



SEARS CENTRE

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Executive Summary

The intent of this executive summary is to introduce the criterions which form the framework for this thesis' research. A wide variety of construction practices and delivery methods were assessed before the official decision was made by Ryan Companies to pursue the Sears Centre project. This executive summary highlights the background information for existing construction conditions. Report structure consist of (7) primary section which are supported by related subtopics.

Report Structure:

1. Project Key Findings
 - ❖ *Budget-Fiscal Constraints*
 - ❖ *Building Construction-Schedule Constraints*
2. Scheduling/ Contraction QC w/ Scheduling Supplement
3. Building System Summary
4. Project Cost Evaluation (RS Means vs. D4 Cost Est.)
5. Project Delivery System
6. Staffing Plan
7. Appendix Section
 - ❖ *Site Layout PDF*
 - ❖ *Schedule Summary PDF*
 - ❖ *Building System Matrix PDF*
 - ❖ *Project Delivery Diagram PDF*
 - ❖ *Project Staffing Plan PDF*

This existing conditions report will describe in depth the multiple factors affecting the development and construction process. Project Delivery Systems are a critical aspect for successful completion of any project. Since the nature of the Sears Centre is time sensitive and impended by liquidity damage clauses typical of any revenue generating project, regional and project specific constraints have been defined early. These constraints have a direct impact on subcontracts, material selection and procurement, site layout and construction practices. Seven potential issues have been included under the question and concerns –“QC” section for the schedule supplement to further illustrate the importance of project coordination and process documentation.

From the PDS standpoint a unique relationship has been created between the Village of Hoffman Estates, Sears & Roebuck and Ryan Companies US, Inc. Ryan Companies has assumed the role of the design build entity. In an effort to comply with all litigation practices this arrangement has created a corporate “spin-off” from Ryan Companies that will assume initial ownership and arena operations (*MADKATSTEP-COO Entertainment*). The Prairie Stone Business Park complex will prove the land for arena and infrastructure development. Sears & Roebuck have obtained 5-year naming rights as part of the overall deal to bring a stable entity to Hoffman Estates Entertainment.



Key Findings

Budget/ Fiscal Driving Forces – Market Demand

Fiscal forces driving the Sears Centre project directly impact the schematic design process. A rigid \$ 51,000,000 budget was established to supplement a building program that called for 42 club suites, an upper and lower concourse, “vomitory”/ grand lobby spaces, MEP distribution, storage and team affiliation areas.

The goal of market force behind the budget was to provide an up-scale arena to handle concert capacities and events that rival neighboring Rosemont, IL Allstate Arena. The success of Chicago area arena events, aging existing facilities and growing traffic patterns among Northwest Chicago’s (I-90) corridor have created demand for an additional concert/ event facility in Hoffman Estates, IL.

Local Arena Capacities:

<u>Facility</u>	<u>Seating Capacity</u>	<u>Age of Facility</u>
(UC) United Center/ Chicago, IL	Approx. 24,000 Seats	11 Yr(s)
(AA) Allstate Arena/ Rosemont, IL	Approx. 19,000 Seats	24 Yr(s)
The Sears Centre/ Hoffman Est., IL	Approx. 11,000 Seats	N/A

Building Construction/ Schedule Constraints

Superstructure Systems:

- ❖ Structural Elements CIP vs. Pre-cast

(CIP) Cast In Place

1. Structural Beams (UC, AA)
2. Structural Columns (UC, AA)
3. Raker Beams (UC, AA)

Pre-cast

1. Structural Beams (Sears Centre)
2. Structural Columns (Sears Centre)
3. Raker Beams (Sears Centre)
4. Risers (Sears Centre, UC)

Foundation and “Shoring System”:

- ❖ Soil Bearing Pressure Ranges for 15’-0” depth samples 4,500 PSF ~ 9,000 PSF
- ❖ Soil Retaining System is integrated with foundation system, 100^k (kip) 55’-0” long tie backs with 1-1/4 “ diameter @ 15° angle of entry
- ❖ Frost Depth 48” below grade
- ❖ Structural Design based on net allowable pressures
Continuous Wall Footings ~ 5,000 PSF
Spread Footings ~ 6,000 PSF
Concrete Compressive Strength for substructure members

Sub-structure members

- Piers
- Footings & Wall

Compressive Strengths f’c

- 4,000 PSI
- 4,000 PSI



- Slab on Grade* *4,000 PSI*
- Grade Beams* *3,000 PSI*
- ** Concrete above metal deck* *3,000 PSI*
- ❖ 24’-0” depth deep foundation wall
- ❖ (2) types of foundation systems used on project Pre-cast/ CIP Foundation Walls (Dock Walls)

Arena Event Level Flooring System/ Ice-Rink System:

- ❖ Ice Rink Event floor installation coordination will require extensive contact between the GC/ Substructure subcontractor and Ice-Rink Installing.
- ❖ Rink Dimensions 85’ -0” x 200’ -0” Radius (d/2) = 28’ -0”
- ❖ Potential Coordination Hazard for Ice Rink Construction
 1. Rink pipes & chairs
 2. Brine heater pipe distribution
- ❖ Rink Installation is not part of the FF&E package

Arena above Grade Flooring System:

10” Hollow core pre-cast panels composed of pre-cast planks.

Exterior Enclosure/ Building Envelope & Cladding Systems:

Core insulated metal wall panels w/ architectural pre-cast panels – decision based on constructability and schedule constraints.

“Chicagoland” Construction Practices:

Chicago construction practices typically follow the pattern of most major cities, however due to the contracting practices; work labor force requires union affiliation. The preferred parking for construction projects is to use asphalt surfaces if they are available. When asphalt parking isn’t available parking areas are provided by means of earth and CA-1 underlayment. The Sears Centre has been fortunate to use a portion of the existing Columbine Blvd infrastructure. A recent shortage of concrete in the Midwest region has prompted large scale developers like Ryan Companies to evaluate concrete procurement and placement methods. If space is available the preferred method for long spanning buildings is erection of pre-cast panels via crawler crane. All envelope and cladding systems will be erected in a “counter-clockwise” path starting at the northeast corner of the arena. Recently an effort by local government and the City of Chicago Mayor’s Office is to have ≈ 10% of the overall project awarded to MBE/ WBE firms.

Liquidated Damages & FFE Installation:

Liquidated Damages clause in effect for arena operations to be active prior to first event
 General Contractor will be responsible for providing a facility to the point of FF&E installation

FF&E Package will be managed and implemented via facility owner CCO Entertainment



FF&E Items

1. Arena Scoreboards/ Visual Display Systems
2. Telecommunications Systems for Broadcast and Club Suites
3. Individual Bowl Seating

Ryan and Owner Expectation:

Each project completed by Ryan Companies will have a “Raving Fan Plan” assessment. The “Raving Fan Plan” for the Sears Centre is under evaluation and has yet to be completed. Guidelines for the plan will include but aren’t limited to Owner/ Client expectation and General Contract fulfillment of request. For the sake of this existing construction conditions report, items that will be addressed on the “Raving Fan Plan” are as follows:

- ❖ Schedule Impacts on first event & FFE installation coordination
- ❖ Provisions for developmental and construction contingencies
- ❖ VE suggestions and regulation
- ❖ Adherence to local policies and safety fulfillments ~ EMR Rating

Scheduling and Contraction “OC” Questions & Concerns

1. How will the procurement of Pre-cast Architectural Panels and cored insulated metal panels affect the schedule turnover date?
2. One item defined as an early potential hazard was the spatial requirement needed to properly sequence strip footings, grade beams and column pads “FRP” building panel erection. How can we determine the size of the foundation crew to optimize output without impacting adjacent productivity via “over crowding”?
3. The north side dock wall uses a cast in place method of placement, majority of the foundation walls for the adjacent areas are pre-cast concrete. Has the location of the frost line affect the method of placement for foundation walls, or is that a negligible condition?
4. Why was a pre-cast structural system chosen for this type of building when typical arena and stadium concrete systems use the cast in place method?
5. Lateral diaphragm forces have been determined to be a factor on this project, how will the constructability of the stair towers and exterior walls which facilitate the “diaphragm effect” impact the overall construction schedule?
6. Architectural Finishes and Telecommunication systems packages, etc. are under the arena FF&E package. Why items like the “ice-floor” are included in the



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general contractor's project scope and stadium seating and telecommunications aren't? Will the general contractor be held liable if the FF&E installation deadlines aren't achieved prior to the first event?

7. (10/12) ~ 83 % of the key project players have a Design Build Lump Sum contract. 75 % to 100 % of all building systems and construction drawings were completed prior to bidding the project. Due to the fact that a final cost wasn't established, a predetermined cost ceiling was set. The goal of releasing contracts and bidding documents to project players is to finalize project cost on an individual building systems basis. Is this the best delivery method for this project since the time frame for re-negotiating and fast tracking has been reduced? One key point to note is that the learning curve for the general contractor is fairly shallow since this will be the first arena built by this construction entity. Should there have been another "PDM" system employed?





Scheduling Supplement

Foundation System Sequencing:

Foundation installation follows a counterclockwise path that starts along the exterior bowl line. The most critical portion of the entire building process, the footings for the stair towers, adjacent strip footings, grade beams and column piers have to be in place prior to the erection of the pre-cast panels. High foundation walls which support column sections affected by lateral earth pressures are supported with $\text{Ø} = 1\text{-}1/4''$ 100^k (kip) tie backs. After perimeter footing sections are excavated and formed in place, the foundation system for the event floor level is constructed with a similar sequenced installation.

Key Foundation Sequences affecting Panel Installation

<u>Foundation Sections</u>	<u>Col Line</u>	<u>Duration</u>
<i>Excavation of Perimeter and Interior:</i>		
Strip, Spread Footings and Grade Beams	C 18 – U 18	15 calendar days
Excavation of Stair tower ftg(s) x 4	H 17 – N 18	<i>(non-consecutive)</i>
Column Piers		
Event Level Floor		20 calendar days
		<i>(non-consecutive)</i>
<i>F/R/P Perimeter and Interior:</i>		
Strip, Spread Footings and Grade Beams	C 18 – U 18	82 calendar days
Stair tower ftg(s) x 4	H 17 – N 18	<i>(non-consecutive)</i>
Column Piers		
Foundation Walls		
<i>Backfill:</i>		
Footings and Piers	C 18 – U 18	18 calendar days
Foundation walls	H 17 – N 18	<i>(non-consecutive)</i>
<i>Tieback Installation:</i>		
100 kip tie-backs @ 15°	H 17 – N 18	20 calendar days
	Line C	<i>(non-consecutive)</i>
	A 8 – X 8	
	Line U	
	Line 18	

Superstructure Sequencing:

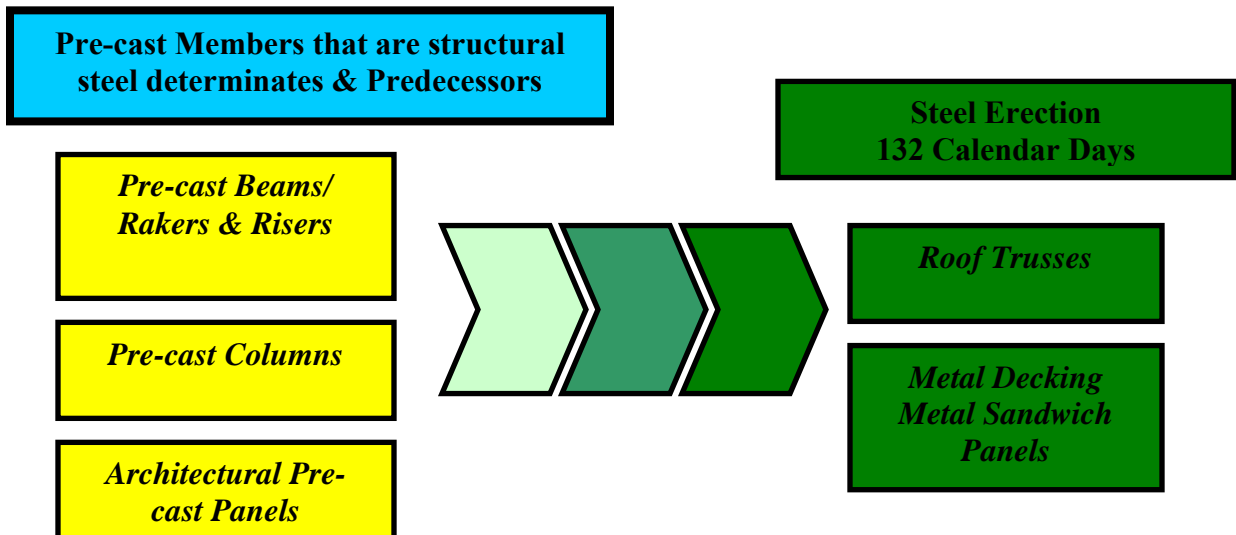
The superstructure system of the Sears Centre primarily consists of pre-cast elements. Flooring systems of the ground floor common areas and facilities administrators offices are composed of a 4” thick slab on grade that is depended on the installation of all pre-cast structural members. The pre-cast erection follows a concentric counterclockwise



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path that starts on the north side of the facility and terminates on the east face of the arena with the pre-cast truck dock area. One interesting item to note is the two separate flooring systems used for support throughout the building. Since the major structural elements are pre-cast, pre-cast erection has been determined as a high “risk” task.

In addition to building enclosure completion, roof trusses and misc. metal installation are direct successors to all critical pre-cast elements. The current erection scheme has structural steel beginning with the conclusion of the west exterior wall. Steel Truss erection will begin the same day that the erection of the south pre-cast wall begins. This particular item is extremely crucial for both scheduling and safety purposes. The entire roof truss erection process, complete with sway members and braced joists, will be 52 calendar days. Roof metal deck will be installed along an east to west direction. Steel erection has staggered installation by one week to insure that steel subcontractors will not interfere or pre-produce work of pre-cast erectors.



Key Pre-cast Sequences affecting Steel Construction (Roof Trusses & Metal Deck)

<u><i>Floor Areas</i></u>	<u><i>Floor Level</i></u>	<u><i>Flooring Support System</i></u>
Common Areas: Vomitories Main Lobbies Administration Event Floor	Lower Concourse	5” Slab on Grade
Common Areas: Upper Concourse Lower Concourse <i>Remaining Area</i>	Lower & Upper Concourses	10” Hollow Pre-cast Planks Formed Pre-cast Floor Panels 2” Concrete Topping



Bridge Level
Club Level
Individual Suites
Adjacent Area

Construction

Pre-cast Members
Beams Raker Beams
Columns Risers
Foundation Walls
Exterior Panels

Building Systems

Superstructure
Above Grade Floor System

Duration

96 Calendar Days
(consecutive days)

Building System Summary

Overall System Summary:

The Sears Centre is the largest project that Ryan Companies US, Inc. has undertaken to date. Ryan Companies operates as the design build partner with Sears and Roebuck for the Sears Centre project. Building systems consist of shallow and deep foundations. Shallow foundations consist of 1'-0" to 6'-0" footings with a maximum height of 1'-4". Deep foundation systems are composed of 24'-0" height foundation walls accompanied with 55'-0", 1-1/4" diameter tiebacks, capable of supporting 100 kips each. Complex envelope and cladding systems consist of architectural pre-cast panels and Type (1), (2), (3) cored insulated metal panels. Two types of superstructure systems are used to provide frame and lateral support. Pre-cast columns, beams and rakers form the even area superstructure. Steel columns and beams provide the support frame for all elevated deck floor areas. Main air distribution system is serviced by (6) AHU equipped to hand 240,000 cfm. Main power supply is by means of 277/480 V system with 120/208 V alterative power supply.

Foundation and Shoring System:

The Soil has been excavated in preparation for the 24'-0" deep foundation walls. Walls of this depth have extreme amounts of lateral pressure caused by adjacent earth. In certain circumstances one option is to construct the foundation walls with a thickness of 33", it has been determined that this option is neither financially nor physically feasible. 55'-0" long tie backs with an angle of entry 10° will be utilize in the main shoring system to support lateral earth pressure.

Recast and Steel Superstructure System

The main concourse framing primary consist of a system of 10" pre-cast hollow core planks, pre cast beams, raker beams and rises. The pre-cast planks for the general



assembly floors are accompanied with a 2” concrete topping. Horizontal structural members, i.e. beams are comprised of pre-cast concrete range in size variation from 12” x 24” to 30” x 42” square configuration. Raker beams which provide load transference to the pre-cast columns were employed for structural support of the arena bowl (stadium seating). Structural Steel framing is used on the bridge and suite level. The steel structural system for the upper arena areas comprises of a series of W 10 – W 30 beams with varying sub weight. Bowed W 18 x 40 beams are used along the south side of the arena bridge level as part of the framing system for the Suite floor system.

Arena Air Distribution System

The Sears Centre Arena/ Concourse/ Suite and Common areas HVAC system is designed to supply air at a rate of 240,000 cfm. The main HVAC system is a 70/30, adjustable/ variable volume system that consist of (6) 40,000 cfm (28,000 cfm Outdoor Air) Air Handling Units located in the Northeast and Southeast roof top mechanical rooms. Each AHU is constructed of 2” thick double insulated metal wall panels. Supply air is distributed to the Arena bowl and event level via (5) 66” Ø un-insulated spiral duct. Operation tolerance restricted circular duct location to be at least 8” above the roof truss bottom chord. The air distribution system is designed to maintain 75° F/ dry bulb 50% relative humidity, (70° F/ dry bulb 50% relative humidity for ice events) during year long operations. Main air supply lines for the arena bowl have supply duct “off-shoots” that accommodate 40/20 supply diffuser size. (6) 40,000 cfm return air units are located at the perimeter of arena along the mechanical catwalk.

Power Supply System

The main power service and distribution for the Sears Centre consist of a 277/480 Volt 3-Ø, 4-wire supply service. Secondary power distribution has been sized for 120/208 Volt supply. (2) Step-down utility service transformers provides the initial 480 Volt 3-phase, 4-wire service @ 3,000 amps. The electrical spaces on the event level houses (8) transformers ranging is size from 30 KVA to 500 KVA. (2) 500 KVA transformers provide service to (2) 1600 amp panel boards which in turn each feeds (4) 800, 600, 400 and 60 amp panels respectively. One 300 KVA transformer serves a dedicated 600 amp service panel which will provide power for mechanical equipment and mobile television truck connections.

Plumbing System

Domestic cold water is sized for a peak 45,000 gpd use (~ 12,600 gpd average for 200 days). The domestic cold water supply is by means of 8” diameter water main routed via the northeast corner of the event level. Cold water distribution, in addition to domestic water service, provides irrigation water service, cold water fixture connections i.e. (food concession-kitchen areas), and make up water w/ backflow prevention to heating water,



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chilled water and condenser water systems. Domestic hot water service is designed to provide 140° F water distribution by means of (2) 1,500 galloon, 3,000 gph indirect fired storage water to water heaters. A triplex water booster system will be used as the catalyst to facility water movement into the upper arena areas.

Conveying System

The Sears Center Conveying system is composed of (2) different types of elevator systems. The electric traction elevator operates on a 480-V, 3 Ø 60 cycle system. This electric traction elevator has a net weight restriction of 3,500 lbs and a minimum speed of 200 ft/ min. The elevator shaft extends from the depth of the event level to the height of the roof catwalk. The hydraulic elevator utilizes the same power system for its motor and hydraulic pumping unit. (2) of the (3) elevators in the Sears Centre will have a rated capacity of 3,000 lbs and employ the use of this electro-hydraulic pump system.

Ice-Rink System

The Sears Centre will contain an 85'- 0" wide by 200'- 0" long, 28'-0" edge radii ice rink design to serve events sized for a 9,000 patron seat configuration. Rink perimeter slab provisions are (86'-2" x 201'-2" with a 28'-7" edge radii for a ± 3/16" tolerance for the 20" rink edge.). Ice-rink ambient temperatures are designed for a 70° F/ dry bulb 50° F dew point temperature 48" above the ice surface. Broadcast lighting at the arena event level of ice events is will be provided @ 250 foot candles. The Ice Rink System consist of under floor heating and cooling headers and pipes, pipe chairs and valve boxes essential to ice production and maintenance. (2) 4" lifts of clean compacted sand will interact with H2O in ice production prior to ice performances and events. A 6", 5,000 psi reinforced concrete slab will supply the structural support for the arena event level/ ice-rink.



Existing Construction Conditions

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Project Cost Evaluation

Total Building Cost:
Raw Total Cost Cost/ SF
\$ 31,586,000 **➔** **\$128/ SF**

w/ Reconciliation:
Total Cost Plus: Cost/ SF
\$ 35,030,000 **➔** **\$142/ SF**

Total Project Cost:
\$ 45,700,000 **➔** **\$186/ SF**

w/ Reconciliation:
\$ 50,708,000 **➔** **\$206/ SF**

Building Systems Cost:
Raw Total Cost Cost/ SF
Substructure/ Foundation System
\$ 3,102,600 **➔** **\$ 13/ SF**

w/ Reconciliation:
Total Cost Plus Cost/ SF
Substructure/ Foundation System
\$ 2,987,300 **➔** **\$ 12/ SF**

Substructure/ Pre-cast & Steel System
(Trusses/ Rakers/ Risers etc.)
\$ 8,768,000 **➔** **\$ 36/ SF**

Substructure/ Pre-cast & Steel System
(Trusses/ Rakers/ Risers etc.)
\$ 9,997,900 **➔** **\$ 41/ SF**

Exterior Enclosure
\$ 3,604,800 **➔** **\$ 15/ SF**

Exterior Enclosure
\$ 3,996,900 **➔** **\$ 16/ SF**

Roofing Systems (TPO-EPDM)
\$ 832,300 **➔** **\$ 4/ SF**

Roofing Systems (TPO-EPDM)
\$ 902,800 **➔** **\$ 4/ SF**

Interior Construction
\$ 3,256,200 **➔** **\$ 13/ SF**

Interior Construction
\$ 4,454,200 **➔** **\$ 18/ SF**

Equipment & Finishes
\$ 6,200 **➔** **DB-LS**

Equipment & Finishes
\$ 6,200 **➔** **DB-LS**



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Special Construction
\$ 777,300 → \$ 3/ SF

Conveying Systems
\$ 235,000 → \$ 1/ SF

Fire Protection Systems
\$ 879,000 → \$ 4/ SF

Plumbing Systems
\$ 1,600,000 → \$ 4/ SF

HVAC Systems
\$ 3,946,500 → \$ 16/ SF

Electrical Distribution System (EDS)
\$ 4,576,800 → \$ 19/ SF

Special Construction
\$ 777,300 → \$ 3/ SF

Conveying Systems
\$ 260,400 → \$ 1/ SF

Fire Protection Systems
\$ 634,000 → \$ 3/ SF

Plumbing Systems
\$ 1,821,400 → \$ 3/ SF

HVAC Systems
\$ 4,498,000 → \$ 18/ SF

Electrical Distribution System (EDS)
\$ 4,694,000 → \$ 19/ SF

Sears Centre R.S. Means Square Foot Estimate Summary

Building Data: The Sears Centre Sports/ Event Facility

Building Size

❖ 240,000 SF

Building Area Breakdown

Event Area (Lower & Upper Concourse)	105,866 SF
Suite Boxes	16,346 SF
Offices/ Administrative Spaces	2,477 SF
Common Area/ Concessions & Storage	115,311 SF

R.S. Means Comparative Analysis:

Event Area (Lower & Upper Concourse)

Source: Means Sq Ft. Data Book, 2005
Catalogue Number: 60055



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Existing Construction Conditions

Model Number: M.350
 Building Type: (4-7) Storey Hotel
 Cost per Square Foot = $\frac{\$125.90 - \$127.50 (105,866 SF - 95,000 SF) + \$127.50}{(115,000 SF - 95,000 SF)}$

Cost per Square Foot = \$ 126.63

Assumptions

Basement additional \$ 25.05/ SF Cost
 4 Elevators @ 3,500 lb = (4)(\$ 116,800) = \$ 467,200
 5 Plastic Display Boards @ 36" x 48" = (5)(\$ 1,275) = \$ 6,375

Total Event Level Area Cost

105,866 SF (\$ 126.63 + \$ 25.05)/ SF = \$ 16,057,755

\$ 16,057,755
\$ 467,200
\$ 6,375
\$ 121,600
+ \$ 104,500
<hr/>
\$ 16,757,430

Suite Boxes

Source: Means Sq Ft. Data Book, 2005
 Catalogue Number: 60055
 Model Number: M.160
 Building Type: (4-7) College Student Center

Cost per Square Foot = $\frac{\$125.75 - \$129.50 (16,346 SF - 15,000 SF) + \$129.70}{(20,000 SF - 15,000 SF)}$

Cost per Square Foot = \$ 128.63

Assumptions

Amplifiers 40 @ \$ 1,925 = \$ 77,000

Total Suite Box Area Cost

16,346 SF (\$ 128.63)/ SF = \$ 2,102,586

\$ 2,102,586
+ \$ 77,000
<hr/>
\$ 2,179,586

Office / Administrative Spaces

Source: Means Sq Ft. Data Book, 2005



Catalogue Number: 60055
 Model Number: M.455
 Building Type: 1 Storey Office Building

$$\text{Cost per Square Foot} = \frac{\$161.00 - \$185.95 (2,477 \text{ SF} - 2,000 \text{ SF}) + \$185.95}{(3,000 \text{ SF} - 2,000 \text{ SF})}$$

Cost per Square Foot = \$ 174.05

Total Office / Administrative Area Cost
 2,477 SF (\$ 174.05)/ SF = \$ 431,122

\$ 431,122

Common Area / Concessions and Storage

Source: Means Sq Ft. Data Book, 2005
 Catalogue Number: 60055
 Model Number: M.570
 Building Type: (2-3) Storey Office Building

$$\text{Cost per Square Foot} = \frac{\$108.05 - \$109.85 (115,311 \text{ SF} - 110,000 \text{ SF}) + \$109.85}{(130,000 \text{ SF} - 115,000 \text{ SF})}$$

Cost per Square Foot = \$ 109.37

Total Office / Administrative Area Cost
 115,311 SF (\$ 126.63 + \$ 25.05)/ SF = \$ 12,611,564

\$ 12,611,564

R.S. Means Square Foot Estimate Cost for the Sears Centre:

$$\Sigma (\$ 16,757,430; \$ 2,179,586; \$ 431,122; \$ 12,611,564) = \$ 31,979,702$$



Existing Construction Conditions

Arnon L. Bazemore
Construction Management

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Sears Centre "D4" Cost Estimate

Code	Division Name	%	Sq. Cost	Projected
00	Bidding Requirements	18.92	34.18	8,203,169
	<i>Design Costs</i>	2.81	5.08	\$ 1,220,000
	<i>General Conditions & Fee</i>	11.64	21.03	\$ 5,047,645
	<i>Insurances & Bonds</i>	4.46	8.06	\$ 1,935,524
01	General Requirements	0.00	0.00	0
03	Concrete	17.98	32.48	7,794,028
	<i>Cast-In-Place</i>	6.21	11.22	\$ 2,692,462
	<i>Reinforcement</i>	0.69	1.25	\$ 300,000
	<i>Pre-cast Concrete</i>	11.08	20.01	\$ 4,801,566
04	Masonry	0.00	0.00	0
05	Metals	10.43	18.85	4,523,542
	<i>Metal Decking</i>	1.42	2.56	\$ 614,744
	<i>Misc. & Sheet Metals</i>	1.57	2.84	\$ 681,392
	<i>Structural Steel</i>	7.44	13.45	\$ 3,227,406
06	Wood & Plastics	0.00	0.00	0
	<i>Architectural Woodwork</i>	0.00	0.00	\$ -
07	Thermal & Moisture Protection	1.61	2.91	698,875
	<i>Roofing</i>	1.61	2.91	\$ 698,875
08	Doors & Windows	3.79	6.85	1,644,807
	<i>Coiling Doors</i>	0.00	0.00	\$ -
	<i>Doors, Frames & Hardware</i>	0.59	1.07	\$ 257,187
	<i>Glass & Glazing</i>	3.20	5.78	\$ 1,387,620
09	Finishes	8.88	16.03	3,848,144
	<i>Acoustical Treatment</i>	1.82	3.29	\$ 789,654
	<i>Carpet</i>	0.35	0.63	\$ 150,000
	<i>Ceramic Tile</i>	0.62	1.12	\$ 267,945
	<i>Drywall</i>	2.78	5.02	\$ 1,204,692
	<i>Lath & Plaster</i>	1.85	3.33	\$ 800,000
	<i>Paint & Wall covering</i>	1.23	2.22	\$ 533,172
	<i>Resinous Flooring</i>	0.24	0.43	\$ 102,682
10	Specialties	3.71	6.70	1,608,167
	<i>Misc.</i>	0.19	0.34	\$ 81,291
	<i>Operable Walls</i>	2.04	3.68	\$ 883,110
	<i>Signage</i>	0.75	1.35	\$ 324,598
	<i>Toilet & Bath Accessories</i>	0.74	1.33	\$ 319,168
11	Equipment	3.48	6.28	1,508,389
	<i>Food Service</i>	3.48	6.28	\$ 1,508,389
12	Furnishings	0.00	0.00	0
13	Special Construction	1.79	3.24	777,298
	<i>Ice Rink Construction</i>	1.79	3.24	\$ 777,298
14	Conveying Systems	1.44	2.59	622,739
	<i>Elevators & Escalators</i>	1.44	2.59	\$ 622,739



15	Mechanical	17.42	31.47		7,553,623
	General Conditions	2.20	3.98	\$	955,345
	Fire Protection	2.42	4.37	\$	1,048,278
	HVAC	9.11	16.46	\$	3,950,000
	Plumbing	3.69	6.67	\$	1,600,000
16	Electrical	10.54	19.03		4,567,982
	Electrical	10.54	19.03	\$	4,567,982
	Total Building Costs	100.00	180.63	\$	43,350,762

The parametric estimate for D4 produced a project construction cost of \$ 51,328,557.
Building cost produced: **\$ 43,350,762**

<u>Building Construction Cost</u>	<u>RS. Means</u>	<u>(Δ) Cost Difference</u>
\$ 35,030,000	\$ 31,979,702	\$ 3,050,298
	<u>“D4” Cost</u>	<u>(Δ) Cost Difference</u>
	\$ 43,350,762	\$ 8,320,762
<u>Total Project Cost</u>	<u>“D4” Cost</u>	<u>(Δ) Cost Difference</u>
\$ 50,708,000	\$ 51,328,557	-\$ 620,557

Site Plan of Existing Conditions

Reference Appendix for Site Plan

Local Conditions

Preferred Construction Methods

- ❖ If space is available for site and parking layout on project utilize spaces
- ❖ Use CA-1 Sub-base for Construction roads and adjacent project parking on site
- ❖ Minimize Concrete placement due to concrete shortages in local market
- ❖ 10% - 15% MBE/ WBE desired for Ryan Owned jobs in the Chicago Area
- ❖ Ample space available for parking within construction site along existing infrastructure

Availability & Recycling & Tipping Fees

- ❖ Not applicable to this job

Soil and Subsurface Water Condition

- ❖ A negligible amount of subsurface was encountered on site, during subsurface exploration. Test bores indicate stable ground at depth of 15’-0”



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- ❖ For water that was encountered at a depth beyond 15'-0", a system of sump pits, sump pumps and well points was used to evacuate necessary water prior to excavation and foundation placement

Client Information

Madkatstep, LLC (*COO Entertainment*) / Sears & Roebuck, have formed a joint merger for the construction and ownership of the Sears Centre. Sears Roebuck will be granted facility naming rights. This project is a planned proto-type that will serve as the model for similar projects through out the United States. Project complexity has afforded the organization the opportunity to create a corporate "spin-off" COO who will own and manage arena facilities like the Sears Centre in the near future.

A culmination of market forces, budget constraints and internal strategic planning were the driving force behind the decision to pursuer this project. COO primary core values are growth and quality. The Sears Centre Arena will be the physical embodiment of these aspects.

Project Expectations:

Cost Expectation

- ❖ Stay within the GMAX ~ \$ 50,708,000 with the goal of redefining the FF & E budget based on the cost savings in project scope.

Time Expectation

- ❖ Finish On Time! This is the most crucial expectation. Project Turnover **9/18/06**. Architectural & Finishes are integrated into the FF & E time window. Every task pertaining to this item must be finished. Ryan Internal Schedule Deadline for systems impacting Architecture, Finishes and FF & E installation – **6/9/05**.

Safety Expectation

- ❖ Maintain EMR Rating via Safety Programs and Weekly Tool Box meetings
- ❖ Subcontractor is strictly enforced.
- ❖ "Ryan Safety" Board displays running tab for successful project "Safety Days."

Quality Expectation

- ❖ "Value Engineering" quality has been intertwined with "VE" Suggestions
- ❖ Architectural Pre-cast panels will have aesthetic elements
- ❖ 40'-2" High Curtain wall will provide thermal enclosure will utilizes natural lighting to produce an ambient environment
- ❖ Epoxy aggregate finishes decorated concrete block

Key Sequencing Issues:

- ❖ Pre-cast Erection
- ❖ Risers



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- ❖ Beams
- ❖ Rakers
- ❖ Aluminum Curtain Wall
- ❖ Concrete Walk
- ❖ Ice-Rink Installation

Key to successful Schedule Compression via Owners Standards:

- ❖ “Raving Fan” Action Plan
- ❖ Early Coordination
- ❖ Personal Owner Walk Through
- ❖ Market Collaboration/ Evaluate Market Trends
- ❖ Construction Practices/ Alternative Material Availability

Project Delivery System

Reference Appendix for Project Delivery Method

Project complexity has afforded the organization the opportunity to create a corporate “spin-off” CCO-MADKATSTEP who will own and manage arena facilities like the Sears Centre in the near future.

A composite of market forces, budget constraints and internal strategic planning were the driving force behind Ryan choosing to use the Design Build “PDM.”

Project Staffing Plan

Reference Appendix for Project Staffing Plan

Ryan Companies has multiple offices. Although the Midwest Office (Chicago/ Naperville, IL) will be building the Sears Centre, Ryan Headquarters has provided architectural and site engineering to keep general requirement & permit cost at a minimum. Jeff Smith, Tim Hennelly and Steve Hyman will be the acting advocates for MADKATSTEP and the Sears-Roebuck Corporation. The project construction team consists of (1) Senior Project Manager, (1) 2nd Level Project Manager, (2) Senior Superintendents and (1) 2nd Level Project Assistant. Information flow follows a “downward directive,” which may include multiple coordination meetings with project managers and subcontractors.

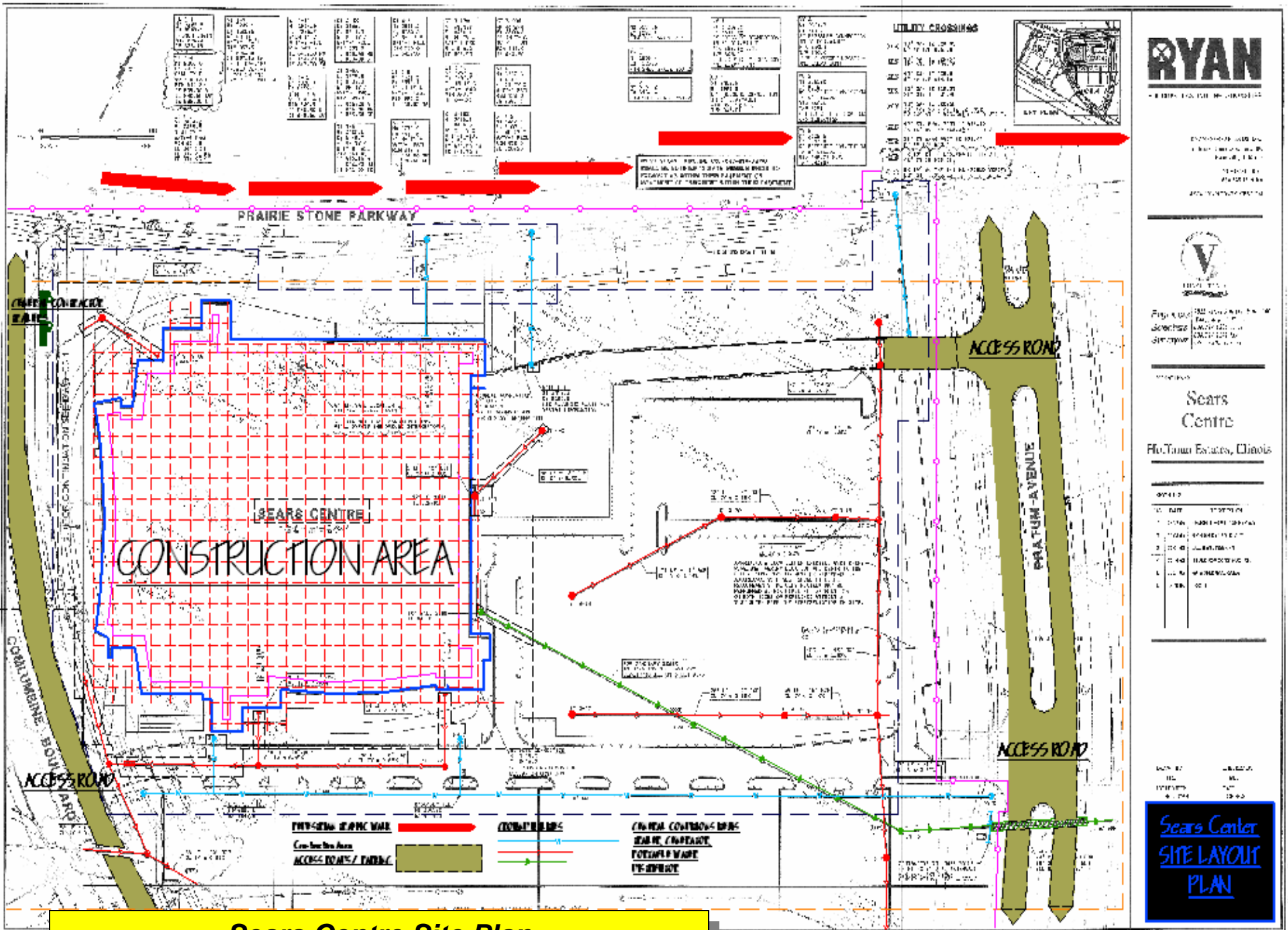


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RYAN
 ENGINEERS ARCHITECTS

PROJECT NO. 100-00000000
 SHEET NO. 100-00000000
 DATE: 10/10/00



Project No. 100-00000000
 Sheet No. 100-00000000
 Date: 10/10/00

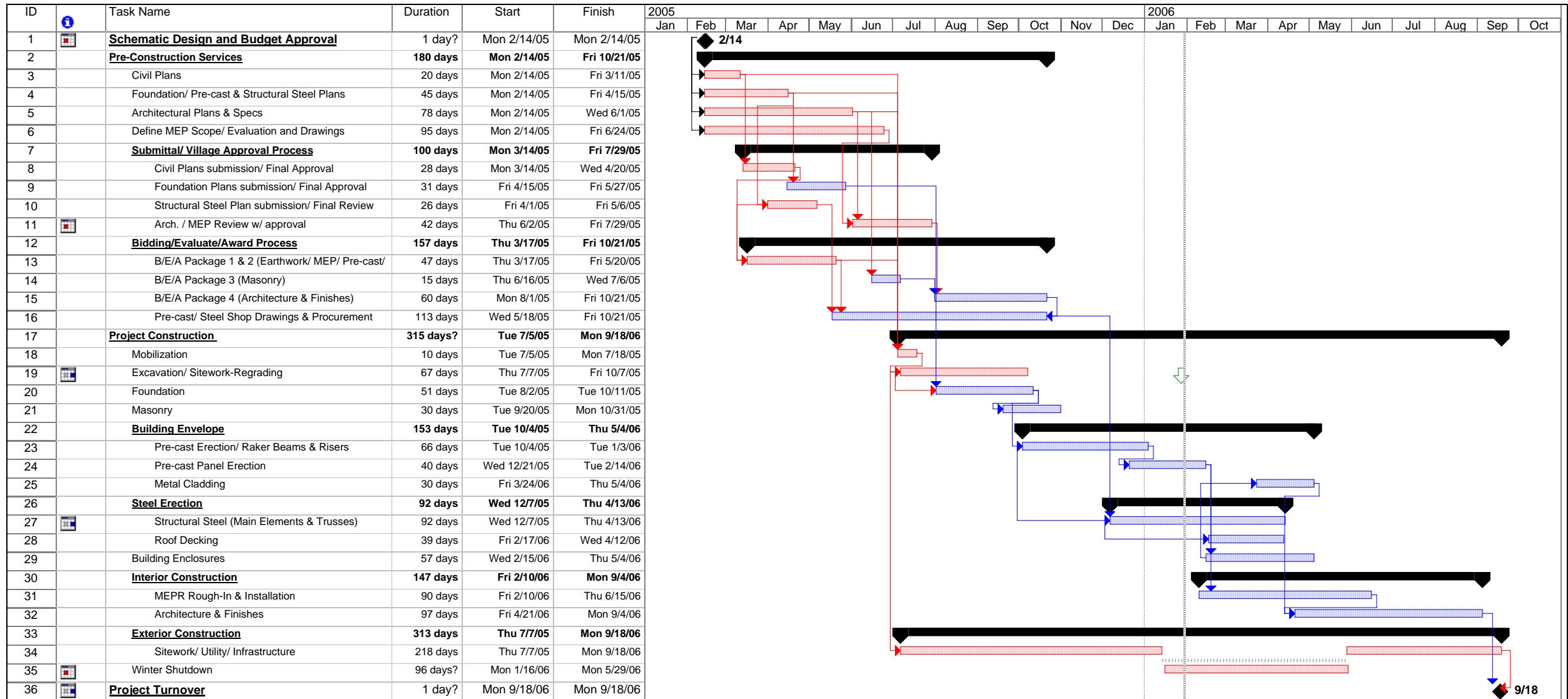
Sears Centre
 Hilltop Estates, Illinois

NO.	DATE	DESCRIPTION
1	10/10/00	ISSUED FOR PERMITS
2	10/10/00	ISSUED FOR PERMITS
3	10/10/00	ISSUED FOR PERMITS
4	10/10/00	ISSUED FOR PERMITS
5	10/10/00	ISSUED FOR PERMITS

NO.	DATE	DESCRIPTION
1	10/10/00	ISSUED FOR PERMITS
2	10/10/00	ISSUED FOR PERMITS

Sears Centre
SITE LAYOUT
PLAN

Sears Centre Site Plan



Project: Revised Sears Centre Summa
Date: Mon 1/30/06

Task		Milestone		Rolled Up Critical Task		Split		Group By Summary	
Critical Task		Summary		Rolled Up Milestone		External Tasks		Deadline	
Progress		Rolled Up Task		Rolled Up Progress		Project Summary			



Existing Construction Conditions

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Construction Management

Building Systems Summary Matrix

Section Number	Building System	Key Design Elements	Key Construction Elements
030000	Substructure Foundation Concrete & Shoring System	<ul style="list-style-type: none"> ➤ Deep Foundations to withstand lateral earth pressures ➤ 55'-0" 100 kip Tie-backs @ 15° angle of entry ➤ Integrated foundation and permanent shoring system 	<ul style="list-style-type: none"> ➤ All elements need to be in place prior to the pre-cast superstructure ➤ Pre-cast procurement time is an essential concern for adjacent walls with a depth of $\geq 24'-0"$ ➤ Dock walls will be cast-in-place and poured after pre-cast superstructure envelope is erected
030040	Pre-cast Framing, Seating And Planks (Superstructure)	Pre-cast Framing <ul style="list-style-type: none"> ➤ Beams ➤ Columns Seating <ul style="list-style-type: none"> ➤ Risers Above Grade Flooring Systems <ul style="list-style-type: none"> ➤ Σ (sum) 10" Pre-cast Hollow core Planks = Pre-cast Floor Panels ➤ Elements must facility "Diaphragm Effect" and account for lateral forces 	<ul style="list-style-type: none"> ➤ Pre-cast Erection path will follow a counter clockwise motion starting on the North wall and terminating at the East Dock wall ➤ Structural Pre-cast Erection will be sequenced to stay ahead of truss placement and stage roof metal decking
034000	Architectural Pre-cast Wall Panels Exterior Enclosure System	ACI/ PCI Architectural Pre-cast Panels Vertical Deflection Requirements <ul style="list-style-type: none"> ➤ $\Delta = \frac{1}{2}$ inch ➤ $\Delta \approx L / 240$ 	<u>Items with CSI section numbers 034000 & 089200 will need pre-construction coordination due to the fact that both elements comprise building enclosures and cladding systems</u>
089200	Prefabricated Metal	Type 1 Panel(s) 26 gauge	<u>Items with CSI section numbers 034000 &</u>



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Construction Management*

Existing Construction Conditions

074120	<p style="text-align: center;">Panels Exterior Enclosure & Cladding Systems</p>	<ul style="list-style-type: none"> ➤ Panel tensile Strength = 30 psi ➤ 3' -0" x 17' -0" x 2" Type 2 Panel(s) 26 gauge ➤ Panel tensile Strength = 30 psi ➤ 3' -0" x 12' -0" x 4-1/2" Type 3 Panel(s) 26 gauge ➤ Panel tensile Strength = 30 psi ➤ 3' -0" x 10' -0" x 2" 	<p>089200 will need pre-construction coordination due to the fact that both elements comprise building enclosures and cladding systems (Cladding depended on Pre-cast Placement)</p> <p><i><u>Check erection sequence of pre-cast panels against installation of pre-fabricated metal panels.</u></i></p>
042200	<p style="text-align: center;">Masonry</p>	12" Brick Veneer	<p>Masonry Veneer will be installed ahead of Pre-cast Panels</p> <p><i><u>Check structural significance of non-load bearing masonry veneer bring installed prior to pre-cast panels</u></i></p>
054000 055000	<p style="text-align: center;">Cold Form Metal Framing Misc. Metals</p>	<p>Roof Trusses and Lateral Bracing (4) Stair Tower Framing I-Beams HSS Structural Tube(s) Roof Metal Deck</p>	<p>Primary structural steel elements for the Sears Centre are the roof truss.</p> <p>Items directly impacted by Roof Truss Design and Installation: Main HVAC ductwork distribution vertical tolerance for 66" Ø supply duct (FF & E) Arena Audio Systems, Devices and infrastructure</p>
075310	<p style="text-align: center;">EPDM & TPO Roofing System</p>	<p>High-Roof</p> <ul style="list-style-type: none"> ➤ Sloped EPDM/ TPO Roofing System <p>Low Roof</p> <ul style="list-style-type: none"> ➤ Single Ply-Ballasted Mechanically attached Membrane 	<ul style="list-style-type: none"> ➤ Cost effective system to provide enclosure for thermal regulation and facility rain run off. ➤ Provision for RTU's and Air Handling Units. <i>MEP Rough-In may be progressing on lower levels in the same direction possible scope interaction</i>
089200	<p style="text-align: center;">Glazed Aluminum</p>	<ul style="list-style-type: none"> ➤ Framing System 	Curtain wall framing system must be plumbed and



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Existing Construction Conditions

	Curtain Walls	➤ Low “E” Tempered Glazing	aligned at location to ensure proper slope
142100 142400	Conveying Systems	<ul style="list-style-type: none"> ➤ Electric Traction Elevators 3,000 lb. capacity, (4 Level service) ➤ Hydraulic Elevator 3,500 lb. capacity, (3 Level service) 	<p><u>Check to see if Elevator and Stair towers are CIP or Pre-cast.</u></p> <ul style="list-style-type: none"> ➤ Elevator construction is dependent on: Building Enclosure completion ➤ Completion of Electric Switchgear for Conveying Systems Testing
153000 154000	“Wet” Suppression Systems Plumbing Systems	<ul style="list-style-type: none"> ➤ Branches , Swing arms and Sprinkler Heads ➤ System Jockey Pumps ➤ 8” Cold Water Supply ➤ Triplex “Booster System” ➤ Backflow Prevention 	<p>Codes Regulation Governing System placement procedures and location 1024.6.2.3 Wet Sprinkler Systems required in all areas with the exception of arena areas in the event level < 50’ -0” depth.</p>
** 157250 **	Ice-Rink Systems	<p>(CaCl₂) Calcium Chloride Systems</p> <ul style="list-style-type: none"> ➤ Ice-take-out Heat Exchanger ➤ Brine Chiller, Pumps & Mixing Tanks ➤ In floor pipe distribution system ➤ Thermostats and Temperature Regulators ➤ “Non-Ice” Event floor covers 	<p>5” slab will be rated at 5,000 psi for additional loading of ice distribution system.</p>
158000	HVAC Systems	<ul style="list-style-type: none"> ➤ Air Handling Units ➤ Cooling Towers ➤ Chillers ➤ Distribution, Diffusers, Grilles and Insulation 	<ul style="list-style-type: none"> ➤ Ducted return distribution not required for event floor area. ➤ Time allotment for event ceiling suspended ductwork <u>63 days</u>
161000 164000 167000	Electrical Systems	<ul style="list-style-type: none"> ➤ Electric Switch Gears ➤ Panel Boards ➤ Transformers (30 KVA- 500 	<p>** Switchgear construction duration 40 days to be completed in conjunction with conveying systems construction</p>



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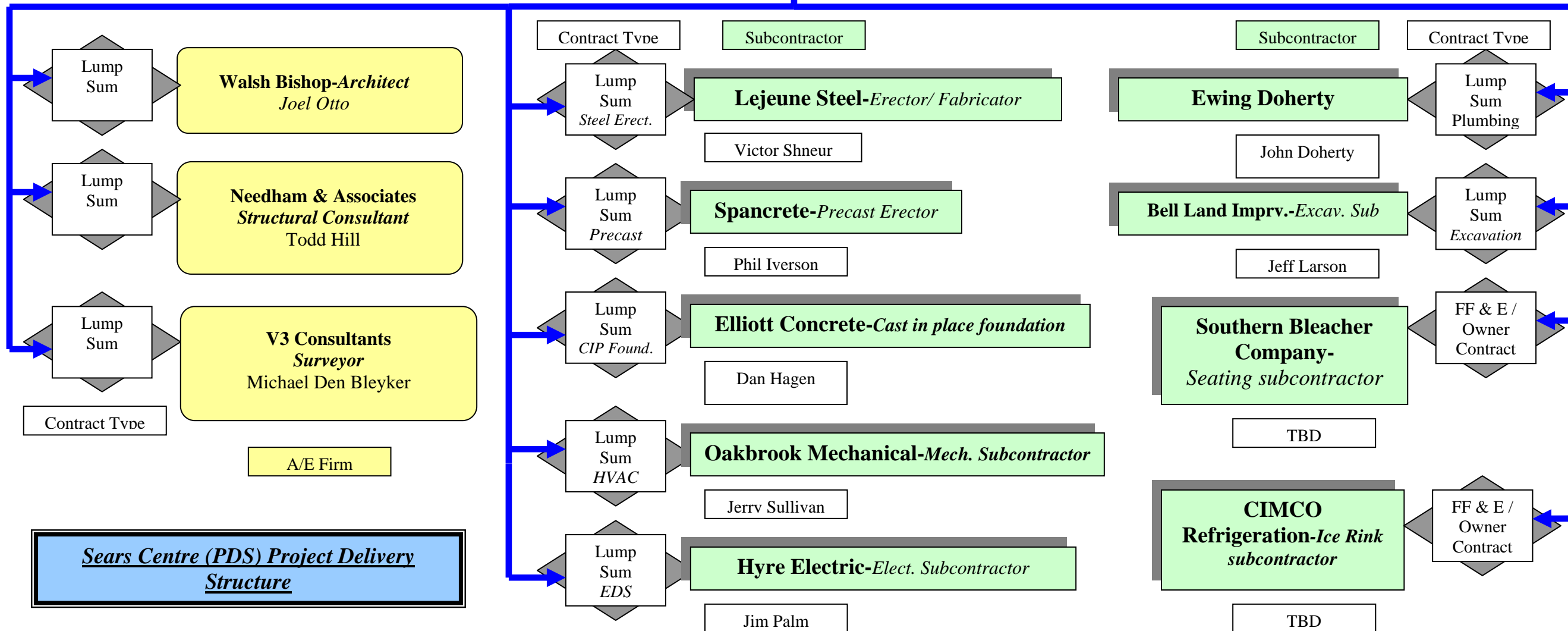
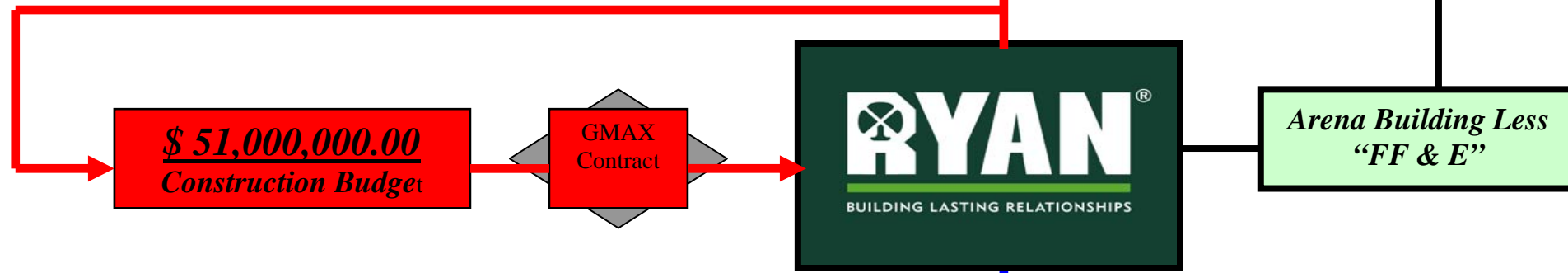
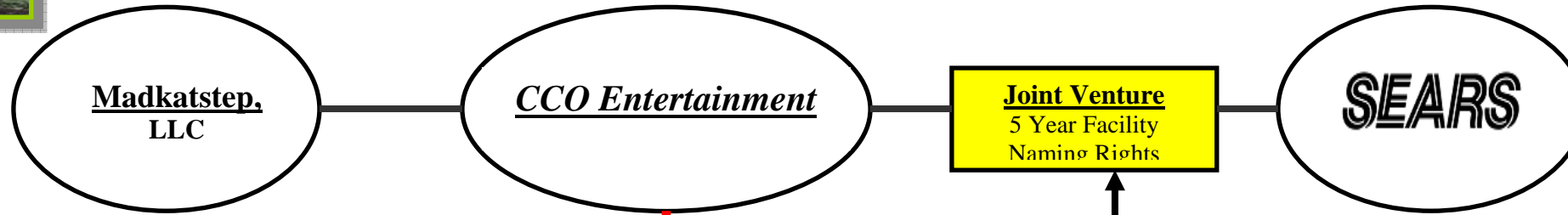
Existing Construction Conditions

		KVA) ➤ 277/ 480 V; 120/ 208 V distribution ➤ Arena Lighting Systems	
** 167000 ** 092700- 099000	Communication Telecommunication Arena Audio Systems Visual Systems Suggestions	➤ Dedicated Panel Boards ➤ Scoreboard ➤ Speakers/ Arena Communication Systems (Common Areas, Offices and Suites) ➤ Flat Scoreboard Display vs. 4x4 Truss Suspended Cluster, (<i>FF & E Package has yet to determine scoreboard scheme</i>)	➤ Requires GC coordination despite being excluded from direct scope and handled by Facility Owner's Budget



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Construction Management
Sears Centre Project Delivery System*





Sears Centre Project Staffing

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