

Section 5 - Project Logistics

The project schedule for the Pearland Recreation Center and Natatorium begins with commencement of design on March 1, 2007 and ends with substantial completion on May 12, 2010.

5 – 1 Milestone Schedule

After site work is completed, the recreation center will be constructed separately from the natatorium. While they are one building, the structural systems and building features of the two portions are completely different so separate construction of the two building sections seems most efficient. Through each phase of construction, the recreation center will generally precede construction of the natatorium.

Site Work

The site work activity contains all work done for site preparation as well as for the parking lot, which will be constructed at the beginning of the project to allow for a cleaner construction site.

Foundations

The foundations in the natatorium will commence once the excavation has been completed for the swimming pools. This excavation will be performed while the foundations are being constructed on the recreation center.

Structural

The structural system in the recreation center is very simple and does not have anything important to note. The natatorium has 14 large glulam beams that will span the swimming pools. The structural system in the natatorium will begin after the recreation center's structural system has been completed and will be constructed by a separate contractor due to the glulam material.

Finishes

The finishes in the recreation center again don't have anything unique to note, however the natatorium must have the interior finishes completed prior to beginning the swimming pool finishes (tiles, etc.) in order to avoid damage to the expensive work that will be put in place in the swimming pool.

Pearland Recreation Center and Natatorium – Final Report

The project schedule for this project is relatively simple. The key item to notice when viewing the schedule is the separation in construction of the two (recreation center and natatorium) portions of the building. See **Appendix 5** for the complete project summary schedule.

5 – 2 Detailed Project Schedule

Construction of the Pearland Recreation Center and Natatorium will begin with the Notice to Proceed on April 20, 2009 and conclude with Substantial Completion on May 12, 2010. The complete detailed schedule is available in **Appendix 5**. To create the construction schedule for the project the building was split into two portions: recreation center and natatorium. This was done because these two portions of the building are very different and will be constructed in a different manner due to the swimming pool and glulam structural system in the natatorium.

Table 5-2.1 – Milestone Date Comparison compares some key construction milestone dates in the recreation center versus the natatorium.

Table 5-2.1 – Milestone Date Comparison

Milestone	Recreation Center	Natatorium
Notice to Proceed	4/20/2009	4/20/2009
Top Out	8/7/2009	8/30/2009
Dry-In	10/23/2009	12/9/2009
Substantial Completion	5/12/2010	4/28/2010

Structure and Enclosure

Construction of the building's structural system and enclosure is sequenced as shown in **Figure 5-2.2 - Structural and Enclosure Trade Construction Sequence**

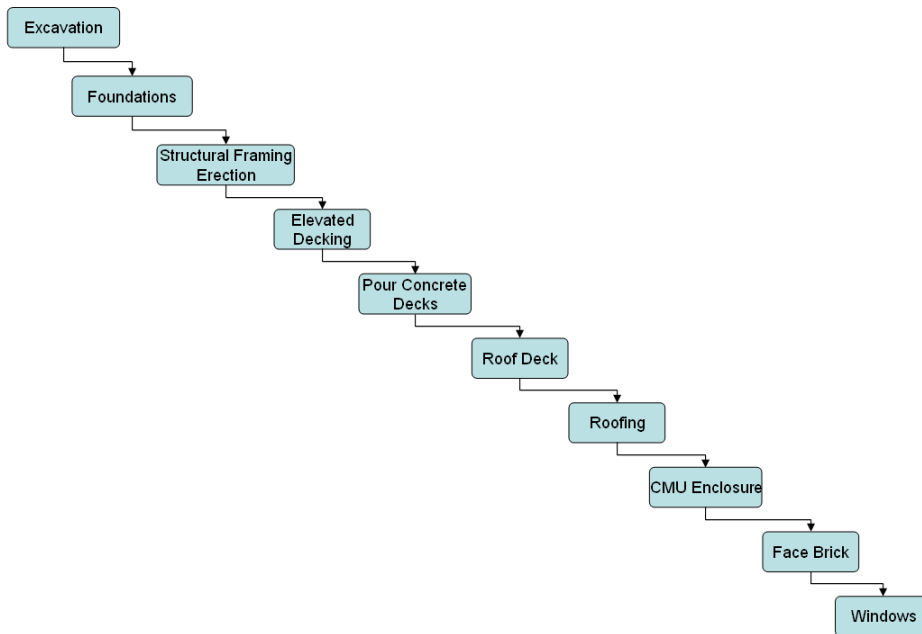


Figure 5-2.2 – Structural and Enclosure Trade Construction Sequence

Interiors

Following 'Dry-In,' a 'parade of trades' construction sequence is applied; that is only one trade works in each space at a time and each trade follows the previous. **Figure 5-2.3 - Interior Trades Construction Sequence** shows the order of the interior 'parade of trades'.

Pearland Recreation Center and Natatorium – Final Report

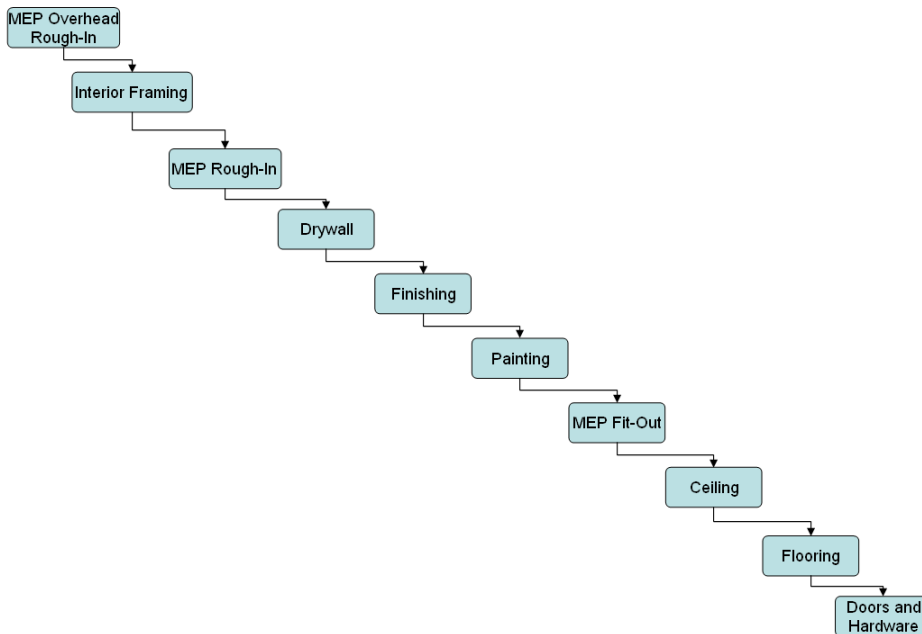


Figure 5-2.3 - Interior Trades Construction Sequence

Following the interior ‘parade of trades’ a number of specialty items are installed, such as casework, gym flooring, and gym equipment. See the detailed schedule in **Appendix 5** for all activities.

Recreation Center

Construction of the recreation center progresses counterclockwise through the building in three phases. **Figure 5-2.4 – Recreation Center Construction Phase Locations** shows the locations of these three phases.

Pearland Recreation Center and Natatorium – Final Report

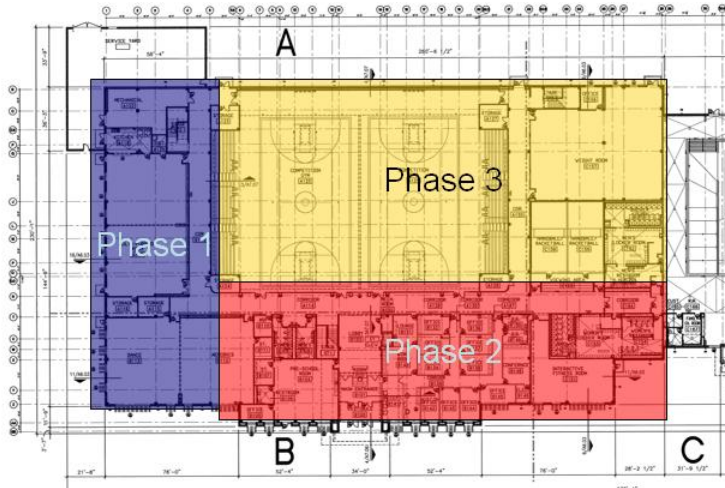


Figure 5-2.4 – Recreation Center Construction Phase Locations

Second floor activities only have two phases since the gym is double height and the small portion of phase three that has a second level is combined with phase 2 for the second floor.

Natorium

There is no phasing of construction in the natatorium as there was in the recreation center. Construction sequencing in the natatorium will revolve around the swimming pool construction. See **Figure 5-2.5 – Swimming Pool Construction Sequence** for the sequence of swimming pool construction activities.

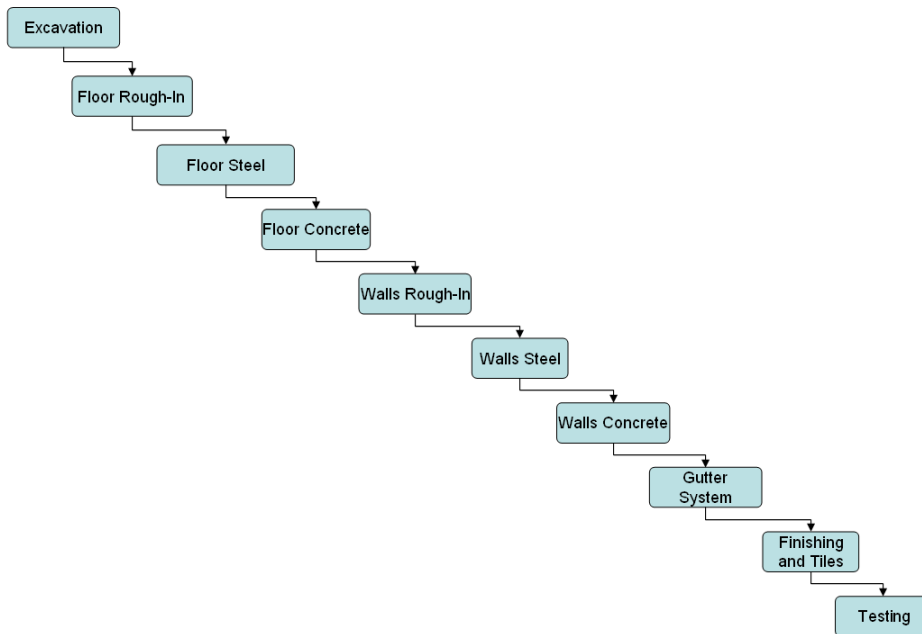


Figure 5-2.5 – Swimming Pool Construction Sequence

Construction of other portions of the natatorium will be occurring throughout the pool construction; however it is critical that the finishing and tiles in the swimming pool are the last activity to occur in the swimming pool area in order to protect the work. Immediately after this is completed, the pool will be filled with water and testing and chemical balancing will begin.

5 – 3 Construction Cost Estimate

Actual Cost

Total Actual Building Construction Cost: \$15,137,233

Actual Building Construction Cost/SF: \$144.00/SF

Total Project Cost: \$16,901,509

Project Cost/SF: \$160.79

Pearland Recreation Center and Natatorium – Final Report

By System

System	Total Cost (\$)	Cost/SF (\$)
Structural Steel (Erection Included)	\$1,054,385	\$5.8
Cast-In Place Concrete	\$1,166,021	\$11.09
Masonry	\$1,223,500	\$11.64
HVAC	\$1,907,000	\$18.14
Electrical	\$41,936	\$0.40
Plumbing	\$499,027	\$4.75
Fire Protection	\$195,450	\$1.86
Elevators	\$41,936	\$0.40
Roofing	\$609,900	\$5.81

NOTE: For confidentiality purposes the actual estimate has not been posted.

Estimated Construction Cost

The estimated cost for the project was created using D4Profiler and RS Means SF Cost Data. D4Profiler takes real cost data from similar past projects and modifies it to meet the specified building requirements.

D4Profiler had a very similar project, a recreation center with a large natatorium, just outside of Cincinnati, Ohio. This project was almost the exact same size as well the Pearland project as well. The cost was within 1% of the actual cost. This cost was the total project cost, not just the construction cost. This total project cost estimate is included in **Appendix 5**.

Obtaining an RS Means estimate was more difficult. A separate cost estimate was obtained for the recreation center (using the 'Gymnasium' building type in RS Means) and the natatorium (using the 'Swimming Pool, Enclosed' building type in RS Means). A problem that arose was that the cost data provided in RS Means was for projects much smaller than the Pearland project. To account for this it was necessary to extrapolate the table values. The cost estimates for these two portions were then combined to obtain a total building cost. This price was again within 1% of the actual cost. This estimate is only for construction costs and is included in **Appendix 5** with all the calculations that were performed.

These estimates are shown in the **Table 5-3.1 - Cost Estimate Comparison** below.

Table 5-3.1 – Cost Estimate Comparison

Method	Total Cost (\$)	Cost/SF (\$)	Price Includes:
D4Cost	\$16,786,542	\$159.87	Total Project Cost
RS Means SF Data	\$15,043,887	\$143.28	Construction Cost

Pearland Recreation Center and Natatorium – Final Report

Detailed Structural Cost Estimate

In addition to the Parametric Cost Estimate from D4Profiler and the SF Cost Estimate from RS Means, a detailed structural system construction cost estimate was also performed. A detailed structural system construction cost estimate for the Pearland Recreation Center and Natatorium project yielded just over \$4,425,000, or about \$42/SF. This cost includes all labor, equipment, and material required for construction of the caissons, concrete, structural steel, steel decking, joists, trusses, wood decking, and glulam structural framing. A break-down of the cost estimate is shown in **Table 5-3.2 – Detailed Structural System Estimate Summary**. The complete estimate as well as the calculations are available in **Appendix 5**.

Table 5-3.2 – Detailed Structural System Estimate Summary

Cost Breakdown Summary		
Dev.	Item	Total Cost
02465	Caissons	\$526,841.25
03220	Rebar	\$60,681.51
03221	WWF	\$18,041.18
03310	3000 psi concrete	\$145,747.62
03311	3500 psi concrete	\$36,687.77
03312	Concrete Finishing	\$15,161.58
03313	Concrete Forming	\$471,115.84
03314	Vapor Barrier	\$123,562.53
03315	5" Concrete Edge Form	\$2,729.14
03316	3" Pour Stop	\$821.42
03500	Roof Deck	\$626,272.50
05100	Structural Steel	\$702,167.12
05200	Steel Floor Joists	\$390,755.16
05300	Metal Deck	\$66,784.03
06100	Wood Trusses	\$170,000.00
06110	Glulam (Decking, Purlins, and Columns)	\$1,070,000.00
	Total Cost	\$4,427,368.67

Pearland Recreation Center and Natatorium – Final Report

Pricing for the estimate was obtained using RS Means 2009 Building Construction Cost Data and contractor information. RM Rodgers provided the glulam pricing and Tectum Inc. provided pricing for the Tectum E roof decking system over the recreation center. All other pricing information came from RS Means.

The estimate was created by doing a detailed take-off of a typical bay of the building and extrapolating. **Figure 5-3.3 – Location of Typical Bay Used for Estimate** shows the 2520 SF (both levels) area, between gridlines G-J and 1-2, which was used.

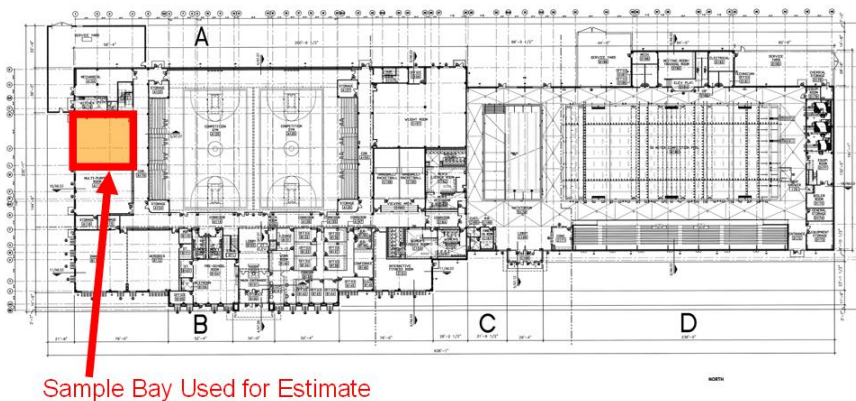


Figure 5-3.3 – Location of Typical Bay Used for Estimate

Recreation Center

Using the total cost estimate obtained from this bay, a cost/SF value was calculated and multiplied by the square footage of the recreation center. This cost/SF did not include the Tectum 'E' roof decking or roof trusses. The cost of these two items was estimated for the entire recreation center then added to the extrapolated cost estimate. See **Appendix 5** for the complete detailed cost estimate.

Natatorium

Modifications had to be made to the cost/SF value to estimate the natatorium's structural system cost since the structural system is glulam instead of steel, like the recreation center. Additionally, there are no elevated slabs in the natatorium. To account for these differences the structural steel and elevated deck costs were subtracted from the recreation center's cost/SF. This new cost/SF was then multiplied by the total square footage of the natatorium. This extrapolated value was added to the glulam columns, purlins, and decking value provided by

Pearland Recreation Center and Natatorium – Final Report

RM Rodgers for the total natatorium structural system construction cost. See **Appendix 5** for the complete detailed cost estimate.

General Conditions Estimate

A detailed general conditions cost estimate was also calculated. A general conditions cost of just over under \$2 million was estimated for the Pearland Recreation Center and Natatorium project. This estimate was obtained using pricing from RS Means and EMJ Corporation. See **Appendix 5** for the complete estimate.

The general conditions estimate contains 5 portions: project management, temporary facilities, temporary utilities, cleaning, and miscellaneous. Project management and insurance, bond, and O&P are the primary costs in the general conditions, totaling almost \$1.9 million. Temporary facilities include items such as job office trailers, temporary sanitary facilities, and barricades. All material hoisting (lifts, cranes etc.) and heavy equipment are to be provided by the contractors so it was not necessary to include these items. Temporary utilities consist of costs for temporary electric, water, and telephone during construction. The cleaning section will pay for weekly site clean-up and final building clean-up. A miscellaneous section with items such as hand tools, safety, and blue prints is also included. A 2% bond, 3% insurance, and 10% overhead and profit are also included in the estimate. These percentages are of the total project cost (\$16,786,542 as per Tech #1 estimate).