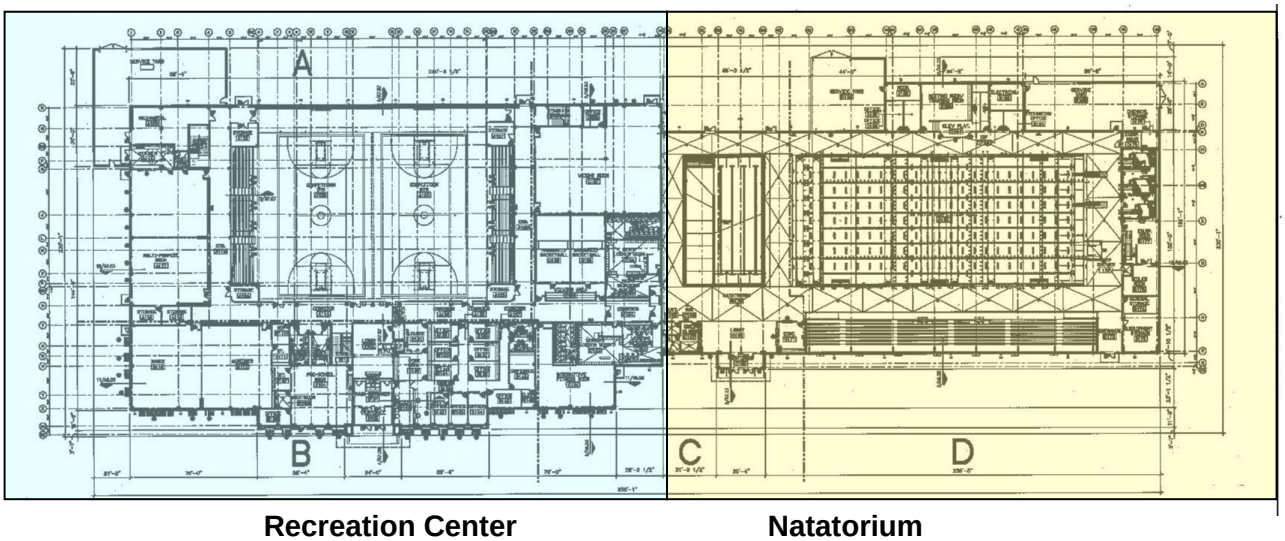
Section 4 - Design and Construction Overview

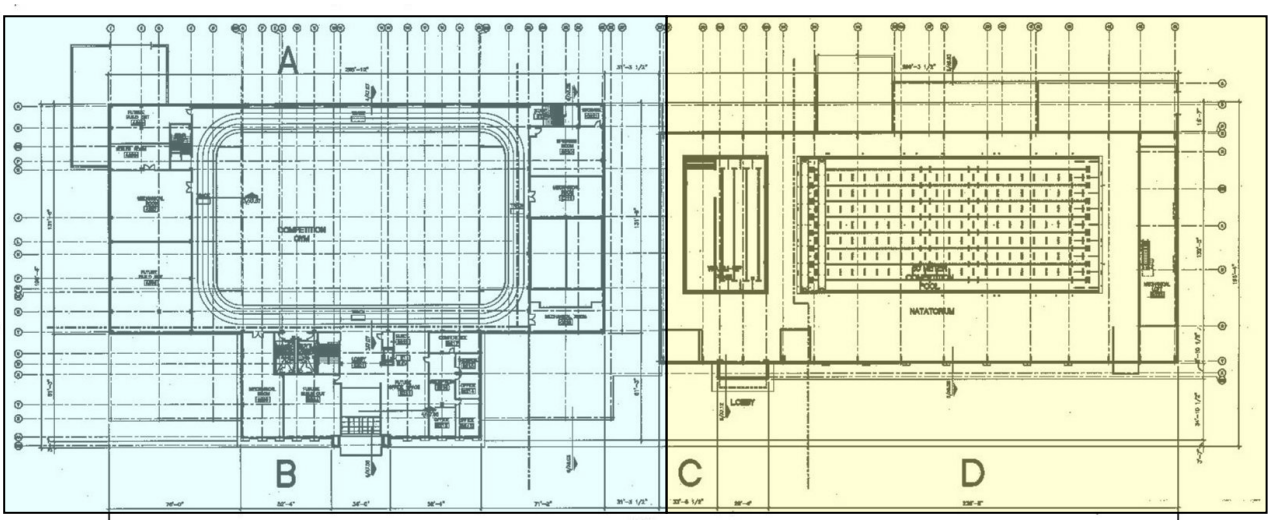
4 - 1 Building Architecture/Enclosure

The Pearland Recreation Center and Natatorium houses a recreation center and natatorium as shown in **Figures 4-1.1 – First Floor Plan** and **4-1.2 – Second Floor Plan**. The building spans 638'-1" and is 230'-1" wide. The natatorium is located on the eastern half of the building and is connected to the recreation center on the opposite half of the building.



Recreation Center **Natatorium**

Figure 4-1.1 - First floor plan



Recreation Center **Natatorium**

Figure 4-1.2: Second floor plan

The 2-story recreation portion of the building contains a double height competitive gym seating 588 spectators and a raised 4-lane running track around the perimeter. There is also a dance room, aerobics room, weight room, 2 racquetball courts, locker rooms, offices, and other multi-purpose rooms.

The double height natatorium contains an 8-lane 50 meter competition pool and a 4-lane 25 yard instructional pool with a handicap ramp. The competition pool includes a moveable bulkhead, (2) 1-meter diving boards, and (2) 3-meter diving boards. There is seating for 694 spectators in bleachers surrounding the competition pool. There are also equipment rooms and training rooms in this portion of the building.

Building Codes

2003 International Building Code

2003 International Plumbing Code

2003 International Mechanical Code

2003 International Electrical Code

2003 International Energy Code

2003 International Fire Code

2003 International Gas Code

1994 Texas Accessibility Standards

1992 Americans with Disabilities Act

Zoning

Zoning District – 'GB' (General Business)

	Requirements	Actual
Minimum Lot Size	22,500 Square Feet	330,090 Square Feet
Minimum Lot Width	150'-0"	727'-7" (Frontage on Bailey Road)
Minimum Lot Depth	125'-0"	453'-8"
Building Setback: Front	25'-0" Minimum	212'-6"
Building Setback: Rear	25'-0" Minimum	32'-9"
Building Setback: Side	10'-0" Minimum	34'-6"
Height Restriction	45'-0" Maximum Height	44'-11"

Historical Requirements

There are no historical requirements on this project.

Building Facades

The facades are primarily face brick on horizontally reinforced 8” CMU with rigid insulation and damp proofing between. The facades by the recreation center and natatorium entrances are calcium silicate masonry units on horizontally reinforced 8” CMU with rigid insulation and damp proofing between. All the glazing is ¼” Tinted Tempered Float Glass.

The south façade, facing Bailey Road is 25% glazing as shown in **Figure 4-1.3 - South Exterior Elevation**.

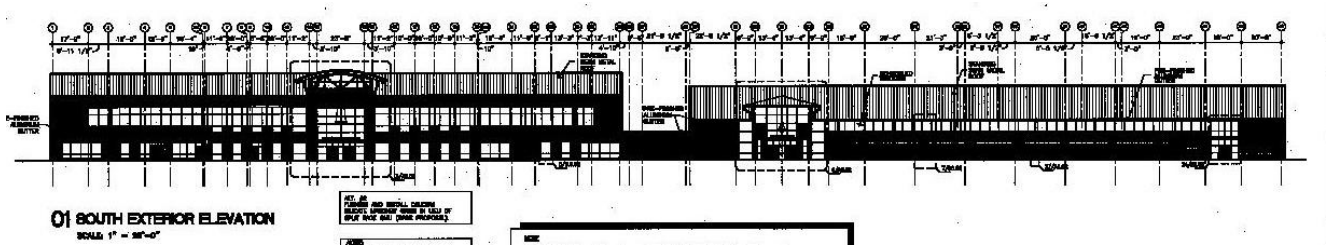


Figure 4-1.3 - South Exterior Elevation

The north façade has 10 windows as shown in **Figure 4-1.4 - North Exterior Elevation.**

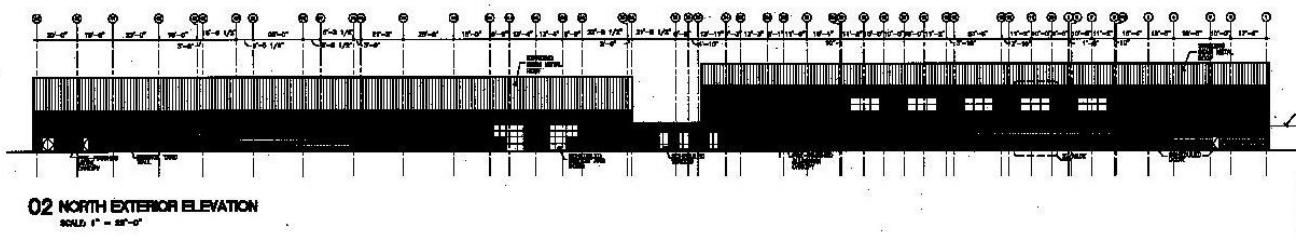


Figure 4-1.4 - North Exterior Elevation

The east façade has a series of strip windows along the recreation center entrance as shown in **Figure 4-1.5 - East Exterior Elevation**.

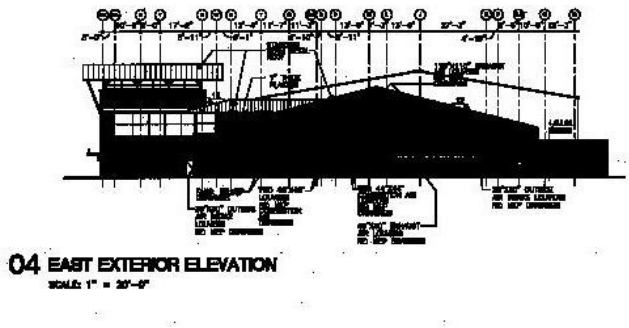


Figure 4-1.5 - East Exterior Elevation

The west façade has 10 windows plus a strip window at the recreation entrance as shown in **Figure 4-1.6 - West Exterior Elevation.**

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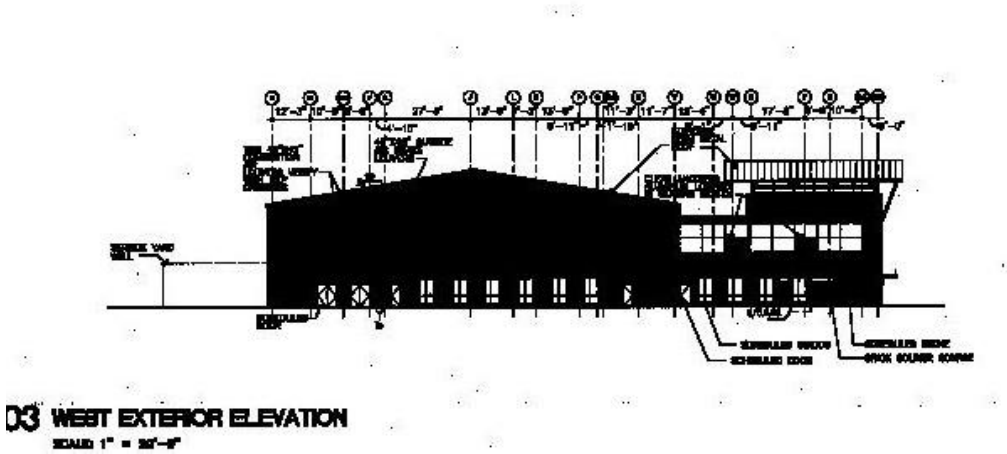

Figure 4-1.6 - West Exterior Elevation

4 - 2 Building Systems

Demolition

No demolition was required.

Excavation

The site is at an elevation of 14' above sea level. It was necessary to excavate to about 14' for the foundations. For this reason it was necessary to dewater the site. This was done using well points throughout the site. Excavation was done with a 1:1 layback so no temporary support was needed.

Structural Framing System

The Recreation center has a structural steel frame. The columns are all tube steel while the beams are W-sections with K-series joists supporting 18ga galvanized 1-1/2" deep non-composite floor decking and 22ga galvanized 1-1/2" deep Type "B" steel non-composite roof decking. All connections between W-sections are bolted and the connections to the tube steel are welded connections. The steel was erected using a 50-Ton and 80-Ton Truck Crane.

The Natatorium has glulam columns supporting glulam purlins which support a 3" wood deck. The glulam system was erected using a 100-Ton and 75-Ton Truck Crane.

Cast-In Place Concrete

The only cast-in-place concrete in this project was the slabs and foundations. The foundation consisted of spread footings on drilled piers. The footings used stick-built forms and were poured with a pump truck. There is a 5" thick reinforced concrete slab-on-grade with a vapor barrier that extends throughout the entire building foundation. There is also a 3" thick concrete slab on WWF on the elevated slabs. The slab-on-grade was placed using a pump truck in 4 different pours. The elevated slabs at the second level and the roof were each poured in 3 pours.

Precast Concrete

There is no precast concrete on this project.

Mechanical System

The recreation center is serviced by five (5) mechanical rooms located as shown below in **Figures 4-2.1 - Rec Center 1st Floor Mechanical Room Locations** and **4-2.2 - Rec Center 2nd Floor Mechanical Room Locations**:

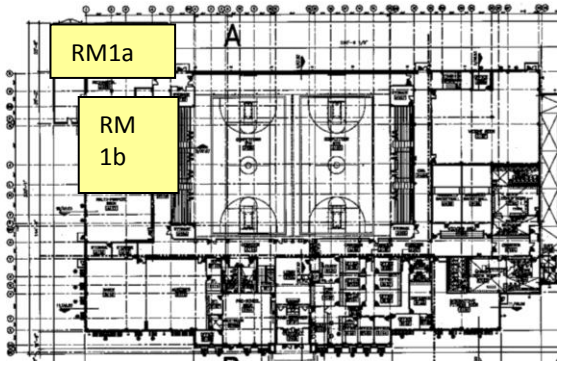

Figure 4-2.1 - Rec Center 1st Floor Mechanical Room Locations

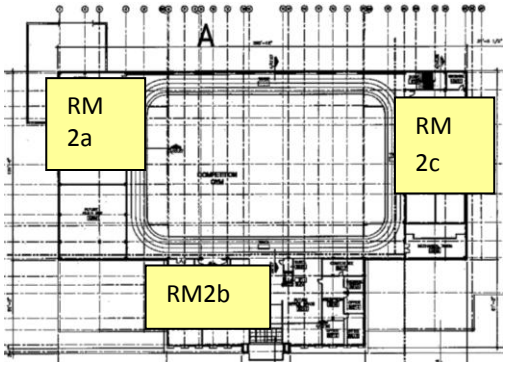

Figure 4-2.2 - Rec Center 2nd Floor Mechanical Room Locations

The Natatorium is serviced by two (2) mechanical rooms as shown below in **Figures 4-2.3 - Natatorium 1st Floor Mechanical Room Location** and **4-2.4 - Natatorium 2nd Floor Mechanical Room Location**:

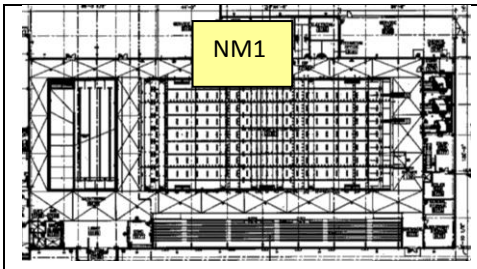

Figure 4-2.3 - Natatorium 1st Floor Mechanical Room Location

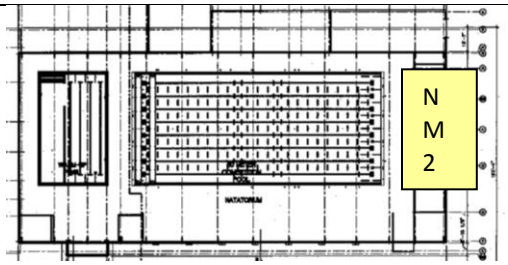

Figure 4-2.4 - Natatorium 2nd Floor Mechanical Room Location

The mechanical rooms contain mechanical equipment as shown in **Table 4-2.5 – Mechanical Room Equipment**.

Table 4-2.5 – Mechanical Room Equipment

Location	Item
RM1a	Two (2) Air Cooled Chillers
RM1b	Four (4) End Suction Pumps
RM2a	Two (2) Air Handling Units, Two (2) Boilers, and One (1) End Suction Pump
RM2b	Three (3) Air Handling Units
RM2c	Four (4) Air Handling Units
NM1	One (1) Air Handling Unit and One (1) Condenser
NM2	Two (2) Air Handling Units

Air is distributed throughout the building using rectangular and flex duct. These ducts then connect to Constant Air Volume Terminals in each room.

Fire Suppression System

The building has a Wet Pipe Pre-Action Fire Sprinkler System that is to be installed to a performance spec of:

Public Spaces, Classrooms, and Offices: 0.10 GPM/SF over the most remote 1,500 SF.

Mechanical Rooms, Storage Areas, and Service Areas: 0.15 GPM/SF over 1,500 SF.

Electrical System

The electrical system for the Pearland Recreation Center and Natatorium has a 3000A building supply with a 600A Surface Mounted Distribution Panel. There is also a 400 KW emergency back-up generator for the building.

Masonry

The entire building has an 8" horizontally reinforced non-load bearing CMU enclosure. There is reinforcing at 16" on-center. There is also a bond beam every 8' (12-courses of block).

Attached to the CMU is a face brick veneer connected by masonry ties every 4-courses of CMU. Between the CMU and face brick there is 1 ½ inch rigid insulation and an air space. Additionally, the CMU has a damp proofing applied to it.

Roofing

The roof in the recreation center is a steel truss system (shown in **Figure 4-2.6 - Construction photo of roof trusses at recreation center**) while the roof in the natatorium is a glulam truss system. The roofing system throughout the recreation center and natatorium consists of a standing seam metal roof on a fully adhered waterproof membrane. The roofing system over the main entrance to the building on the south side, a small strip between the recreation area and natatorium, and a small portion of the north side of the natatorium is modified bitumen.

Figure 4-2.6 - Construction photo of roof trusses at recreation center

Curtain Wall

There are no curtain walls in this building.

Sustainable Features

This building has no sustainable features.

4 - 3 Local Conditions

Labor

The project site is located in a suburb of Houston, TX; the 4th largest city in the US. This location enables easy access to a diversely skilled labor force. For this reason labor availability will not be a problem.

Weather

Houston, TX has a warm and mild climate. While winter weather will not be an issue, there is the potential for tropical weather to affect the project during the fall months. Additionally, since the project is located in a region that is prone to tropical weather, there will be more stringent building codes and inspections.

Geography

The project is located on a 7-acre plot of land in an unpopulated portion of the suburb of Houston, Texas. There is ample area for construction lay down and parking.

The project site is at a very low elevation (+14'). Because of the low site elevation, ground water will be a serious consideration during excavation. It will be necessary to de-water the site during all excavation activities.

Sustainability

Sustainable construction practices are not predominant in the Houston area. It is uncommon for construction projects to apply sustainable practices such as construction material recycling, etc.

Tipping Fees:

It is common practice in the Houston area to not recycle construction material. For this reason, all construction waste is placed in the same dumpster on site. Removal of this waste costs $316 per 40 cubic yard dump. This is $7.9 per cubic yard of waste.

4 - 4 Site Layout Planning

Site layout for the Pearland Recreation Center and Natatorium is greatly simplified due to a large site. Consistent across all phases of the project are the dumpsters in the northeast corner of the site with a dedicated entrance off of Bailey road for access to empty them, porta-potties in the northeast corner of the parking lot, the construction offices on the east side of the site, the temporary transformer in the southeast corner of the building, temporary utilities running to the southeast corner of the building from Bailey Rd, contractor parking on the south side of the site, and the site entrance off of Bailey road on the south side of the site.

Site layout for the excavation phase of construction is shown in **Figure 4-4.1 – Excavation Phase Site Plan**. Excavation will begin from the northwest corner of the building and proceed towards the southeast corner of the building as shown. Dump trucks will arrive and circulate through the site to remove soil as shown.

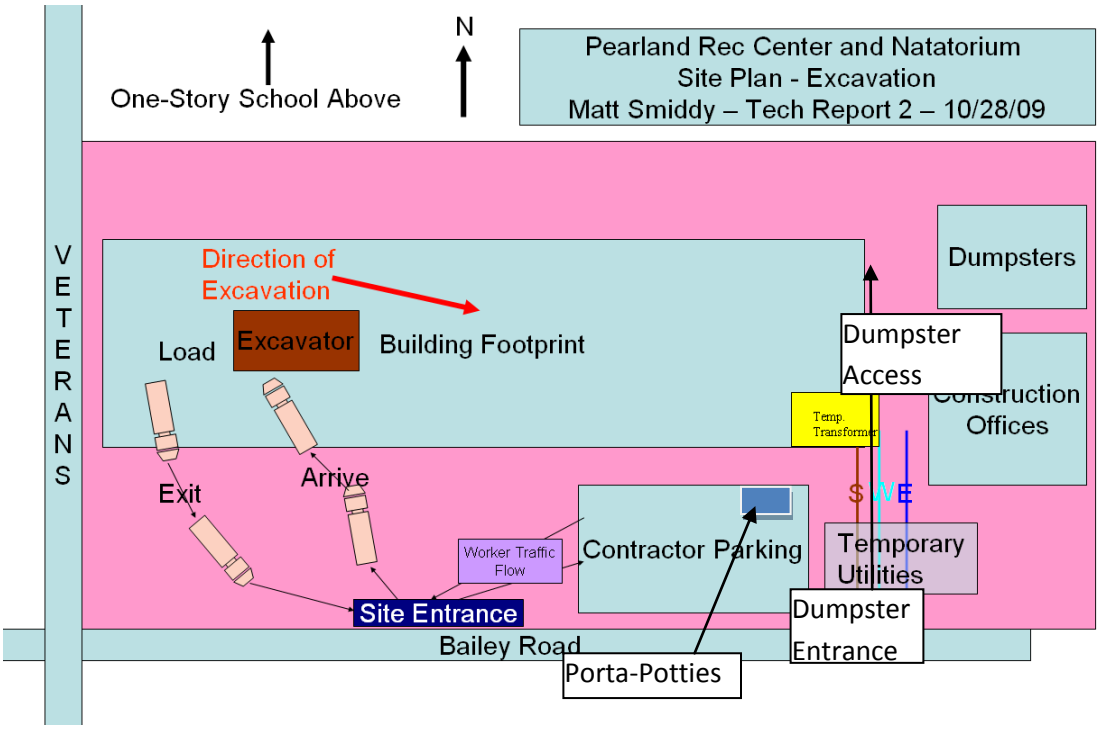

Figure 4-4.1 – Excavation Phase Site Plan

Figure 4-4.2 – Foundations Phase Site Plan shows the site layout for the foundations phase of construction. Foundations work will again progress from the northwest corner to the southeast corner of the building. A rebar yard, with access provided for flatbed rebar truck deliveries, is provided in the southwest corner of the site. The pump truck and concrete trucks will circulate as shown. They will only be present on site during concrete pours. The location of the pump truck will move eastward on the site as work progresses. A contractor material storage area is also provided in the southeast corner of the site.

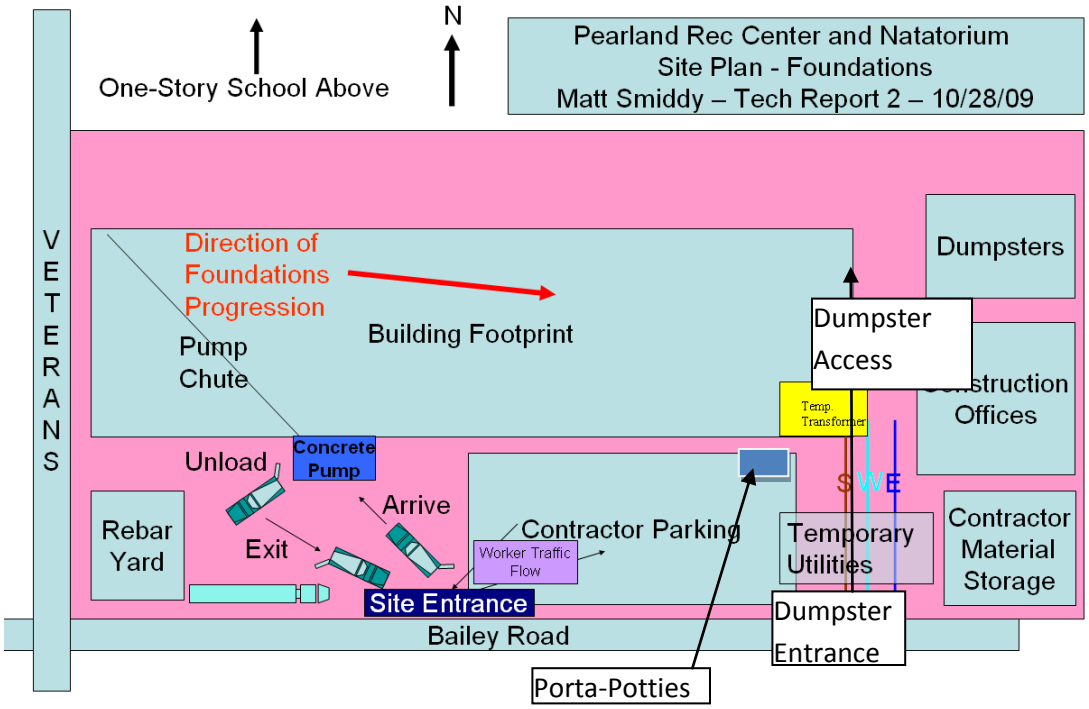

Figure 4-4.2 – Foundations Phase Site Plan

The project site begins to become more congested as the structural framing erection phase of construction begins. Site layout for this phase is shown in **Figure 4-4.3 – Structural Framing Erection Phase Site Plan**. Erection of the steel and glulam will proceed from the west end of the building to the east end. Steel and glulam members will be delivered and unloaded in the shake-out area in the southwest corner of the site. Two cranes will be erecting the steel and glulam on site, one on the north side and one on the south side of the building as shown. Steel joists will be delivered to this shake-out area as well, but will then be moved to the joist shake-out area on the north side of the site to be prepared for final erection. There will be an access point for stocking material to the building located at the southwest corner of the building. This will be done using front loaders.

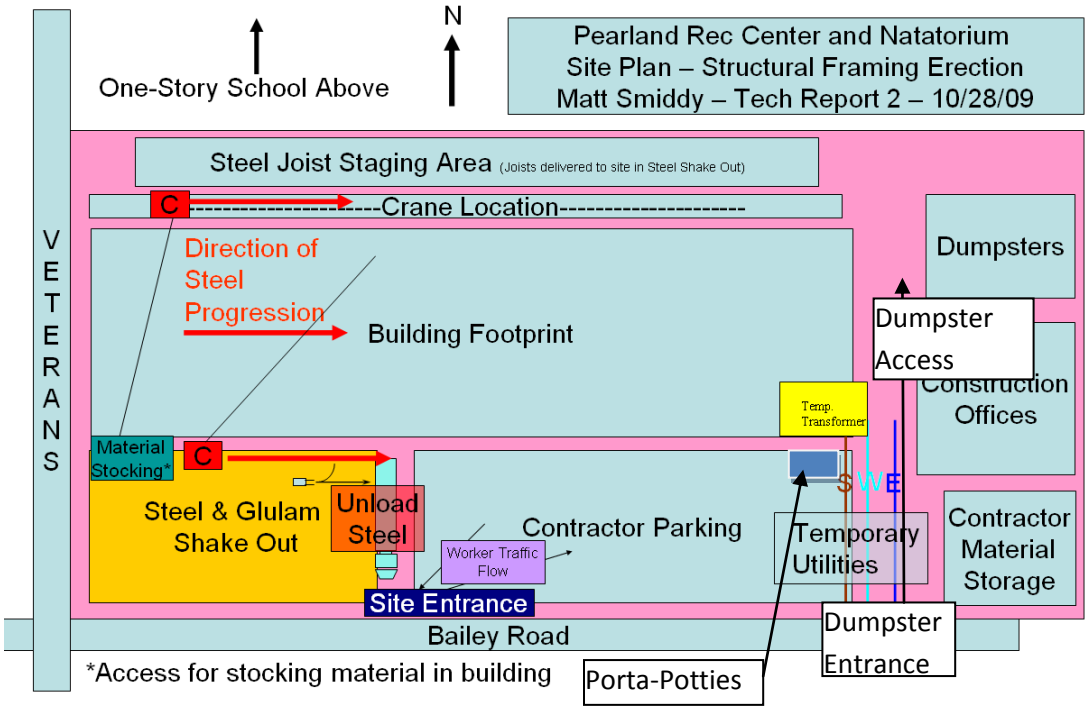

Figure 4-4.3 – Structural Framing Erection Phase Site Plan

Enclosures is the final phase of construction. Work in this phase will progress in a clockwise direction, first around the recreation center than proceeding to go around the natatorium. There will be a contractor material staging area in the southwest corner of the site. This area will be used by contractors to unload materials from trucks as shown. There are also material storage areas on the north side and in the southeast corner of the site. Materials will again be stocked to the building through the access point at the southwest corner of the building using front loaders. **Figure 4-4.4 – Enclosure Phase Site Plan** shows the site layout for this phase of construction.

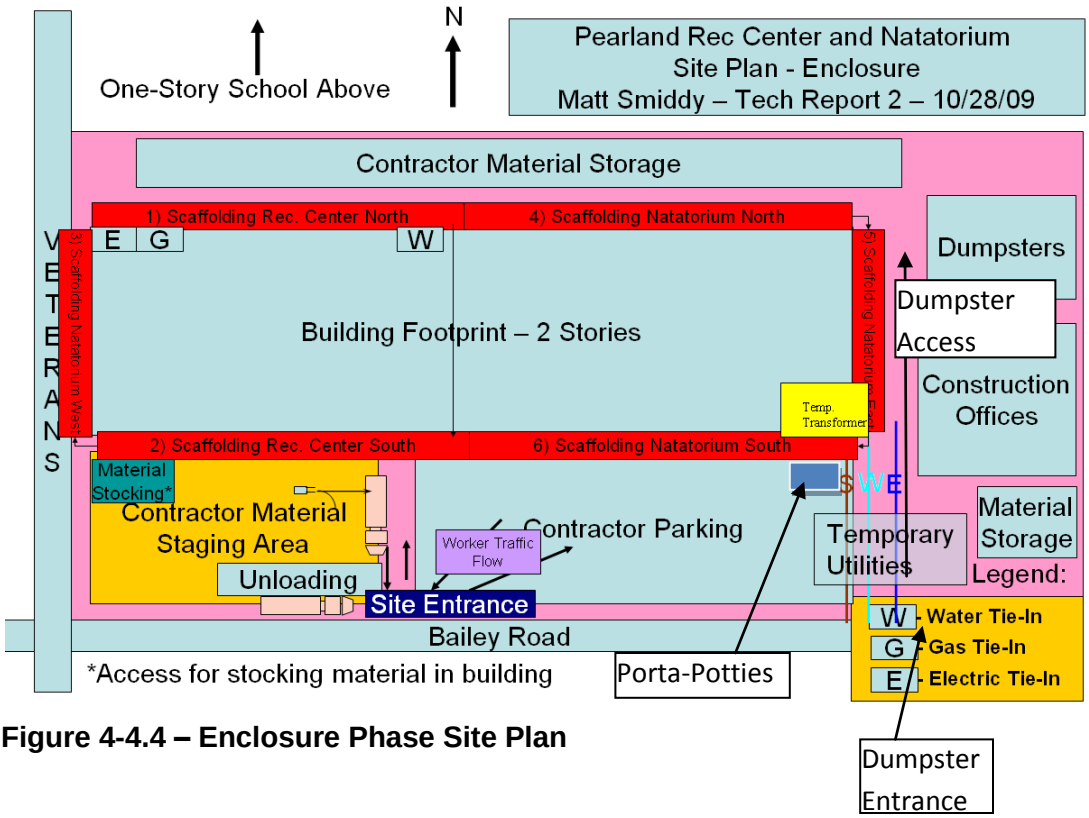

Figure 4-4.4 – Enclosure Phase Site Plan