt with layers of brown, black, grey, white, and tan sand and gravel. Weathered shale bedrock was encountered at depths ranging from approximately 11.7 feet below grade, to greater than 20 feet below grade. Indications of wet to saturated material representative of the water table were encountered at depths of approximately 6.5 feet to greater than 20 feet below grade.

Many of boring samples concluded with levels of contamination due to gasoline leaks from the existing service station tanks. Soil remediation was required in order to decontaminate the site, as well as prevent future environmental impacts

Please view Appendix F of this technical assignment for the soil boring locations on the site.

F. Client Information

Mission

The owner of the Campus Square building is GreenWorks Development, LLC. Their mission is to work to enhance the quality of life in the region by creating new communities in previously developed urban areas. They believe there is extraordinary value in the restoration of our older, blighted communities, rather than contributing to suburban sprawl by paving over our ever-shrinking open spaces. GreenWorks Development focuses on renewal projects in the 6-County Central Pennsylvania region, with activities currently underway in Harrisburg, Carlisle, and several other midstate communities and townships.

GreenWorks Development has the experience and the expertise required to manage all of the challenges of urban redevelopment. They work closely with state, county and municipal governments, building and property owners, architects and others engaged in revitalization efforts to restore our communities. "We *stimulate* investment; *integrate* the new with the old; and *create* opportunity."

Integrated Community Renewal is important not only because it creates financial value, but also because it boosts community value. GreenWorks Development is passionate about redeveloping urban core and traditional towns, as these communities are thriving with opportunity and hope.

Midtown has long been one of Central Pennsylvania's most unique neighborhoods. The area boasts a diverse racial, ethnic, and socioeconomic fabric that is unmatched elsewhere in the region. While once a thriving community of working class row houses, eclectic retail shops, and industrial activity, Midtown has suffered from years of disinvestment and urban decline. This trend has begun to change. Today, new investments bring the promise of a renewed vibrancy as a thriving retail and office corridor, academic center, and expanding residential area.

The largest project is the Midtown Corporate and Academic Center Development. The project, which began in 2006, proposes nothing short of transforming a 12 acre section of Midtown into a vibrant economic engine for the region. The project is centered at the intersection of Third & Reily Streets extending East to Fifth Street, West to Green Street, South to Verbeke Street, and North to Harris Street. The project is a public/private partnership between GreenWorks Development, the City of Harrisburg, and Harrisburg Area Community College (HACC). The targeted Midtown development site has been designated a Governor's Community Action Team priority location, and it is within the City's Enterprise Zone.

Midtown Master Plan and Future Development

GreenWorks Development and HACC developed a clear vision for what the future of what

Midtown could be, with the result being one of the most comprehensive urban renewal projects ever undertaken in the Capital City. The project began with the $19 million renovation of the Evangelical Press Building. The 130,000 square foot building, referred to as Midtown II, now serves as HACC's state-of-the-art technical education and training center.

While the HACC Midtown investment stands as a major renewal project, it serves as the anchor development of the much larger commercial redevelopment effort. These investments represent the beginning of what is expected to be a 10 year, $120 million development project as outlined in GreenWorks Development Midtown Master Plan. The full plan was announced by Mayor Stephen R. Reed and officials from GreenWorks Development in April of 2007. GreenWorks Development commissioned the Hillier Group, an international architectural and master planning firm, to develop the Master Plan.

The Master Plan calls for the development of nearly one million square feet of new academic, commercial, residential and retail space in the targeted 12 acre Midtown area. The combination of rehabilitation, new construction and landscaping will transform a mostly vacant and long under-utilized area into what Mayor Reed calls "a hub for investment and activity" that is expected to spur revitalization throughout the Third and Reily Street Corridor.

One of the primary elements of the plan calls for the preservation of sites along Reily Street for use in future commercial and retail development, allowing the wide thoroughfare to serve as the "front door" of the project area. Previously cleared areas now used as surface parking lots are earmarked for new, multi-story development, with retail on street-level floors, and office space on upper floors that could eventually total nearly a million square feet. Last year, Mayor Reed and GreenWorks Development unveiled plans for the proposed 73,400 sq. ft. Campus Square building on the corner of Third and Reily Streets, which serves to kick-off the new retail and commercial building construction identified in the Master Plan. Paralleling the Reily Street effort is GreenWorks Development redevelopment of the N. Third Street corridor between Reily and Calder Streets. The vision is to restore the vitality of the once thriving retail, residential, and commercial corridor. GreenWorks Development is actively purchasing vacant, abandoned, and underutilized properties along N. Third Street with the vision to restore, modernize, and bring back to productive use the many historic structures that line the corridor.

Cost, Quality, Schedule and Safety Expectations

GreenWorks Development budgeted $15 million for the completion of Campus Square. Wohlsen Construction Company delivered the core and shell portion of the project, and will soon begin construction on a portion of the tenant fit-outs. Due to the speculative nature of the overall project, the schedule, on the owner's side, did not require any specific demands. Also,

because the project was all new construction, occupancy concerns were not an issue for the core and shell portion of the project. Furthermore, once tenant fit-out begins, and the first tenants move in, continued construction will result in occupancy concerns.

As with any project, specifically projects urban in nature, there were numerous safety concerns because of the active public sidewalks and street. GreenWorks Development expressed how the Wohlsen Construction Company did an excellent job managing the site to lower any concerns regarding safety.

Keys to a Satisfactory Project

It was important to the owner to maintain a high level of budget and quality control; and consequently, were both achieved to satisfaction. Furthermore GreenWorks Development felt it was very important to the overall success of the project that it be awarded with, at a minimum, a LEED Silver certification. Not only was the goal met, but extra efforts contributed to the structure being awarded a LEED Gold rating.

G. Project Delivery System

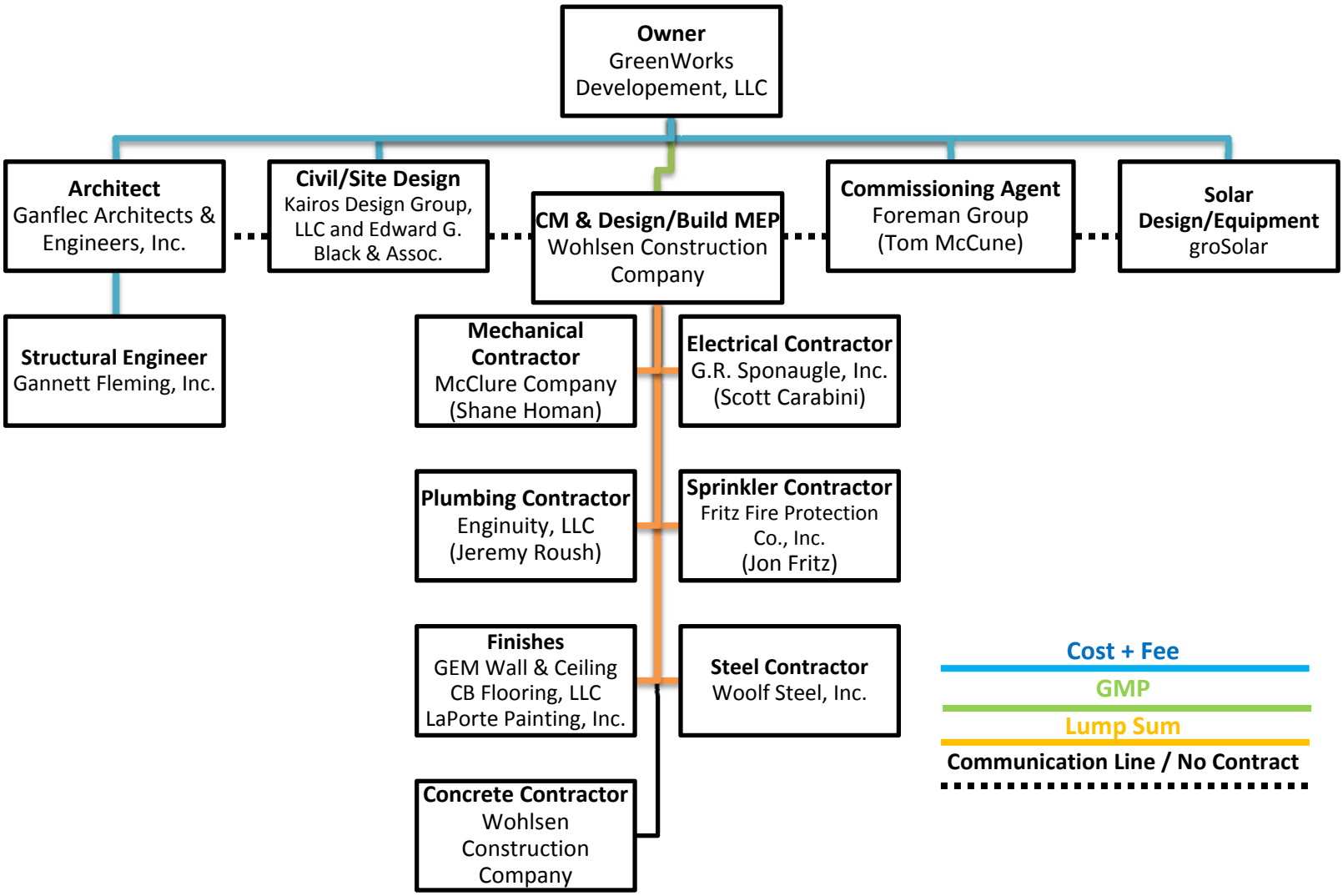


Figure 1 – Project Organization Chart

The project delivery method for the Campus Square project was design/build, with Wohlsen Construction Company as the construction manager at risk. A GMP contract was developed with GreenWorks development, and Wohlsen assisted mainly with the MEP design/build portion of the project. This contract type was chosen because of the ability to expedite the construction process, as well as maintain a higher level of cost control.

A GMP contract between GreenWorks and Wohlsen was the best solution to delivering a successful project because it allowed for a shorter design period before construction could begin. Furthermore, Wohlsen was able to start procuring subcontractors and initializing contracts while the design for later phases of the project were still being finalized. Similarly, a GMP contract also enabled Wohlsen to initiate and purchase long LEED items such as steel and transformers, which would assist in avoiding schedule growth and cost escalation.

Wohlsen awarded subcontract contracts mostly through a lowest-bidder process. However, in some instances, Wohlsen was not always confident in some of the low-bid subcontractor's performance capabilities to perform the work to the owner's standards and expectations. Each contract was a lump sum contract type. Payment and performance bond were required for all design/build contractors, as well as contracts over $500,000. The low-bid contracts Wohlsen had with their subcontractors assisted in keeping overall costs down, as well as helped deliver the project to the owner with the best possible value.

H. Staffing Plan

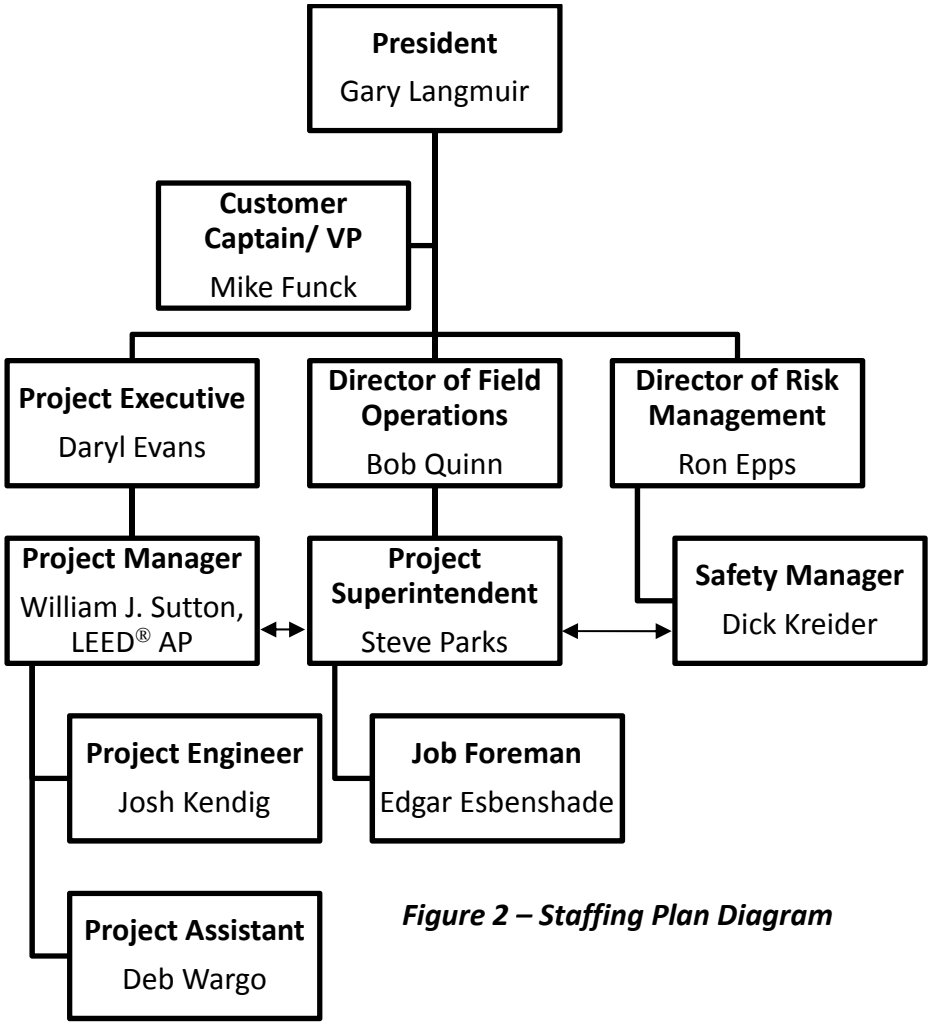
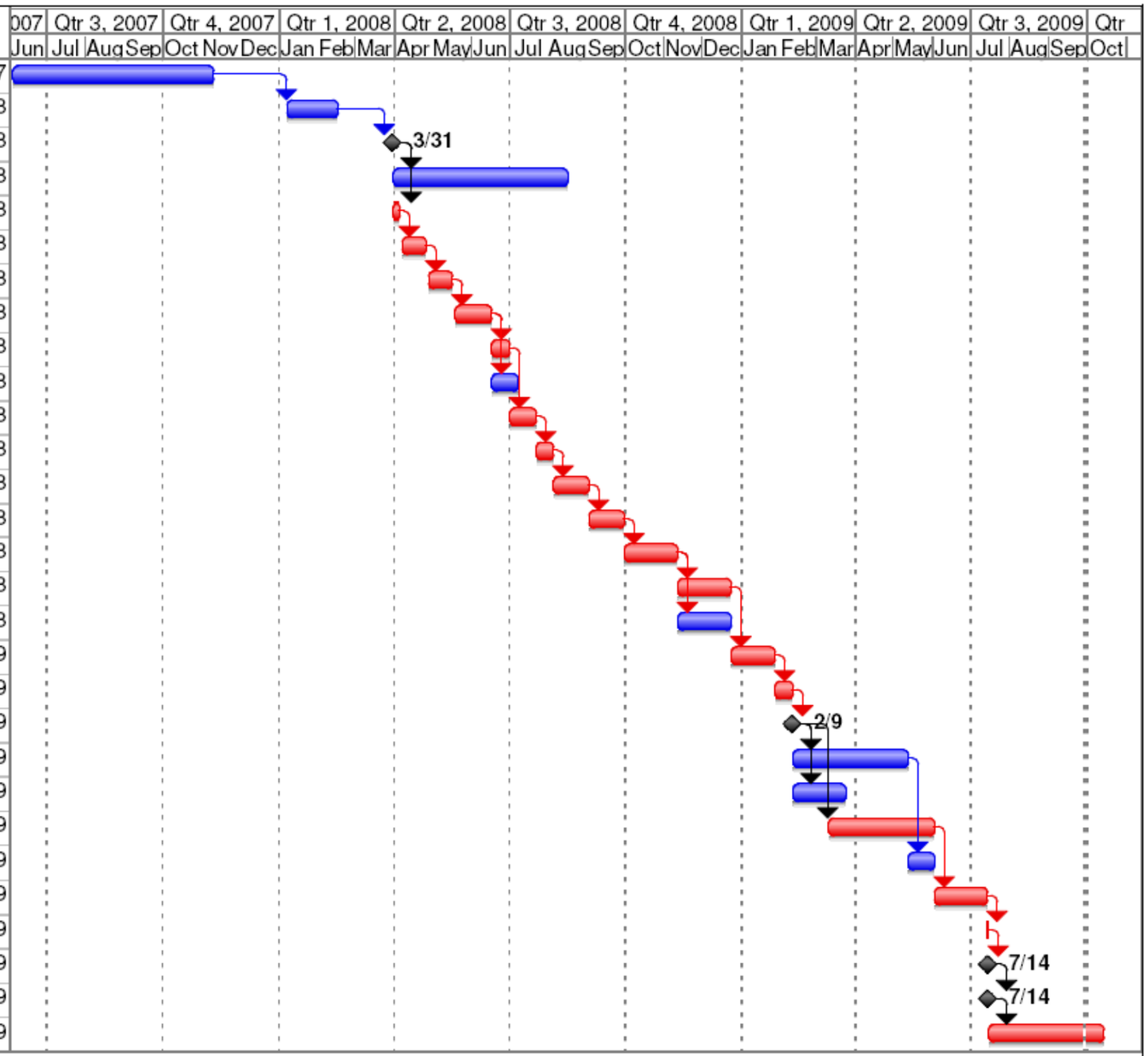


Figure 2 – Staffing Plan Diagram

Figure 2 represents the basic staffing plan that Wohlsen Construction Company established to construct the Campus Square project. Daryl Evans, the project executive, is in charge of the overall project and reports directly back to the senior level leadership of Wohlsen. Bob Quinn, director of field operations, oversees all field level staff in the company. Ron Epps, director of risk management is responsible for the safety department within the company; as well as overseeing safety personnel deployed to Wohlsen jobsites. William Sutton, the project manager, as well as the LEED certified representative for the project, is in charge of the business side of the construction project. He oversees project engineers, as well as deals with client communication, design coordination, subcontractor management, quality control, project finance, and contract administration. Steve Parks, the project superintendent, is tasked with site supervision and management, construction coordination, and scheduling for the project.

Appendix A - Project Schedule Summary

ID	Task Name	Duration	Start	Finish
1	Design Phase	115 days	Mon 6/4/07	Fri 11/9/07
2	Bidding	30 days	Mon 1/7/08	Fri 2/15/08
3	Notice to Proceed	0 days	Mon 3/31/08	Mon 3/31/08
4	Procurement	100 days	Mon 3/31/08	Fri 8/15/08
5	Mobilization	5 days	Mon 3/31/08	Fri 4/4/08
6	Demolition & Tank Removal	15 days	Mon 4/7/08	Fri 4/25/08
7	Site Excavation	15 days	Mon 4/28/08	Fri 5/16/08
8	Geothermal Well Drilling	21 days	Mon 5/19/08	Mon 6/16/08
9	Pour Piers	10 days	Tue 6/17/08	Mon 6/30/08
10	Utilities Installation	15 days	Tue 6/17/08	Mon 7/7/08
11	Pour Footers	15 days	Tue 7/1/08	Mon 7/21/08
12	Pour Foundation Walls	10 days	Tue 7/22/08	Mon 8/4/08
13	MEP Rough Ins	20 days	Tue 8/5/08	Mon 9/1/08
14	Erect Structural Steel	20 days	Tue 9/2/08	Mon 9/29/08
15	Install Decking	30 days	Tue 9/30/08	Mon 11/10/08
16	Exterior Wall Framing	30 days	Tue 11/11/08	Mon 12/22/08
17	Roof Installation	30 days	Tue 11/11/08	Mon 12/22/08
18	Masonry Installation	25 days	Tue 12/23/08	Mon 1/26/09
19	Window Installation	10 days	Tue 1/27/09	Mon 2/9/09
20	Building Enclosed	0 days	Mon 2/9/09	Mon 2/9/09
21	Interior MEP Installation	65 days	Tue 2/10/09	Mon 5/11/09
22	Elevators	30 days	Tue 2/10/09	Mon 3/23/09
23	Interior Finishes	60 days	Tue 3/10/09	Mon 6/1/09
24	Testing & Balancing	15 days	Tue 5/12/09	Mon 6/1/09
25	Punch List Items	30 days	Tue 6/2/09	Mon 7/13/09
26	Final Inspection	1 day	Tue 7/14/09	Tue 7/14/09
27	Certificate of Occupancy	0 days	Tue 7/14/09	Tue 7/14/09
28	Core & Shell Turnover	0 days	Tue 7/14/09	Tue 7/14/09
29	Tenant Fit Outs	65 days	Wed 7/15/09	Tue 10/13/09



Appendix B – RS Means Square Foot Cost Data

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

Costs per square foot of floor area

Exterior Wall	S.F. Area	5000	8000	12000	16000	20000	35000	50000	65000	80000
	L.F. Perimeter	220	260	310	330	360	440	490	548	580
Face Brick with Concrete Block Back-up	Wood Joists	235.30	204.45	186.75	174.45	168.05	155.30	149.05	145.90	143.35
	Steel Joists	243.30	212.45	194.70	182.45	176.00	163.20	157.05	153.90	151.35
Glass and Metal Curtain Wall	Steel Frame	286.85	246.25	222.90	206.20	197.50	180.15	171.60	167.25	163.75
	R/Conc. Frame	279.85	239.75	216.70	200.15	191.55	174.30	165.85	161.55	158.05
Wood Siding	Wood Frame	188.10	165.95	153.35	145.00	140.50	131.85	127.30	125.65	124.00
Brick Veneer	Wood Frame	210.90	182.75	168.05	159.00	149.80	138.40	132.00	130.00	127.30
Perimeter Adj., Add or Deduct	Per 100 L.F.	36.85	23.05	15.40	11.55	9.20	5.25	3.70	2.85	2.30
Story Hgt. Adj., Add or Deduct	Per 1 Ft.	9.00	4.40	3.55	2.80	2.45	1.70	1.35	1.15	1.00

For Basement, add $33.65 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 $66.30 to $256.80 per S.F.

Common additives

Description	Unit	$ Cost
Clock System		
20 room	Each	16,000
50 room	Each	39,100
Closed Circuit Surveillance, One station		
Camera and monitor	Each	1850
For additional camera stations, add	Each	1000
Directory Boards, Plastic, glass covered		
30" x 20"	Each	595
36" x 48"	Each	1450
Aluminum, 24" x 18"	Each	600
36" x 24"	Each	675
48" x 32"	Each	980
48" x 60"	Each	2025
Elevators, Hydraulic passenger, 2 stops		
1500# capacity	Each	62,800
2500# capacity	Each	66,300
3500# capacity	Each	72,000
Additional stop, add	Each	7825
Emergency lighting, 25 watt, battery operated		
Lead battery	Each	282
Nickel cadmium	Each	805

Description	Unit	$ Cost
Smoke Detectors		
Ceiling type	Each	187
Duct type	Each	480
Sound System		
Amplifier, 250 watts	Each	2350
Speaker, ceiling or wall	Each	191
Trumpet	Each	365
TV Antenna, Master system, 12 outlet	Outlet	315
30 outlet	Outlet	203
100 outlet	Outlet	194

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Important: See the Reference Section for Location Factors

Model costs calculated for a 3 story building with 12′ story height and 20,000 square feet of floor area

Office, 2-4 Story

				Unit	Unit Cost	Cost Per S.F.	% Of Sub-Total
A. SUBSTRUCTURE							
1010	Standard Foundations	Poured concrete; strip and spread footings		S.F. Ground	7.35	2.45	4.4%
1020	Special Foundations	N/A		–	–	–	
1030	Slab on Grade	4" reinforced concrete with vapor barrier and granular base		S.F. Slab	4.74	1.58	
2010	Basement Excavation	Site preparation for slab and trench for foundation wall and footing		S.F. Ground	.17	.06	
2020	Basement Walls	4′ foundation wall		L.F. Wall	74	1.64	
B. SHELL							
	B10 Superstructure						
1010	Floor Construction	Open web steel joists, slab form, concrete, columns		S.F. Floor	19.79	13.19	12.2%
1020	Roof Construction	Metal deck, open web steel joists, columns		S.F. Roof	8.43	2.81	
	B20 Exterior Enclosure						
2010	Exterior Walls	Face brick with concrete block backup	*80% of wall*	S.F. Wall	30.84	15.99	15.8%
2020	Exterior Windows	Aluminum outward projecting	*20% of wall*	Each	696	3.93	
2030	Exterior Doors	Aluminum and glass, hollow metal		Each	2987	.90	
	B30 Roofing						
3010	Roof Coverings	Built-up tar and gravel with flashing; perlite/EPS composite		S.F. Roof	6.33	2.11	1.6%
3020	Roof Openings	N/A		–	–	–	
C. INTERIORS							
1010	Partitions	Gypsum board on metal studs	*20 S.F. Floor/L.F. Partition*	S.F. Partition	9.43	3.77	22.7%
1020	Interior Doors	Single leaf hollow metal	*200 S.F. Floor/Door*	Each	875	4.38	
1030	Fittings	Toilet partitions		S.F. Floor	1.10	1.10	
2010	Stair Construction	Concrete filled metal pan		Flight	15,800	5.53	
3010	Wall Finishes	60% vinyl wall covering, 40% paint		S.F. Surface	1.34	1.07	
3020	Floor Finishes	60% carpet, 30% vinyl composition tile, 10% ceramic tile		S.F. Floor	7.62	7.62	
3030	Ceiling Finishes	Mineral fiber tile on concealed zee bars		S.F. Ceiling	6.38	6.38	
D. SERVICES							
	D10 Conveying						
1010	Elevators & Lifts	Two hydraulic passenger elevators		Each	117,500	11.75	3.0%
1020	Escalators & Moving Walks	N/A		–	–	–	
	D20 Plumbing						
2010	Plumbing Fixtures	Toilet and service fixtures, supply and drainage	*1 Fixture/1020 S.F. Floor*	Each	2775	2.86	2.3%
2020	Domestic Water Distribution	Gas fired water heater		S.F. Floor	.38	.38	
2040	Rain Water Drainage	Roof drains		S.F. Roof	1.53	.51	
	D30 HVAC						
3010	Energy Supply	N/A		–	–	–	11.8 %
3020	Heat Generating Systems	Included in D3050		–	–	–	
3030	Cooling Generating Systems	N/A		–	–	–	
3050	Terminal & Package Units	Multizone unit gas heating, electric cooling		S.F. Floor	15.50	15.50	
3090	Other HVAC Sys. & Equipment	N/A		–	–	–	
	D40 Fire Protection						
4010	Sprinklers	Wet pipe sprinkler system		S.F. Floor	2.96	2.96	2.8%
4020	Standpipes	Standpipes and hose systems		S.F. Floor	.72	.72	
	D50 Electrical						
5010	Electrical Service/Distribution	1000 ampere service, panel board and feeders		S.F. Floor	4.55	4.55	17.0%
5020	Lighting & Branch Wiring	High efficiency fluorescent fixtures, receptacles, switches, A.C. and misc. power		S.F. Floor	11.20	11.20	
5030	Communications & Security	Addressable alarm systems, internet and phone wiring, and emergency lighting		S.F. Floor	6.42	6.42	
5090	Other Electrical Systems	Emergency generator, 7.5 kW, uninterruptible power supply		S.F. Floor	.22	.22	
E. EQUIPMENT & FURNISHINGS							
1010	Commercial Equipment	N/A		–	–	–	0.0 %
1020	Institutional Equipment	N/A		–	–	–	
1030	Vehicular Equipment	N/A		–	–	–	
1090	Other Equipment	N/A		–	–	–	
F. SPECIAL CONSTRUCTION							
1020	Integrated Construction	N/A		–	–	–	0.0 %
1040	Special Facilities	N/A		–	–	–	
G. BUILDING SITEWORK		**N/A**					
					Sub-Total	131.58	**100%**
	CONTRACTOR FEES (General Requirements: 10%, Overhead: 5%, Profit: 10%)				25%	32.91	
	ARCHITECT FEES				7%	11.51	
					Total Building Cost	**176**	

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Location Factors

STATE/ZIP	CITY	Residential	Commercial
NORTH DAKOTA (CONT'D)			
586	Dickinson	.76	.84
587	Minot	.81	.87
588	Williston	.76	.83
OHIO			
430-432	Columbus	.93	.93
433	Marion	.89	.89
434-436	Toledo	1.00	.98
437-438	Zanesville	.88	.89
439	Steubenville	.93	.93
440	Lorain	.98	.96
441	Cleveland	1.01	1.00
442-443	Akron	.98	.96
444-445	Youngstown	.95	.94
446-447	Canton	.93	.92
448-449	Mansfield	.93	.92
450	Hamilton	.92	.91
451-452	Cincinnati	.92	.92
453-454	Dayton	.91	.91
455	Springfield	.92	.91
456	Chillicothe	.94	.93
457	Athens	.87	.88
458	Lima	.90	.92
OKLAHOMA			
730-731	Oklahoma City	.79	.83
734	Ardmore	.78	.81
735	Lawton	.80	.83
736	Clinton	.76	.81
737	Enid	.76	.82
738	Woodward	.76	.80
739	Guymon	.67	.69
740-741	Tulsa	.77	.80
743	Miami	.81	.82
744	Muskogee	.71	.74
745	Mcalester	.73	.77
746	Ponca City	.77	.80
747	Durant	.77	.80
748	Shawnee	.75	.80
749	Poteau	.77	.81
OREGON			
970-972	Portland	1.00	1.01
973	Salem	.98	1.00
974	Eugene	.99	1.00
975	Medford	.98	1.00
976	Klamath Falls	.98	1.00
977	Bend	1.00	1.00
978	Pendleton	.98	.97
979	Vale	.97	.92
PENNSYLVANIA			
150-152	Pittsburgh	.96	.98
153	Washington	.93	.96
154	Uniontown	.90	.95
155	Bedford	.87	.93
156	Greensburg	.93	.96
157	Indiana	.90	.95
158	Dubois	.89	.95
159	Johnstown	.89	.94
160	Butler	.91	.94
161	New Castle	.91	.93
162	Kittanning	.93	.95
163	Oil City	.89	.92
164-165	Erie	.93	.93
166	Altoona	.87	.92
167	Bradford	.89	.93
168	State College	.90	.93
169	Wellsboro	.90	.94
170-171	Harrisburg	.94	.96
172	Chambersburg	.89	.93
173-174	York	.91	.95
175-176	Lancaster	.91	.92
177	Williamsport	.85	.88
178	Sunbury	.91	.94
179	Pottsville	.91	.93
180	Lehigh Valley	1.01	1.02
181	Allentown	1.03	1.01
182	Hazleton	.90	.94
183	Stroudsburg	.91	.97
184-185	Scranton	.95	.97
186-187	Wilkes-Barre	.92	.94
188	Montrose	.90	.94
189	Doylestown	1.05	1.05

STATE/ZIP	CITY	Residential	Commercial
PENNSYLVANIA (CONT'D)			
190-191	Philadelphia	1.16	1.13
193	Westchester	1.10	1.07
194	Norristown	1.09	1.09
195-196	Reading	.97	.98
PUERTO RICO			
009	San Juan	.75	.80
RHODE ISLAND			
028	Newport	1.06	1.03
029	Providence	1.06	1.03
SOUTH CAROLINA			
290-292	Columbia	.84	.80
293	Spartanburg	.84	.78
294	Charleston	.87	.83
295	Florence	.80	.78
296	Greenville	.83	.78
297	Rock Hill	.82	.77
298	Aiken	.97	.86
299	Beaufort	.82	.76
SOUTH DAKOTA			
570-571	Sioux Falls	.79	.83
572	Watertown	.75	.80
573	Mitchell	.77	.80
574	Aberdeen	.77	.82
575	Pierre	.77	.81
576	Mobridge	.75	.80
577	Rapid City	.78	.82
TENNESSEE			
370-372	Nashville	.84	.88
373-374	Chattanooga	.75	.81
375,380-381	Memphis	.81	.86
376	Johnson City	.70	.80
377-379	Knoxville	.72	.79
382	McKenzie	.72	.80
383	Jackson	.70	.78
384	Columbia	.71	.79
385	Cookeville	.71	.81
TEXAS			
750	McKinney	.73	.79
751	Waxanachie	.74	.80
752-753	Dallas	.83	.85
754	Greenville	.68	.72
755	Texarkana	.72	.78
756	Longview	.67	.74
757	Tyler	.73	.80
758	Palestine	.66	.72
759	Lufkin	.70	.74
760-761	Fort Worth	.81	.82
762	Denton	.75	.77
763	Wichita Falls	.78	.80
764	Eastland	.71	.73
765	Temple	.74	.76
766-767	Waco	.76	.81
768	Brownwood	.68	.73
769	San Angelo	.71	.76
770-772	Houston	.85	.88
773	Huntsville	.68	.73
774	Wharton	.69	.76
775	Galveston	.83	.86
776-777	Beaumont	.80	.82
778	Bryan	.73	.82
779	Victoria	.73	.77
780	Laredo	.72	.77
781-782	San Antonio	.80	.83
783-784	Corpus Christi	.77	.78
785	McAllen	.75	.76
786-787	Austin	.79	.81
788	Del Rio	.66	.70
789	Giddings	.69	.72
790-791	Amarillo	.76	.81
792	Childress	.74	.77
793-794	Lubbock	.74	.80
795-796	Abilene	.74	.78
797	Midland	.75	.78
798-799,885	El Paso	.73	.78
UTAH			
840-841	Salt Lake City	.81	.88
842,844	Ogden	.78	.85
843	Logan	.79	.86

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Appendix C- LEED Checklist

LEED for Core and Shell v2.0
Registered Project Checklist

Project Name:
Project Address:

Yes	?	No			
			Sustainable Sites		15 Points
Y			Prereq 1	**Construction Activity Pollution Prevention**	Required
1			Credit 1	**Site Selection**	1
1			Credit 2	**Development Density & Community Connectivity**	1
1			Credit 3	**Brownfield Redevelopment**	1
1			Credit 4.1	**Alternative Transportation:** Public Transportation Access	1
	1		Credit 4.2	**Alternative Transportation:** Bicycle Storage & Changing Rooms	1
		1	Credit 4.3	**Alternative Transportation:** Low-Emitting and Fuel-Efficient Vehicles	1
		1	Credit 4.4	**Alternative Transportation:** Parking Capacity	1
	1		Credit 5.1	**Site Development:** Protect of Restore Habitat	1
		1	Credit 5.2	**Site Development:** Maximize Open Space	1
		1	Credit 6.1	**Stormwater Design:** Quantity Control	1
		1	Credit 6.2	**Stormwater Design:** Quality Control	1
		1	Credit 7.1	**Heat Island Effect,** Non-Roof	1
1			Credit 7.2	**Heat Island Effect,** Roof	1
1			Credit 8	**Light Pollution Reduction**	1
1			Credit 9	**Tenant Design & Construction Guidelines**	1

Yes	?	No			
7	1	7	**Water Efficiency**		5 Points
1			Credit 1.1	**Water Efficient Landscaping:** Reduce by 50%	1
1			Credit 1.2	**Water Efficient Landscaping:** No Potable Use or No Irrigation	1
		1	Credit 2	**Innovative Wastewater Technologies**	1
1			Credit 3.1	**Water Use Reduction:** 20% Reduction	1
1			Credit 3.2	**Water Use Reduction:** 30% Reduction	1

Yes	?	No			
4	0	1	**Energy & Atmosphere**		14 Points
Y			Prereq 1	**Fundamental Commissioning of the Building Energy Systems**	Required
Y			Prereq 2	**Minimum Energy Performance**	Required
Y			Prereq 3	**Fundamental Refrigerant Management**	Required

*Note for EAc1: All LEED for Core and Shell projects registered after June 26th, 2007 are required to achieve at least two (2) points under EAc1.

4			Credit 1	**Optimize Energy Performance**	1 to 8
				10.5% New Buildings or 3.5% Existing Building Renovations	1
				14% New Buildings or 7% Existing Building Renovations	2
				17.5% New Buildings or 10.5% Existing Building Renovations	3
			X	21% New Buildings or 14% Existing Building Renovations	4
				24.5% New Buildings or 17.5% Existing Building Renovations	5
				28% New Buildings or 21% Existing Building Renovations	6
				31.5% New Buildings or 24.5% Existing Building Renovations	7
				35% New Buildings or 28% Existing Building Renovations	8
1			Credit 2	**On-Site Renewable Energy**	1
1			Credit 3	**Enhanced Commissioning**	1
1			Credit 4	**Enhanced Refrigerant Management**	1
1			Credit 5.1	**Measurement & Verification** - Base Building	1
1			Credit 5.2	**Measurement & Verification** - Tenant Sub-metering	1
		1	Credit 6	**Green Power**	1

Yes	?	No	Materials & Resources	11 Points
9	0	1		

Y					
		1	Prereq 1	**Storage & Collection of Recyclables**	Required
		1	Credit 1.1	**Building Reuse:** Maintain 25% of Existing Walls, Floors & Roof	1
		1	Credit 1.2	**Building Reuse:** Maintain 50% of Existing Walls, Floors & Roof	1
		1	Credit 1.3	**Building Reuse:** Maintain 75% of Interior Non-Structural Elements	1
1			Credit 2.1	**Construction Waste Management:** Divert 50% from Disposal	1
1			Credit 2.2	**Construction Waste Management:** Divert 75% from Disposal	1
		1	Credit 3	**Materials Reuse:** 1%	1
1			Credit 4.1	**Recycled Content:** 10% (post-consumer + ½ pre-consumer)	1
	1		Credit 4.2	**Recycled Content:** 20% (post-consumer + ½ pre-consumer)	1
1			Credit 5.1	**Regional Materials:** 10% Extracted, Processed & Manufactured Regionally	1
	1		Credit 5.2	**Regional Materials:** 20% Extracted, Processed & Manufactured Regionally	1
1			Credit 6	**Certified Wood**	1

Yes	?	No	Indoor Environmental Quality	11 Points
5	2	4		

Y					
Y			Prereq 1	**Minimum IAQ Performance**	Required
Y			Prereq 2	**Environmental Tobacco Smoke (ETS) Control**	Required
	1		Credit 1	**Outdoor Air Delivery Monitoring** MCCLURE ?	1
1			Credit 2	**Increased Ventilation**	1
1			Credit 3	**Construction IAQ Management Plan:** During Construction	1
1			Credit 4.1	**Low-Emitting Materials:** Adhesives & Sealants	1
1			Credit 4.2	**Low-Emitting Materials:** Paints & Coatings	1
1			Credit 4.3	**Low-Emitting Materials:** Carpet Systems	1
	1		Credit 4.4	**Low-Emitting Materials:** Composite Wood & Agrifiber Products A&L DOORS	1
	1		Credit 5	**Indoor Chemical & Pollutant Source Control**	1
1			Credit 6	**Controllability of Systems:** Thermal Comfort	1
1			Credit 7	**Thermal Comfort:** Design	1
		1	Credit 8.1	**Daylight & Views:** Daylight 75% of Spaces	1
		1	Credit 8.2	**Daylight & Views:** Views for 90% of Spaces	1

Yes	?	No	Innovation & Design Process	5 Points
7	3	2		

1			Credit 1.1	**Innovation in Design:** Provide Specific Title WATER USAGE 50%	1
1			Credit 1.2	**Innovation in Design:** Provide Specific Title CONSTRUCTION WASTE 95%	1
1			Credit 1.3	**Innovation in Design:** Provide Specific Title GEOTHERMAL	1
1			Credit 1.4	**Innovation in Design:** Provide Specific Title EDUCATION	1
1			Credit 2	**LEED® Accredited Professional**	1

Yes	?	No	Totals (pre-certification estimates)	61
5	0	0		

Certified: 23 to 27 points, **Silver:** 28 to 33 points, **Gold:** 34 to 44 points, **Platinum:** 45 to 61 points

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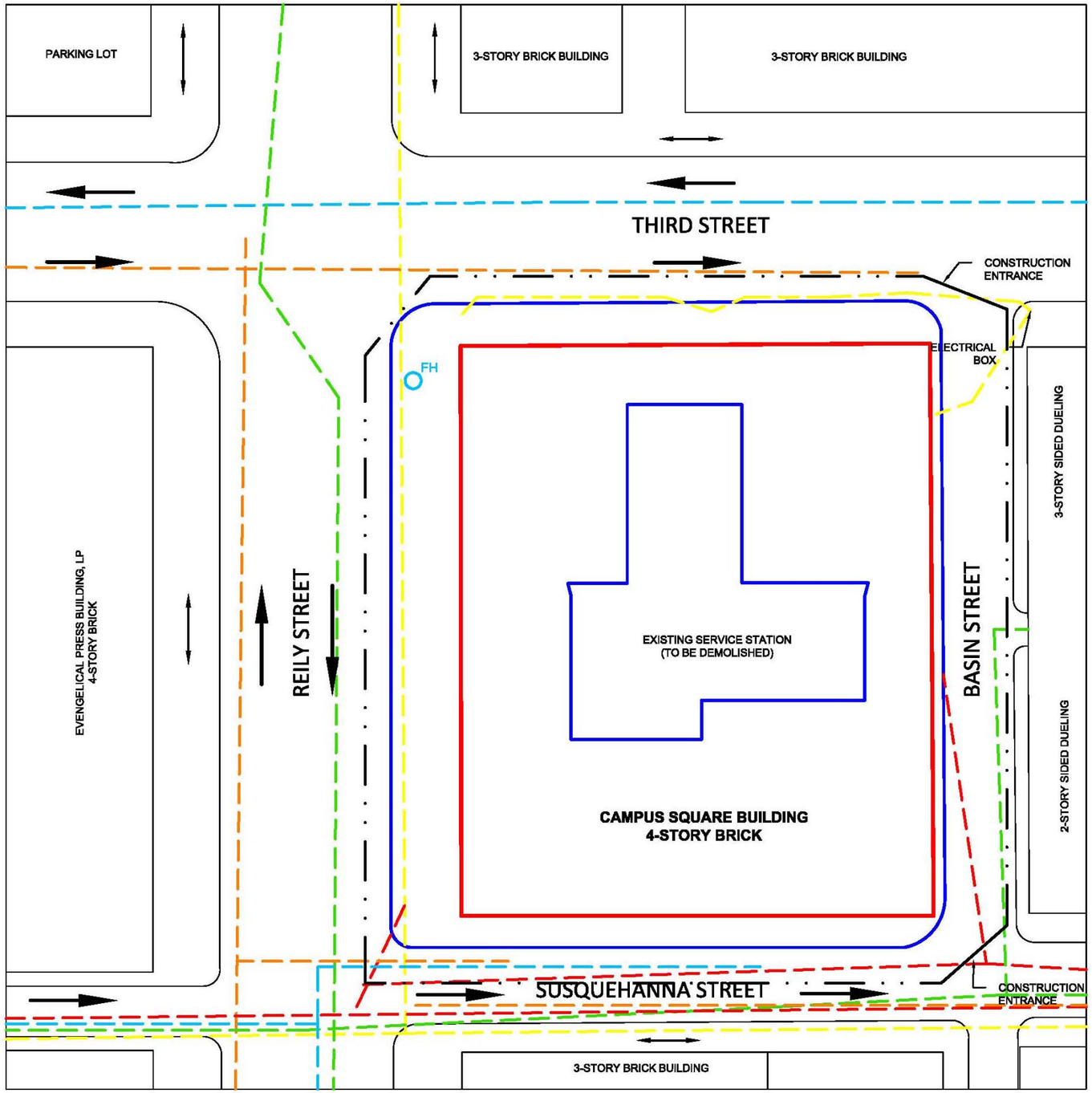
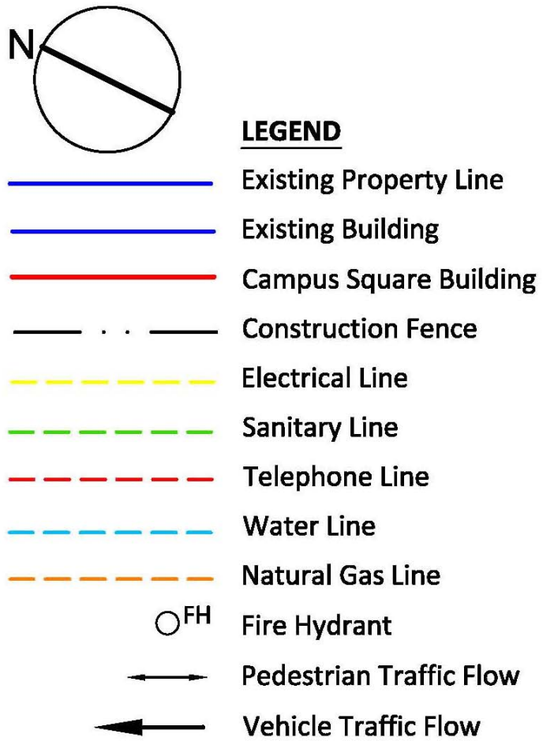
Appendix D - Site Plan of Existing conditions





CAMPUS SQUARE BUILDING

EXISTING CONDITIONS
SITE PLAN

TECHNICAL ASSINGMENT 1

ANDREW MARTIN

10.05.09

Appendix E – Construction Waste Management Plan

CONSTRUCTION WASTE MANAGEMENT PLAN

Project Owner:	**Campus Square Partners, LP**	
	C/O Powers & Associates, LLC	**Contact Person: Matt Tunnell**
Address:	**3029 North Front Street**	**Telephone #: (717) 238-2646**
	Harrisburg, PA 17110	

PROJECT LOCATION: CAMPUS SQUARE BUILDING, 1426 NORTH THIRD STREET, HARRISBURG, PA 17110

Contractor: Wohlsen Construction Company	**Architect: Ganflec Architects**
Contact Person: William Sutton	**Contact Person:**
Telephone #: (717) 299-2500	**Telephone #: (717) 763-7220**

RECYCLING COORDINATORS:

Steve Parks (Wohlsen Superintendent)
Telephone: (717) 665-6385 (Cell)

Rick Frescatore, Frescatore Consulting, LLC (LEED Waste Management Consultant)
Telephone: (717) 431-6685

George Fetrow, Chambersburg Waste Paper (Waste Management Service Provider)
Telephone: (717) 729-6690

Project Description: New Construction 73,000 sq ft /Retail and Commercial Office Space – Attempting LEED Certification under the LEED Core and Shell rating system.

Waste Management Goals:

- This project will recycle or salvage for reuse a minimum of 75% by weight of the waste generated on-site.
- Waste reduction will be achieved through-out building construction. Recycling efforts will be maintained during the construction process.

Waste Prevention Planning:

- In Compliance with LEED Certification goals set forth, the following items will be targeted for landfill diversion and recycling:
  - Concrete, Brick, Block, and associated masonry material
  - Clean Dimensional Wood, Plywood, pallets
  - Ferrous and Non-ferrous metals
  - Gypsum Board (Dry-wall)
  - Corrugated cardboard, and all paper waste
- Project Construction Documents. A copy of this Construction Waste Management Plan (CWMP) will accompany all Subcontractor Agreements and require subcontractor participation.
- The Construction Waste Reduction Plan shall be implemented and executed as follows and as on the material chart attached:
  - Salvageable materials will be diverted from disposal where feasible.
  - There will be a designated area on the construction site reserved for a row of dumpsters each specifically labeled for respective materials to be received.
  - Before proceeding with any removal of construction materials from the construction site, On Site Recycling Coordinator, or designee will inspect containers for compliance with CWMP requirements.

1

COMMUNICATION AND EDUCATION:

- The General Contractor will conduct an on-site pre-construction meeting with subcontractors. Attendance will be required for the subcontractor's key field personnel. The purpose of the meeting is to reinforce to subcontractor's key field employees the commitments made by their companies with regard to the project goals and requirements.
- Waste prevention and recycling activities will be discussed at the beginning of each weekly subcontractor coordination meeting to reinforce project goals and communicate progress to date.
- As each new subcontractor comes on site, the recycling coordinator will present him/her with a copy of the Waste Management Plan, training as outlined in the Training Guidelines, and provide a tour of the recycling areas.
- The subcontractor will be expected to make sure all their crews comply with the Construction Waste Management Plan.
- All recycling containers will be clearly labeled. Containers shall be located in close proximity to the building(s) under construction in which recyclables/salvageable materials will be placed.
- Lists of acceptable/unacceptable materials will be distributed to all on site personnel. Guidelines will also be posted throughout the site.
- All subcontractors will be informed in writing of the importance of non-contamination with other materials or trash.
- Recycling coordinator shall inspect the containers on a daily basis to insure that no contamination is occurring and precautions shall also be taken to deter any contamination by the public.

RESPONSIBILITIES:

- **Wohlsen Construction Waste Coordinator** will be responsible for:
  - Achievement of waste management goals. Progress toward those goals, will be a regular agenda item during job meetings.
  - Responsible for preparation and submission of waste management reports required under the project LEED program.
  - Maintaining proper signage on waste and recycling containers.
  - Works with Owner, Architect/Engineer, Waste and Recycling Hauler to meet waste management requirements of the LEED program.
  - Training of subcontractor leadership on policy and procedure for our Waste Management Program.
  - Regular review and inspection of the job waste disposal operations to ensure procedures are being followed and progress is being made towards achievement of the waste management goal.

- **LEED Waste Management Consultant**:
  - Responsible for preparation and submission of the following supplemental waste management reports to Wohlsen Construction Project Manager.
    - Monthly and cumulative summary report detailing: total waste, recycled material, and percentages for previous billing cycle.
    - Prepares and maintains required three ring binder of waste management records to be submitted at project completion to document LEED® Certification MR 2.1 and 2.2 credits.
    - Attend weekly meetings as needed to provide guidance, and collect feedback.
    - Develop and submit training guidelines to be used on-site to train and educate on-site personnel and sub-contractors.

- **Waste Management Service Provider**:
  - Shall dispose of and recycle all materials in accordance with the regulations of the Pennsylvania Department of Environmental Protection.
  - Certifies that Chambersburg Waste Paper is permitted to transport and dispose of Construction and Demolition debris in the State of Pennsylvania.
  - Shall provide all labor and equipment necessary to perform the waste and recycling services.

Expected Project Waste, Disposal, and Handling:

The following chart identifies waste materials expected on this project, their disposal method, and handling procedures:

Material	Qty	%	Disposal Method	Handling Procedure
Masonry Waste / Clean Fill: Block, Bricks, Concrete, other masonry waste	**96 Tons**	**38%**	Recycle at: H&W Equities 2224 Paxton Street – Rear Harrisburg, PA 17111 (717) 233-1868	Keep separated in designated areas on site. Place in "CLEAN FILL" container.
Clean Wood Waste: untreated lumber, Wood trim, wood sheets – similar to plywood an wood crates – NO OSB	**23 Tons**	**9%**	Recycle at: Zeager Brothers, Inc 4000 East Harrisburg Pike Middletown, PA 17057 (717) 944-7481	Keep separated in designated areas on site. Place in "SCRAP WOOD" container.
Metals: Various types of metals, including Steel pipes, and electrical conduit.	**18 Tons**	**7%**	Recycle at: Chambersburg Waste Paper 2047 Loop Rd. Chambersburg, PA (717) 264-4890	Keep separated in designated areas on site. Place in "SCRAP METAL" container.
Gypsum Board (Dry Wall)	**46 Tons**	**18%**	Recycle at: Gypsum Agri-Cycle Inc. 488 Anderson Ferry Road Mount Joy, PA 17552 (717) 426-1990	Keep scraps separate for recycling. Place in "DRY WALL" container.
per Packaging: To include paper, cardboard, and boxes	**10 Tons**	**4%**	Recycle at: Chambersburg Waste Paper 2047 Loop Rd. Chambersburg, PA (717) 264-4890	Keep separated in designated areas on site. Place in "CARDBOARD AND PAPER" container.
Other Construction Waste	**62 Tons**	**24%**	Landfill at: Blue Ridge Landfill White Church Road Chambersburg, PA (717)709-1700	Place in "CONSTRUCTION WASTE" container
TOTAL	**255 Tons**	**100%**		

Notes:
Material Diversion rates and cost factors contained in this Construction Waste Management Plan are based on assumptions, and should be considered estimates.

As the project generates material, the Waste and Recycling Hauler will be evaluating other opportunities to recycle, and divert materials from landfill disposal.

Waste Disposal:

Waste and Recycling Hauler (Chambersburg Waste Paper Company), will transport general trash designated for a landfill, and the clean wood, metals, drywall, paper and other materials designated for recycling, in company owned roll-off trucks. The roll-off trucks are permitted to carry non-hazardous waste, and have the necessary ACT 90 stickers, issued by the Pennsylvania Department of Environmental Protection.

COST ANALYSIS:

If all construction waste was disposed in landfill:

43 loads x $160.00 (including rentals and delivery fees) per pull = $6,880.00 (transportation cost)
23% Fuel Surcharge x $6,880.00 = $1,582.00
255 tons x $46.00/ton = $11,730.00 (disposal cost)

- **Total Waste/No Recycling Cost = $20,192.00 (rounded, estimated)**

Recycling Calculation:

Trash:
20 loads of waste x $160.00 (including rentals and delivery fees) per pull = $3,200.00 (transportation cost)
23% Fuel Surcharge x $3,200.00 = $752.00
61 tons x $46.00/ton = $2,806.00(disposal cost)

Recycling:
35 loads x $176.00 (blended cost per load – rebates, disposal, and transport) = $6,160.00
23% Fuel Surcharge = $986.00

- **Total Waste/with recycling Cost = $13,904.00 (rounded)**

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Summary:

All Waste – NO Recycling:	**$ 20,192.00**
Waste and Recycling:	**$ 13,904.00**
Estimated Savings:	**$ 6,288.00**
Difference % :	**31%**
Recycling Percentage Goal:	**75%**

Appendix F – Site Plan With Soil Boring Locations