WAYNE STATE UNIVERSITY

G LEAGUE ARENA DISCOVER/PROGRAMMING

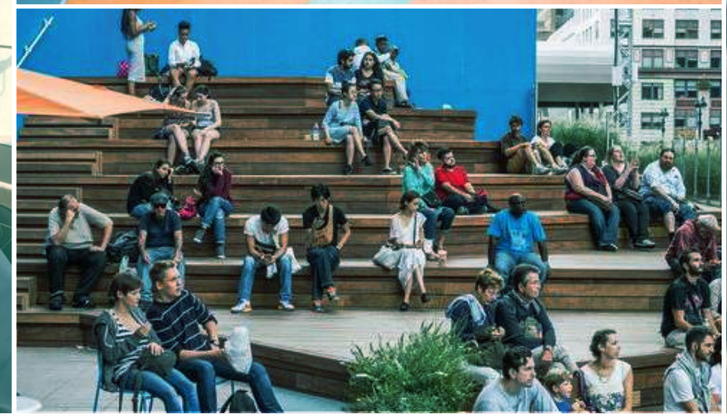
ROSSETTI NOVEMBER 26, 2018

DISCOVER SESSION

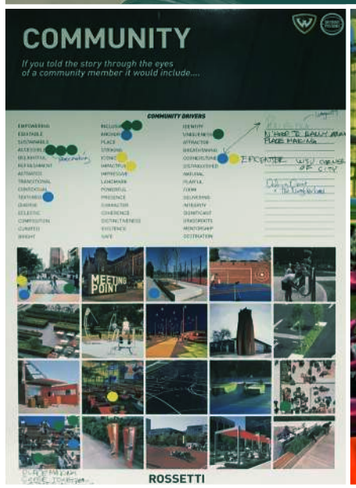
SEPTEMBER 20, 2018
WSU HARWELL CENTER

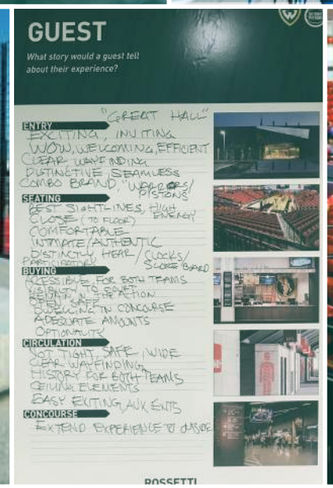
- OVER 12 INDIVIDUAL STAKEHOLDERS MET OVER THE SPAN OF TWO MEETINGS. ROSSETTI FACILITATED THE CONVERSATION THAT WAS SPARKED BY ASKING EACH ATTENDEE A SERIES OF QUESTIONS. WHAT ARE WORDS AND IMAGERY THAT DESCRIBE YOUR VISION FOR WSU ARENA? WHAT IS THE LONG TERM VISION FOR THE NEIGHBORHOOD, WSU, PISTONS? WHAT DOES THIS PROJECT PERSONALLY MEAN TO YOU? THESE ANSWERS WERE RECORDED, ANALYZED AND ULTIMATELY SUMMARIZED

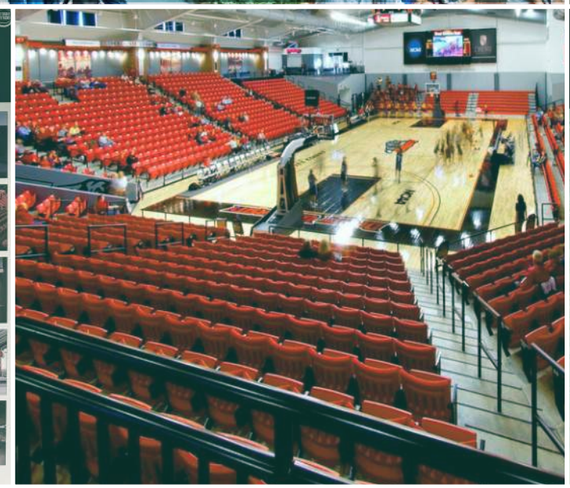

A REAL HIT!
Schaefer
REAL BEER!
RIGHT FIELD
TICKETS
TICKETS
TICKETS

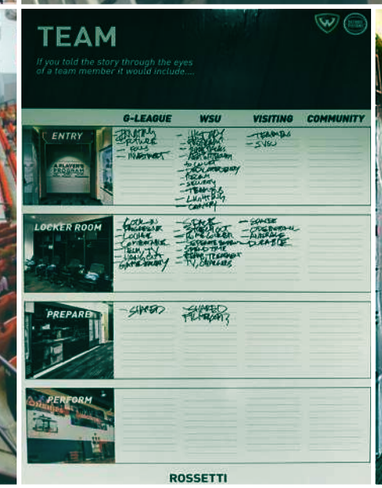



BROOKLYN AVEN
TICKETS
EXIT


COMMUNITY
If you told the story through the eyes of a community member it would include....
COMMUNITY DRIVERS
MEETING POINT
ROSSETTI


GUEST
What story would a guest tell about their experience?
"GREAT HALL"
ENTRY
SEATING
BUYING
CIRCULATION
CONCOURSE
ROSSETTI




TEAM
If you told the story through the eyes of a team member it would include...
G-LEAGUE
WSU
VISITING
COMMUNITY
ENTRY
LOCKER ROOM
PREPARE
PERFORM
ROSSETTI


A PLAYER'S
PROGRAM
PAST CURRENT FUTURE

DISCOVER VALUES

COMMUNITY

ACCESSIBLE
CORNERSTONE
PLACE MAKING
TEXTURED
INCLUSIVE
ANCHOR
ICONIC
IMPACTFUL
UNIQUENESS
PALESTRA

GUEST

PARTICIPATORY
EXTEND EXPERIENCE
WELCOMING
EFFICIENT
CLEAR WAY FINDING
HIGH ENERGY
COMFORTABLE
VISIBILITY TO COURT
REMAIN IN ACTION
OPEN / SAFE
OPTIONALITY
HISTORY FOR BOTH TEAMS
CEILING ELEMENTS

TEAM

COMFORTABLE
HISTORY
DEDICATED ENTRY
INVESTMENT
RECRUITING
SECURITY
LIGHTING
CANOPY
PROGRESSIVE
TECHNOLOGY
HANGOUT SPACE
STRETCH OUT
REHAB TREATMENT
FUNCTIONALITY

WAYNE STATE UNIVERSITY

WSU + G League Arena Program

DETROIT PISTONS

	SF	Units	Total NSF
SPECTATOR FACILITIES			19,514
EVENT FACILITIES			11,800
TEAM FACILITIES			10,968
MEDIA FACILITIES			145
OPERATIONS SUPPORT			7,655
CONCESSIONAIRE FACILITIES			1,255
CIRCULATION			17,105
BUILDING TOTAL NET S.F.			68,442
+ NET-TO-GROSS MULTIPLIER (+00%)			0
ESTIMATE OF GROSS SQUARE FOOTAGE			68,442

PROGRAM - DETAIL

SPECTATOR FACILITIES					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Spectator Seating	Approximately 3,000 seats will be provided in the basketball configuration.				
	General Admission				
	Chair Seating (20" width)	7,886	1	7,886	*Fixed seating*
	Retractable Seating Area (20" wide seats)	6,153	1	6,153	
	VIP Seating	665	2	1,330	
	ADA & Companion Seating	0	23	0	*1.0% ADA with companion seats min.(verify actual with code)included in court*
	SUB-TOTAL SPECTATOR SEATING		27	0	*Note: accommodations for wheelchair and ambulatory disabled patrons and their companions shall be provided in accordance with the ADA and distributed among all levels.*
	Men's Toilets: w.c. (1:120) + urinals (included) + lavs (1:200)	725	2	1,450	*Code minimum 20 W.C. & 8 Lavatories*
	Women's Toilets: w.c. (1:60) + lavs (1:150)	1,140	2	2,280	*Code minimum 38 W.C. & 10 Lavatories*
	Family Toilets	55	2	110	
	Drinking Fountain	0	2	0	
Guest Services/First Aid	Primary First Aid Room	150	1	150	
	Guest Service / Information	155	1	155	
SUB-TOTAL				**19,514**	
design contingency multiplier (5%)				**0**	
TOTAL				**19,514**	

TEAM FACILITIES					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
G League Home Team	Home Team Locker Room Suite				
	Locker Room with (15) 36" lockers	800	1	800	
	Wet Area (sinks, toilets and showers)	470	1	470	
	Players Lounge	0	1	0	
	Training				
	Training Room / Treatment	470	1	470	*Two Training Tables, Medical Supplies Storage, One Mobile Whirlpool*
	Coaches Suite				
	Coaches Office & Showers	355	1	355	*Minimum Six Lockers*
	Equipment				
	Team Equipment Storage	188	1	188	*Adjacent to Shared Laundry*
	SUB-TOTAL G LEAGUE HOME TEAM			2,283	
WSU Basketball Offices	Head Coach Office	130	1	130	
	Head Coach Office	120	1	120	
	Office	100	4	400	
	Conference Room	210	1	210	
	Open Office	645	1	645	
	Film Room	515	1	515	*Tiered seating for 24, telestrator control for large screen*
	SUB-TOTAL WSU BASKETBALL OFFICES			2,020	
WSU Basketball Teams	WSU Basketball Team Locker Room Suite				
	Locker Room with (15) 36" lockers	760	2	1,520	*Men's and women's*
	Wet Area (sinks, toilets and showers)	455	2	910	*Men's and women's*
	Training Room / Treatment (Shared w/ G-league)	0	2	0	*Men's and women's*
	Coaches Suite				
	Coaches Lockers	355	2	710	*Men's and women's*
	Equipment				
	Team Equipment Storage	125	1	125	*Shared between men's and women's*
	Laundry Room	275	1	275	*Shared with G League laundry*
	SUB-TOTAL WSU BASKETBALL TEAMS			3,540	
Visiting Team	Visiting Team Locker Room Suite				
	Locker Room with (15) 36" lockers	650	2	1,300	
	Wet Area (sinks, toilets and showers)	315	2	630	
	Training Room / Treatment	235	1	235	
	Coaches Suite				
	Coaches Office & Showers	235	1	235	
	SUB-TOTAL VISITING TEAM			2,400	
Officials Lockers	Officials Locker Room Suite				
	Locker Rooms with Wet Area (sinks, toilets and showers)	300	2	600	*Per negotiation with G League from other projects. Min. 4 Lockers*
	Conference Rm	125	1	125	*Per negotiation with G League from other projects*
	SUB-TOTAL OFFICIALS LOCKERS			725	
Auxiliary Lockers	Additional locker room for Tournaments and Concert				
	Locker Rooms with Wet Area (sinks, toilets and showers)	0	0	0	
	SUB-TOTAL AUXILIARY LOCKERS			0	
SUB-TOTAL				**10,968**	
design contingency multiplier (5%)				**0**	
TOTAL				**10,968**	

EVENT FACILITIES					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Event Floor	Basketball Competition: 50' x 94' playing court; 70' x 134' clear Basketball Practice: (2) courts	11,800	1	11,800	Verify if G-League Court will be portable over WSU court
SUB-TOTAL				**11,800**	
design contingency multiplier 0%					

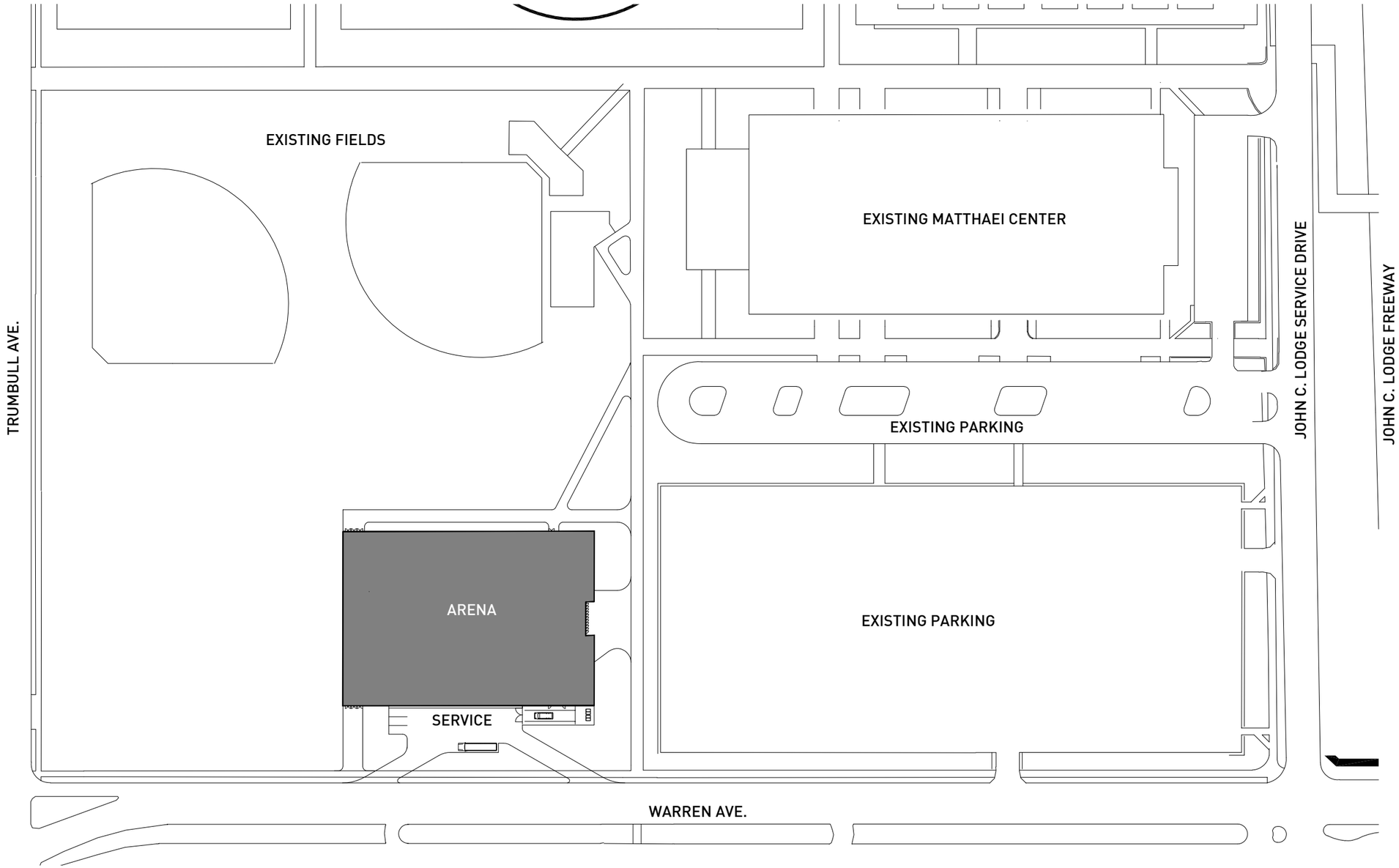
MEDIA FACILITIES					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Press/Media	Writing Press / Interview Room	500	0	0	*film room / aux*
	Broadcast Booth(s)	80	0	0	*Courtside*
	Public Announcer Booth	80	0	0	*Courtside*
Operations	Broadcast Control Room	145	1	145	
Camera Locations	Fixed camera boxes/platforms	100	0	0	*per G league*
SUB-TOTAL				**145**	
design contingency multiplier (5%)				**0**	
TOTAL				**145**	

OPERATIONS SUPPORT					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Maintenance	Facility Management Office	190	1	190	
	Maintenance Shop	435	1	435	
	Janitor's Closet (distributed)	0	0	0	
Security Office	Security and Fire Command Center	185	1	185	
	Event Security	0	0	0	*Located in Video Surveillance Room*
Storage	General Storage	0	1	0	*10'w X 10' H Roll Up Door Opens to Court*
	Low Headroom Storage	615	1	615	
	Event Storage (portable floor, basketball hoop, stage, etc.)	600	1	600	*Verify if G-League Court will be portable over WSU court*
Dock / Staging	Loading / Receiving	0	0	0	*Confirm Location of 10'w X 10' H Roll up Door*
Event Operations	Event Staff Offices and Work Area				
	Ticket Offices	415	1	415	*4 windows+ manager room with view to sales, floor mounted safe*
	Event Staff Lockers	300	1	300	
M/E/P	M/E/P Spaces				
	MDF	100	1	100	*WSU standards min. size 10'x12'*
	Fire Pump / Water Service	315	1	315	
	M/E/P/IT etc.	350	1	1,500	
	SUB-TOTAL M/E/P			1,915	
MEP Mezzanine		3,000	1	3,000	
SUB-TOTAL				**7,655**	
design contingency multiplier (5%)				**0**	
TOTAL				**7,655**	

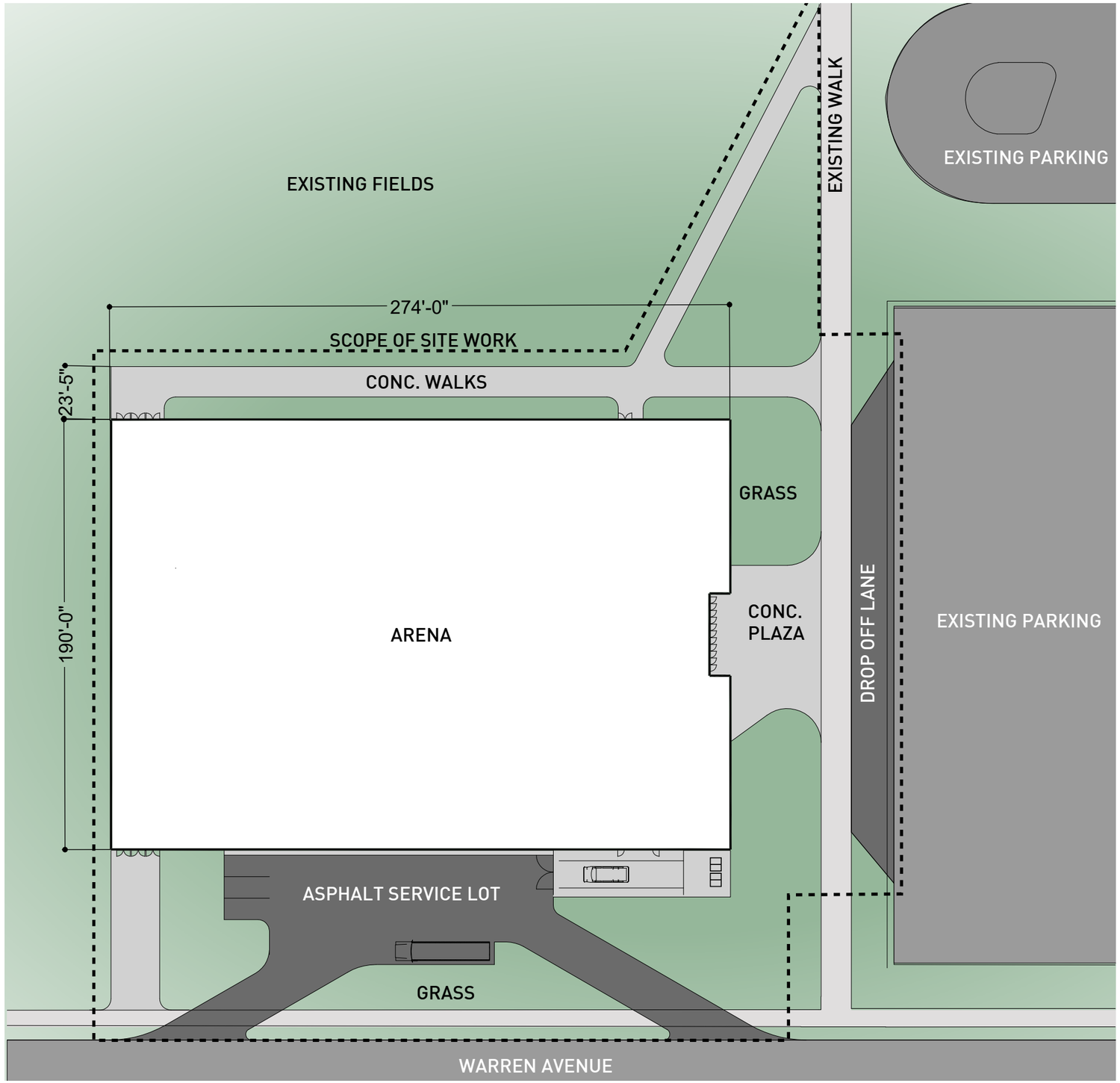
CONCESSIONAIRE FACILITIES					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Concession Stands	Concession Stands	480	2	960	*Cooking in one stand, white box in the other.*
	Portable Concession Stands	0	0	0	
Food Service Support	Food Service Storage	0	0	0	*Located in Concession Room*
Retail Sales	Retail Shop	295	1	295	*Adjacent to Concourse*
Hall of Fame	Hall of History	0	0	0	*Located in concourse*
SUB-TOTAL				**1,255**	
design contingency multiplier (5%)				**0**	
TOTAL				**1,255**	

CIRCULATION					
Space Type	**Room Description**	**SF**	**Units**	**Total NSF**	**Comments**
Entrances and Lobbies	Main Entry Vestibules	565	1	565	
	G League Entry	0	1	250	
	Visiting Team Entry	0	1	0	
	WSU Team Entry	0	1	0	*Located in WSU Team Office*
	Staff Entry	165	1	165	
Concourse	Main Concourse	11,675	1	11,675	
Corridors	Exit Corridor	170	1	170	
	BOH Corridor Ground Floor	525	1	525	
	Event Corridor - North	1,260	1	1,260	
	Event Corridor - South	1,125	1	1,125	
Vertical Circulation	Stairs Event Level	250	2	500	
	Stairs Event Level	350	2	700	
	No. of 2500 lb. Passenger/Service Elevators: 1	80	1	80	
	Elev. Machine Rm.	90	1	90	
SUB-TOTAL				**17,105**	
design contingency multiplier (5%)				**0**	
TOTAL				**17,105**	

SITE LOCATION

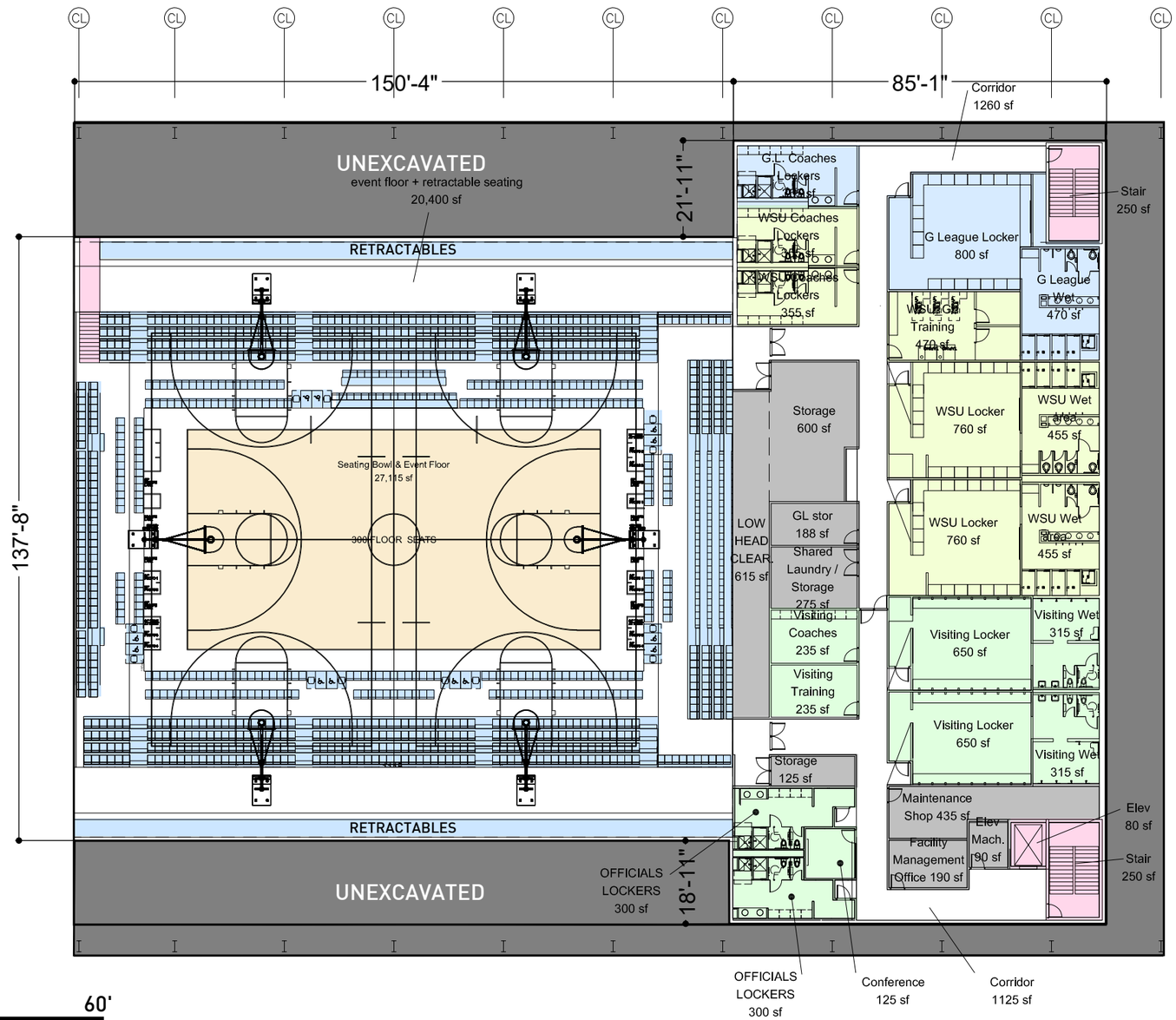


SITE PLAN



SCALE 25' 50' 100'

PLAN| EVENT LEVEL



TOTAL AREA EVENT LVL:
15,200 S.F.

(COURT AND STADIA AREA APPLIED TO CONCOURSE S.F. SEE NEXT PAGE)

SCALE 15' 30' 60'

GENERAL NOTES:

1. ALL INTERIOR WALLS GYPSUM BOARD WITH CORNER GUARDS.
2. UNLESS NOTED OTHERWISE ALL FLOORS SEALED CONCRETE
3. UNLESS NOTED OTHERWISE ALL CEILINGS EXPOSED PAINTED
4. ALL DOORS PAINTED HOLLOW METAL

WSU/G-LEAGUE TEAM, COACHES, OFFICIAL LOCKERS:

FLOORS: CARPET TILE, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY-IN ACOUSTIC CEILING TILE
LOCKERS: PLASTIC LAMINATE
WET AREAS:
FLOORS: TILE
SHOWER WALLS: TILE
COUNTER: SOLID SURFACE

HOME TRAINING:

FLOORS: VCT, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACT
MILLWORK: PLASTIC LAMINATE

VISITING TEAM AND COACHES LOCKERS, TRAINING:

FLOORS: CARPET TILE, RUBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: EXPOSED
LOCKERS: NONE, BENCH WITH HOOKS
WET AREAS:
FLOORS: TILE
SHOWER WALLS: TILE

EGRESS STAIRS:

METAL PAN WITH CONCRETE

COURT FLOORING

BASIS OF DESIGN: CONNOR FOCUS RESILIENT

PLAN | CONCOURSE

TOILETS:

FLOORS: SEALED CONC.
WALLS: PAINTED GYP. BD.
CEILING: EXPOSED
PARTITIONS: PHENOLIC
FULL HEIGHT MIRROR EXIT ONLY

VIP AREA:

FLOORS: CARPET
WALLS: PAINTED GYP HALF
CEILING: EXPOSED
MILLWORK: PLASTIC LAM.

TELESCOPIC SEATING:

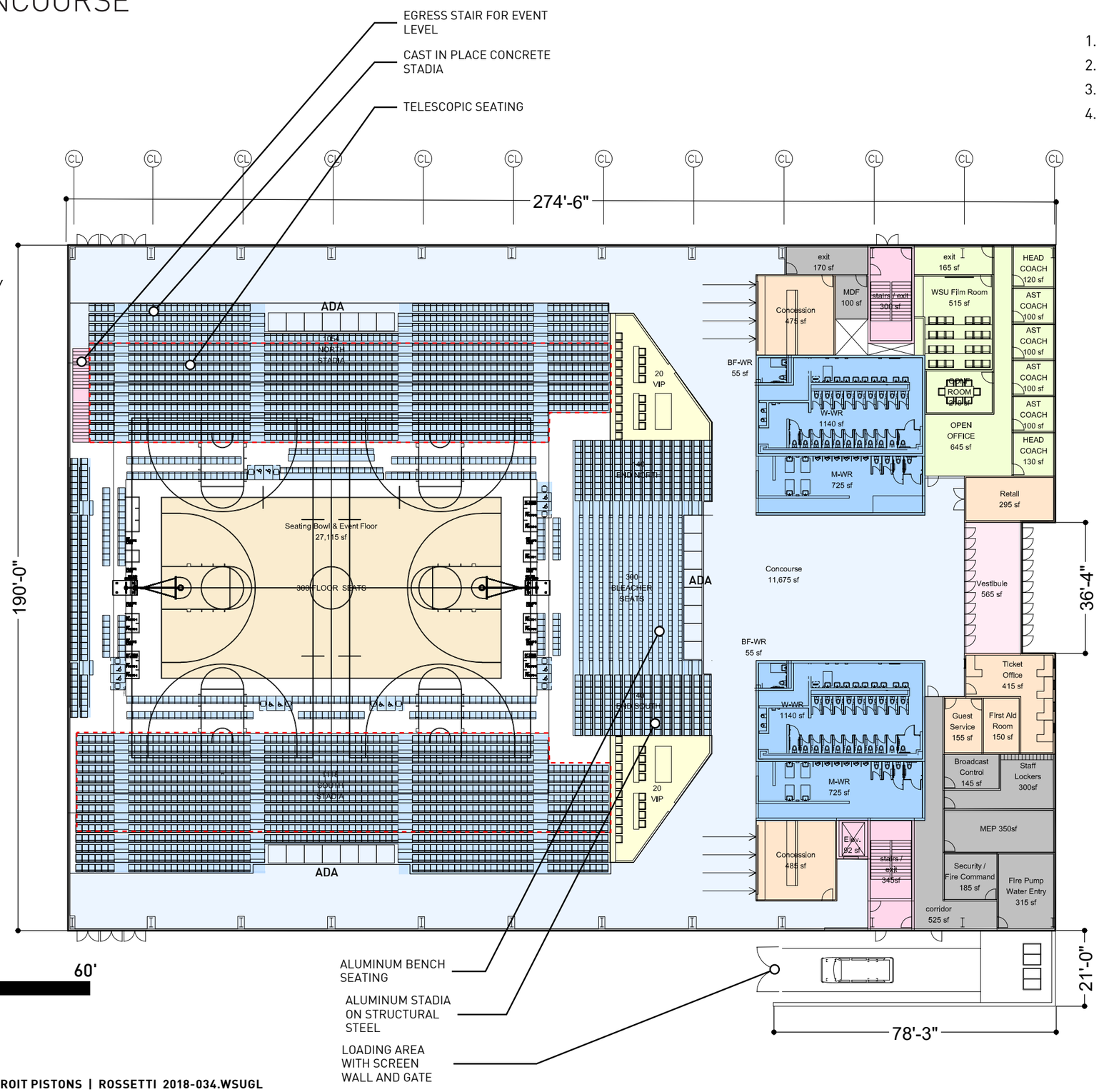
HUSSEY - MAXAM
WITH 20" METRO CHAIRS

TOTAL SEATING:
3,000

TOTAL AREA CONCOURSE:
51,700 S.F.

(INCLUDES COURT AND STADIA)

TOTAL BUILDING AREA:
68,442 S.F.



SCALE 15' 30' 60'

GENERAL NOTES:

1. ALL INTERIOR WALLS GYP BD. WITH CORNER GUARDS.
2. UNLESS NOTED OTHERWISE ALL FLOORS SEALED CONCRETE
3. UNLESS NOTED OTHERWISE ALL CEILINGS EXPOSED PAINTED
4. ALL DOORS PAINTED HOLLOW METAL U.N.O.

WSU OFFICES:

FLOORS: CARPET TILE, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACT
VIDEO ROOM:
RAISED PLATFORMS
RELOCATE EXISTING CHAIRS FROM MATTHAEI
MILLWORK: PLASTIC LAMINATE

RETAIL:

FLOORS: CARPET TILE, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACOUSTIC CEILING TILE

ENTRY VESTIBULE:

FLOORS: WALK-OFF CARPET, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: GYPSUM BOARD PAINTED

TICKET OFFICES:

FLOORS: CARPET TILE, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACOUSTIC CEILING TILE
MILLWORK: PLASTIC LAMINATE

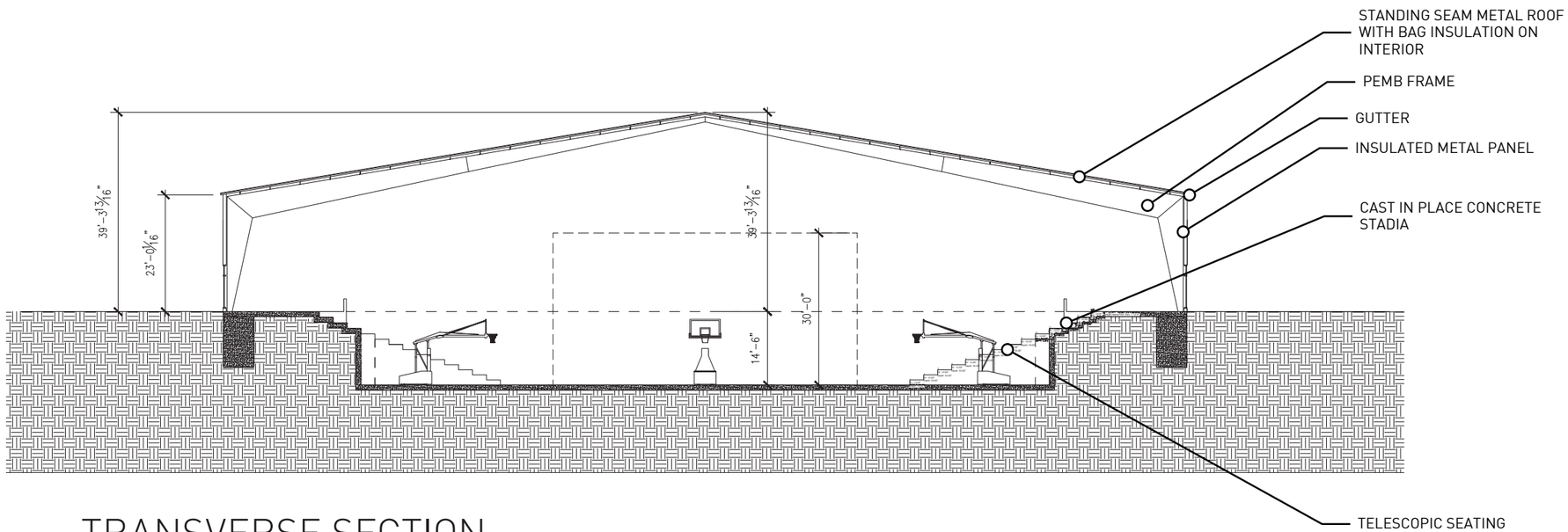
GUEST SERVICE/FIRST AID:

FLOORS: VCT, RUBBER BASE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACOUSTIC CEILING TILE
MILLWORK: PLASTIC LAMINATE

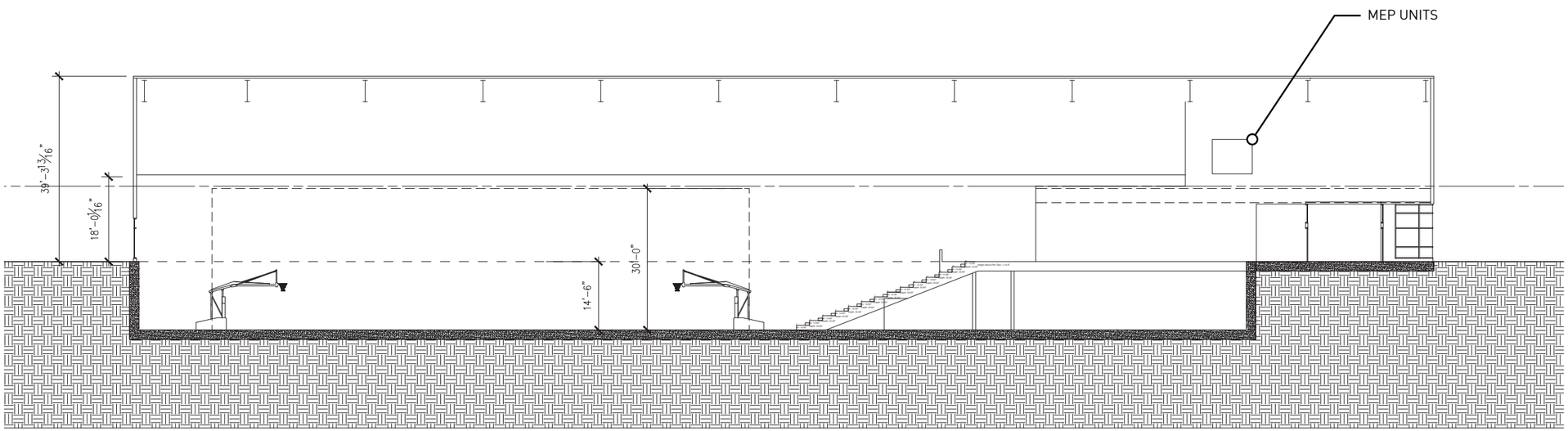
CONCESSION STANDS:

FLOORS: EPOXY, RUBBER BASE WITH COVE
WALLS: PAINTED GYPSUM BOARD
CEILING: 2X2 LAY IN ACT VINYL FACED
COUNTERS: STAINLESS STEEL
OVERHEAD COILING DOOR PTD. STEEL

BUILDING SECTIONS

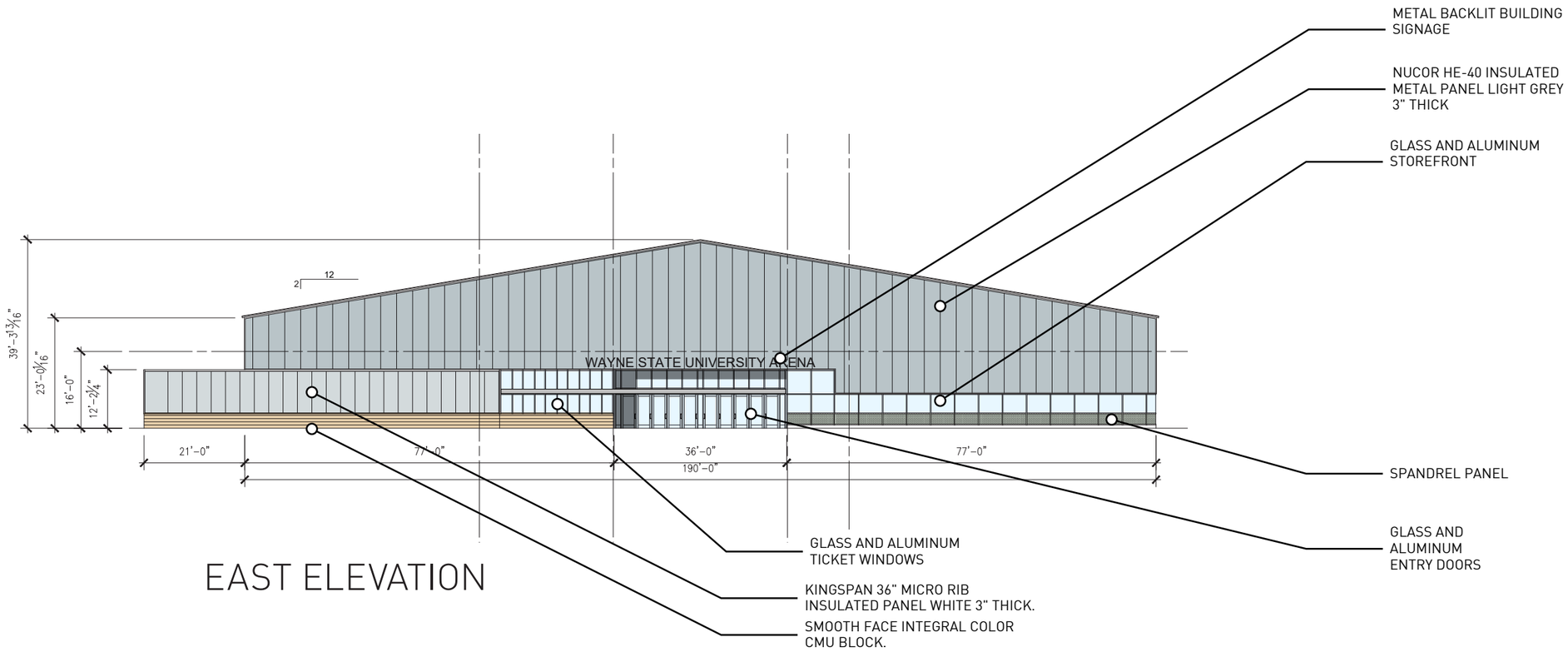


TRANSVERSE SECTION

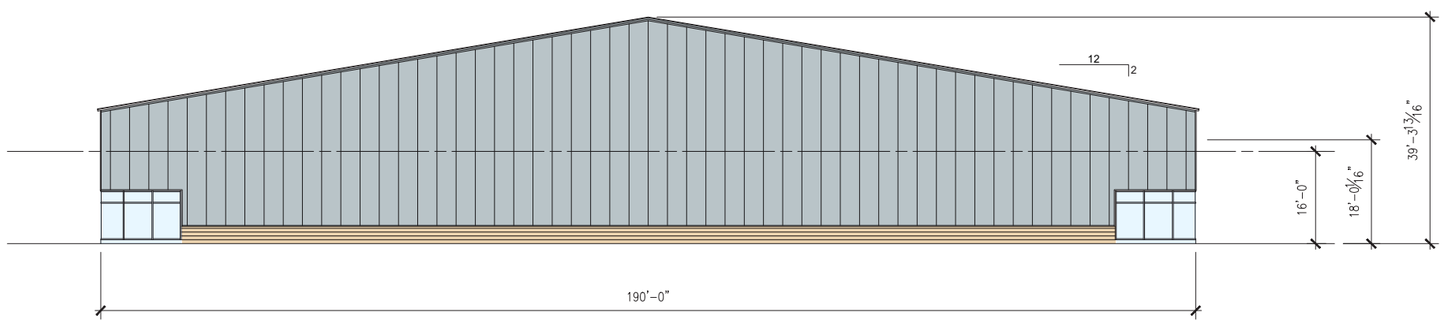


LONGITUDINAL SECTION

EXTERIOR ELEVATIONS

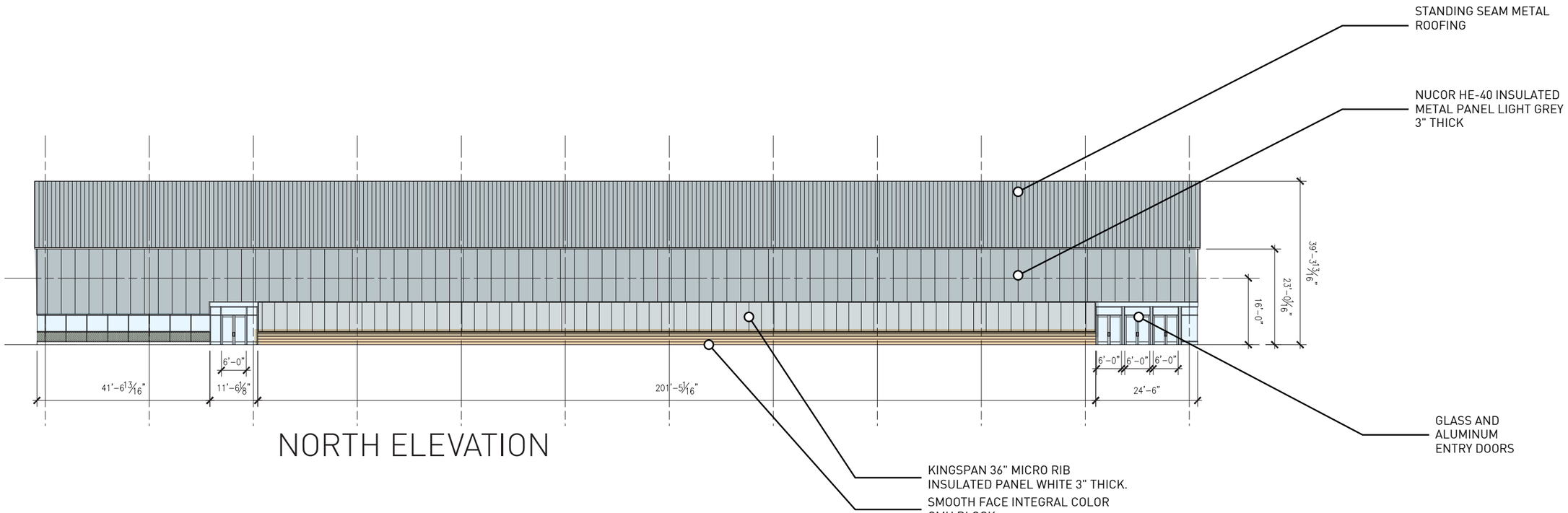


EAST ELEVATION

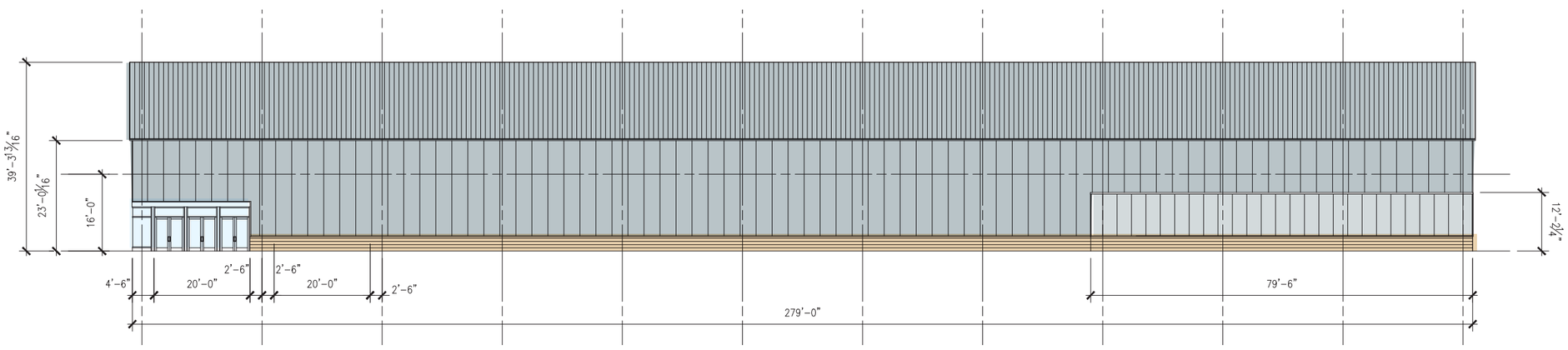


WEST ELEVATION

EXTERIOR ELEVATIONS



NORTH ELEVATION



SOUTH ELEVATION

General Description

The building program consists of design and construction of a new depressed bowl arena facility with approximate square footage and usages as follows:

- Spectator Facilities – Gross area approximately 19,500 SF
- Event Facilities – Gross area approximately 11,800 SF
- Team Facilities – Gross area approximately 11,000 SF
- Operations Support – Gross area approximately 7,650 SF
- Concessionaire Facilities – Gross area approximately 1,250 SF
- Circulation – Gross area approximately 17,100 SF
- Total building area – Gross area approximately 68,400 SF

The general layout of the structure is proposed as a Stacked configuration as shown in Sketches 1 and 2 along with expected construction types for the highlighted areas. The structure is proposed as a Pre-Engineered Manufactured Building (PEMB) designed and constructed by a contractor qualified and experienced in the type of construction consistent with the project scope and performance requirements.

Main Roof Structural Framing System

The main roof structural framing system consists of steel purlins spanning between steel portal frames designed and fabricated by a PEMB contractor and bearing on shallow foundations designed by Desai Nasr Consulting Engineers Inc. (DNCE). Bay spacing of the portal frames is expected to be selected based on the building configuration, and economy as it relates to the use of off the shelf purlin stock lengths. PEMB columns lengths for take-off and estimation purposes shall be assumed to extend -1’-4” below the reference finish floor elevation in order to conceal the baseplates and permit the installation of a column cover flush with the floor slabs. PEMB columns are required to be considered as pinned at the bases for the purposes of design.

The PEMB structure is required to be designed to accommodate all architectural, mechanical, electrical, and plumbing appurtenances including but not limited to: MEP equipment either supported or hung from the roof, misc. catwalks as required to facilitate mechanical equipment maintenance, mechanical screen walls, score boards, signs, partitions framed above the concourse level that require support at the head, stadia seating attachments where required for stability, and façade support.

Because of the length of this building, A horizontal expansion joint may be necessary to be built in to the building to avoid any detrimental effects to the façade and cladding elements from cyclical thermal expansion and contraction. The horizontal expansion joint type – if required – is to be determined by the pre-engineered building contractor and indicated as such on their plans and reflected in their loads.

Lateral Load Resisting System

Lateral loads from wind and seismic forces applied to the PEMB are required to be resisted by a combination of portal frames and braced frames.

The lateral drift of the PEMB shall be limited to H/80 for drift perpendicular to any exterior wall. This lateral drift limit shall be coordinated with both the PEMB contractor and the wall panel contractor to ensure adequate movement joints are provided to prevent performance problems with the façade panels.

Foundation System

A site-specific geotechnical investigation is required to be performed by a qualified geotechnical engineer to provide information for the design of the foundation system. Shallow foundations are expected to be used at the PEMB columns approximately at grade. At these locations, conventional spread footings are expected to be used as indicated in Sketches 3 and 4. The shallow spread footings are required to be reinforced with steel and extend a minimum of 42” below adjacent grade. Additional depth may be required to resist sliding forces and depending on local soil conditions. To accommodate the frost depth requirement, two (2) courses of 10” CMU could be used which would also reduce the required concrete placement and forming requirements associated with the sill conditions. Interior footings are required to bear at a minimum depth as indicated in the geotechnical report. At locations where fill soils are encountered, removal and replacement of fill soils with engineered fill is required.

At exterior walls, both bearing and non-bearing, continuous strip footings are expected to be used at locations not coincident with retaining walls. These strip foundations are expected to be reinforced in the longitudinal direction and as required for shear.

The slab at the concourse level is expected to be a slab on grade conventionally reinforced with welded wire fabric. Control joints are required at +/- 15’-0” O.C. to control cracking. A shrinkage inhibiting admixture or Type K cement is recommended to be used to further mitigate unintended shrinkage cracks.

Based on local soil conditions and ground water table levels, the slab at the event level may require support for gravity and hydrostatic forces. It is unknown at this time if the site is located in a favorable geological position relative to the undulating moraine of bearings clays prevalent in the downtown Detroit area. If the depth of the excavation for the event level is suitably above the clay bearing soils and the ground water table is lower than the slab; the slab can likely be founded on grade, with shallow foundations used to support the concourse floor framing elements and retaining walls. Otherwise a deep foundation system is required to resist gravity and hydrostatic uplift forces. If a deep foundation system is required, it is expected to be comprised of a combination of drilled piers and helical piers for economy or rammed aggregate piers/rigid inclusions. Based on previous geotechnical evaluations performed in this area, the clay bearing soils are expected to disappear in the range of 15-20ft below grade.

Concourse Level Framing System

The framing system at the concourse level is proposed to be 8”, 10”, or 12” pre-topped hollow core precast planks spanning between masonry bearing walls. At the vestibule and entrance, solid precast planks are proposed for integrity and potential exposure to the environment. The foundation system for these bearing walls is unknown to be shallow or deep according to the conditions described in the Foundation System section of this narrative. Stairs opening are expected to be framed with 8” masonry with conventional stair construction by the stair contractor.

Stadia Seating

The stadia seating is expected to be comprised of both retractable and fixed construction. The retractable construction is expected to be light weight aluminum with lateral support provided by the adjacent retaining walls and PEMB structure as required. The fixed construction is expected to consist of cast in place concrete reinforced for both applied loads and crack control performance. At the fixed construction, a shrinkage inhibiting admixture or Type K cement is recommended to be used to further mitigate unintended shrinkage cracks. As an option at the fixed construction, precast seating can be evaluated for savings to both cost and schedule.

STRUCTURAL NARRATIVE

Design Loads

Design loads are not available at the time of the issuance of the structural narrative. Foundations types and loads are assumed until further direction is provided by the PEMB contractor and geotechnical engineer. Design loads to the foundation system will be provided to DNCE by the PEMB contractor

The PEMB contractor is required to provide all gravity and lateral loads at the bases of columns and walls – as applicable – to DNCE for the design of the foundation system and related structural elements. Structural design work by DNCE cannot proceed without column reactions from the PEMB contractor that are guaranteed to not change by greater than 5%.

Building Codes

The foundation, event, and concourse level structures shall be designed in accordance with:

- Michigan Building Code and IBC 2015
- American Concrete Institute – ACI 318 “Building Code Requirements for Structural Concrete”
- America Institute of Steel Construction – AISC 14th Edition Steel Construction Manual – Allowable Stress Design (ASD)

Materials and Specifications

1. Concrete:
   All concrete work shall conform to the requirements of ACI 301 current edition “Specifications for Structural Concrete for Buildings” and ACI 318, “Building Code Requirements for Reinforced Concrete”.

   Concrete shall have a minimum 28-day compressive strength as follows:

Footings and foundations including walls:	4,000 psi
Drilled-pier foundations	4,000 psi
Slab on grade:	3,000 psi
Supported Slab:	4,000 psi
Exterior concrete:	4,000 psi

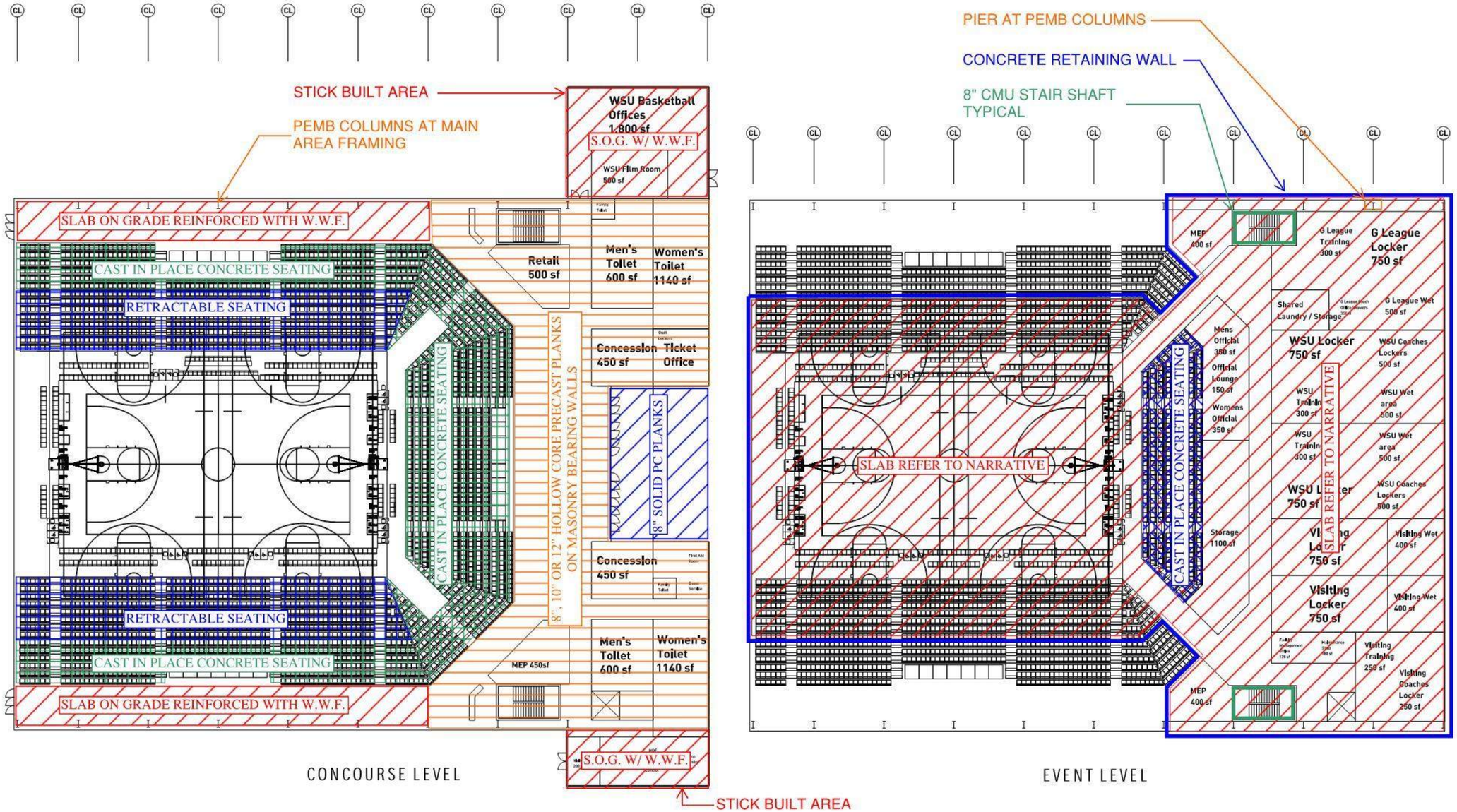
   Exterior concrete shall be air entrained, 6% ± 1%

2. Reinforcing Steel:
   Reinforcing steel including welded wire fabric shall conform to ASTM A615, grade 60 fabricated and placed according to ACI 315, “Details and Detailing of Concrete Reinforcement”, and ACI 315R, “Manual of Engineering and Placing Drawings for Reinforced Concrete Structures.”

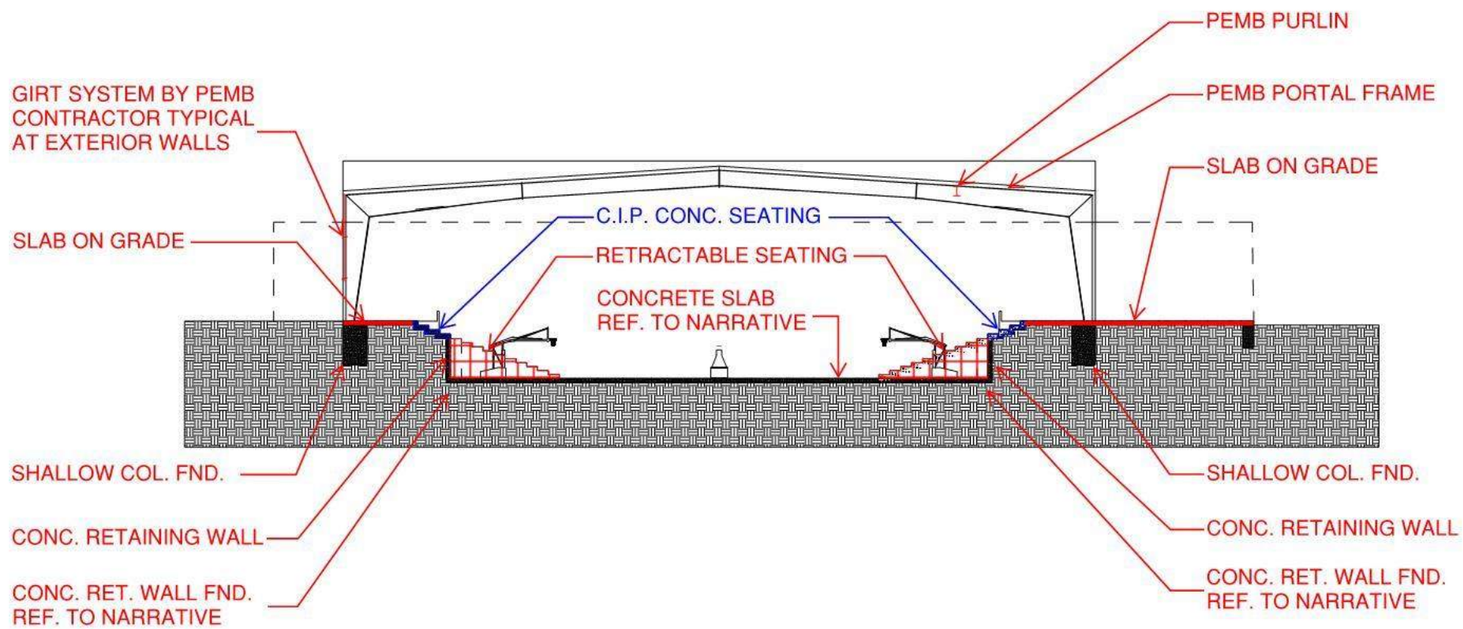
3. Structural Steel Anchors:
   All structural steel shall be designed, fabricated and erected in accordance with the “Manual of Steel Construction”, of the American Institute of Steel Construction. The following materials shall be used:

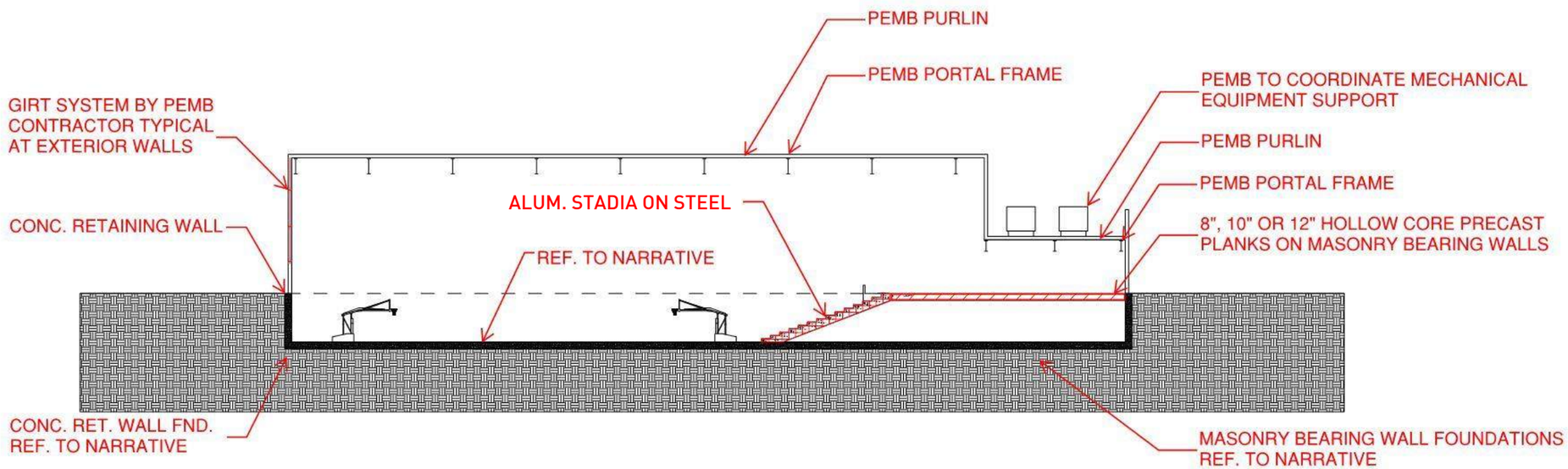
Bolts	ASTM A325 or A490
Anchor rods	ASTM F-1554, grade 55
Welding electrodes	E70XX, low hydrogen
Headed studs	ASTM A108

STRUCTURAL NARRATIVE

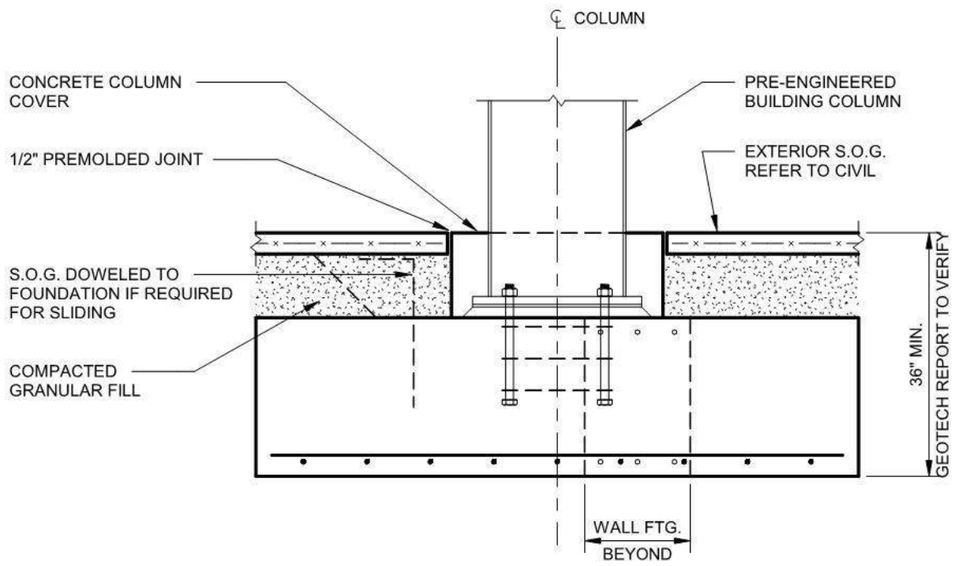


SKETCH 1 - STACKED CONFIGURATION PLANS

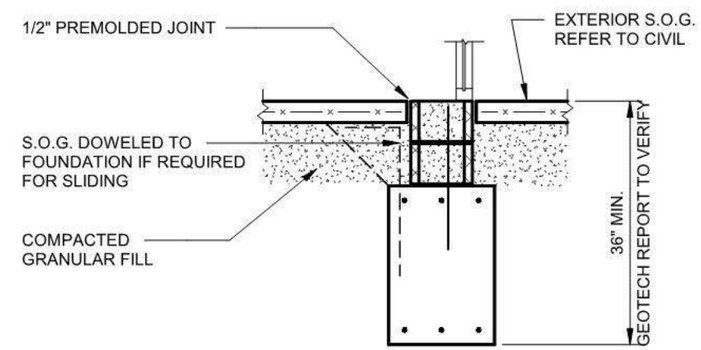




SKETCH 2 - STACKED CONFIGURATION SECTIONS



SKETCH 3 - TYPICAL EXTERIOR COLUMN SHALLOW FOUNDATION CONCEPT



SKETCH 4 - TYPICAL EXTERIOR WALL SHALLOW FOUNDATION CONCEPT

1.1 GENERAL

A. General:

1. A fully functional HVAC system will be provided that is in compliance with all governing documents and codes. The systems will provide occupant comfort, indoor air quality, acceptable noise levels, energy efficiency, reliable operation, and ease of maintenance. All equipment, piping, insulation and accessories shall be commercial grade.

B. Codes and Standards:

1. All systems shall be designed in accordance with all applicable codes and standards including but not limited to:

   a. 2015 Michigan Building Code and all related references

   b. 2015 Michigan Plumbing Code and all related references

   c. 2015 Michigan Mechanical Code and all related references

   d. 2015 International Fuel Gas Code

   e. Michigan Energy Code (ASHRAE 90.1-2013 with State of Michigan amendments)

   f. SMACNA DCS

C. Calculations:

1. Computerized load calculations for all spaces will be provided to determine the proper equipment and distribution sizing.

2. Building energy calculations will be completed to show compliance with The Michigan Energy Code. All products specified will meet or exceed the minimum energy requirements of the code.

3. All piping and ductwork will be sized to comply with codes and standards and in accordance with good engineering practices.

D. HVAC Design Conditions:

1. Outdoor Design Conditions
   Winter: 0°F/ 0% RH (use -10 for 100% OA unit capacity)
   Summer: 90.4°F DB/73.8°F WB (ASHRAE 0.4 %)

2. Indoor Design Conditions
   Winter: All occupied spaces 72°F DB at three feet above the finished floor/ no minimum humidity control.
   Summer: 75°F DB/ 50% RH

3. Utility Spaces (Heated and Ventilated)
   Winter: 60°F DB
   Summer: l0°F above outside ambient

4. Required noise levels:
   Concourses, Concessions and other Public Spaces: NC/RC 45
   Back of House: NC/RC 45
   Office/Locker Areas: NC/RC 35

5. Internal loads will be based on:
   1.0 W/sf in bowl area.
   1.25 W/sf offices
   1.0 W/sf lockers, meeting and other multi-use spaces.
   Kitchen, exercise rooms, elevator rooms, IT rooms, shall be based on proposed equipment.

6. Lighting Loads: Based on actual lighting layout.

7. Minimum outdoor airflow ventilation rates will be provided in accordance with the Michigan Mechanical Code. The building will be maintained at a slight positive pressure.

E. HVAC Systems:

1. The building will be served by variable air volume (VAV) HVAC systems with hot gas reheat dehumidification for the bowl area and hot water reheat for other areas. VAV Air handling units will be located in the building mechanical mezzanine. Intake and relief louvers will be provided in the building exterior. Each unit will be a 4” double wall insulated unit and will have a return or relief fan with variable frequency drives, return air/outdoor air mixing box, MERV 8 pre-filter section and MERV 12 secondary filters, direct expansion cooling coil with VS digital compressors and stainless-steel drain pan, supply air fan with variable frequency drive, hot water coil with circulating pump and enthalpy economizer. The air handling units will have hinged access doors and all fans will have vibration isolation. Remote condensing units will be located outdoors. The bowl units may also require energy recovery per the Michigan Energy Code, based on the hours of operation. The energy recovery would reduce the size of the boilers and condensing units. Proposed manufacturers are Trane, Daikin, and JCI York.

2. The bowl/concourse area will be served by two 100-ton single zone VAV air handling units. The units will utilize demand-controlled ventilation (CO2 Sensors) to modulate outdoor air volume to match the arena population. The speed of the unit will vary based on loads, humidity control and the occupancy. There will be large single point returns to the units from the bowl area. The bowl will be maintained at a slight positive pressure to prevent infiltration.

3. The locker room and support office spaces will be served by two 50-ton VAV units air handling with zoned VAV boxes with hot water reheat coils. Supply air will be distributed to pressure-independent VAV boxes with hot water reheat coils. Building HVAC zoning will include separate zones for each room type and for each exposure. Each locker will be zoned independently to allow for variable occupancy.

The return air system will be a plenum return to main duct for each area as applicable.

4. Locker rooms will be fully exhausted. Each locker room will be controlled independently and can be in occupied or unoccupied modes. Locker exhaust fans will have VFDs to allow for the varying occupancy. Exhaust systems will have discharge louvers.

5. Toilet rooms will be exhausted at the code required quantities. Transfer air from the bowl will provide make-up air. Exhaust systems will have discharge louvers.

6. Grease exhaust will be provided for concession area. Transfer air from the bowl will provide make-up air and ventilation.

7. Dedicated split system air conditioning units will be provided for all Communication and Elevator Equipment Rooms. Condensing units will be located on the building roof. Moisture detectors will be provided in the rooms along with temperature sensors to report back to the building BMS.

8. Hot water cabinet unit heaters will be provided in all entryways and stairwells.

9. Heating hot water will be generated by three 2,5000,000 btu/hr high efficiency condensing boilers, each sized for 40% of the building load, Three pumps, each sized for 50% of the total flow, with variable frequency drives will be provided. The boilers will have high turn down and be monitored by the building BMS

10. Ventilation systems will be provided for all electrical, mechanical and utility rooms with exhaust fans with discharge louvers and intake louvers. Rooms will have electric or hot water unit heaters.

11. Controls Systems: A complete digital controls system will be provided. The system will control all mechanical equipment and monitor miscellaneous points. The controls will include a fully integrated BACnet Mechanical Control System incorporating electric, and direct digital control components for the control and monitoring of heating, ventilating and air conditioning equipment and other related systems. The system will use distributed local controllers that will natively use the most current ANSI/ASHRAE Standard 135 for communications and shall be BTL certified with BTL published PIC statements. The system will be able to communicate with the Wayne State University Siemens front end systems and be internet based.

12. Alternate Heating System: In lieu of utilizing hot water heat, gas heat exchangers on air handling units and electric resistance heat for reheat and entryway heating may be considered.

F. Materials:

1. Heating Hot Water: Type L copper with soldered/brazed or pro-press joints.

2. Ductwork: All galvanized G90 in accordance with SMACNA DCS. Shower/Locker exhaust – aluminum first 20 feet.

3. A minimum of 18” high insulated equipment curbs will be provided for all roof mounted equipment.

4. NEMA premium efficiency Motors will be provided. Induction duty motors will be provided for all variable frequency drives and include Aegis grounding rings.

5. 4” thick concrete equipment pads will be provided under all equipment

G. Maintenance and Durability:

1. All equipment will be selected for durability and ease of maintenance. Access doors are to be provided, equipment required clearances are maintained including coil pull areas, and housekeeping pads are provided for all equipment.

PLUMBING

A. General:

1. A fully functional plumbing system will be provided that is in compliance with all governing documents and codes. The system will provide energy efficiency, reliable operation, and ease of maintenance. All equipment, piping, insulation and accessories shall be commercial grade.

2. All building service entrances will be coordinated with utility companies and the civil engineer.

B. Codes and Standards:

1. All systems will be designed in accordance with all applicable codes and standards including:

a. 2015 Michigan Building Code and all related references

b. 2015 Michigan Plumbing Code and all related references

c. 2015 Michigan Mechanical Code and all related references

d. 2015 International Fuel Gas Code

e. Michigan Energy Code

C. Plumbing Systems

1. Domestic Water: A complete domestic hot and cold-water distribution system will be provided for the building. A 4” water service will be provided to the building. A reduced pressure backflow prevention device and water meter on the domestic service in accordance with the City of Detroit Water Department will be provided. Additional backflow devices as required by code will be provided where required. A domestic water booster pump is not anticipated, but water pressure tests will be requested to verify that adequate pressure exists. Piping will be provided to all fixtures and appliances.

2. A complete domestic hot water system that includes two high efficiency stainless steel condensing gas fired water heaters, circulation pumps and accessories will be provided. The hot water generation system will be located in the mechanical room. Domestic hot water will be generated at 140°F and mixed to 110°F at fixtures. Piping will be provided to all fixtures and appliances. Concessions will

have dedicated high efficiency gas fired heaters, sized to comply with the Michigan Department of Health requirements.

3. Sanitary Waste: A complete sanitary waste and vent system in accordance with The Michigan Building Code, will be provided. Which includes all piping, hangers, cleanouts, drains, and other required accessories: An 8” sanitary sewer will serve the building. The sanitary piping system will include collection from all fixtures, drains and other outlets. If invert elevations require, a basement drainage system will be provided that collects fixtures and floor drains from the basement into a sump that will be pumped into the sanitary sewer leaving the building. A duplex grinder sanitary lift station with control panel that has high level contacts to the BMS system will be provided. An elevator sump pump sized in accordance with the Michigan Elevator and Plumbing codes will also discharge into the sanitary lift station. If the elevator is hydraulic, an oil/water separator will be provided. Local grease interceptors will be provided at concession stands.

4. Storm Drainage: A complete storm and overflow drainage system will be provided in accordance with the Michigan Building Code will be provided that will collect roof drainage from the building. The system will include connections from gutters to the storm sewer system and roof sumps and overflows in canopies and other flat roof areas. Storm drainage from the building will be collected in a gutter system provided by the pre-manufactured building manufacturer. A complete independent overflow drainage system will be provided that will discharge out the side of the building on the first floor. A drainage system will be provided that collects subsoil drainage (drain tile) into a sump that will be pumped into the storm sewer leaving the building. A duplex storm lift station with control panel that has high level contacts to the BMS system will be provided.

5. Natural Gas: A complete natural gas piping system will be provided in accordance with the International Fuel Gas Code and Detroit Edison will be provided. The service entrance will be coordinated with Detroit Edison for required metering, regulators. Gas will be distributed throughout the building at 2 PSI to rooftop units, boilers, water heaters and other appliances. Regulators will be provided at all equipment and vented if necessary.

6. Plumbing Fixtures:

   a. Low Flow (1.28 gpf) flush valve wall hung water closets. Battery Auto-Flush.

   b. High efficiency (0.5 gpf) siphon jet urinals. Battery Auto-Flush

   c. Low Flow China lavatories. Metering Faucets in public areas.

   d. Commercial 2.5 GPM showers and mixing valves. Mounted at 7’-6”.

   e. Terrazo janitor basins.

   f. Kitchen equipment per food service program _TBD.

   g. Secure fixtures to walls and floors or countertops in accordance with manufacturer's rough-in requirements and form a rigid installation.

   h. Vacuum breakers shall be provided at all outlets with hose connections.

   i. 3" minimum floor drains with trap seals shall be provided in all restrooms and concessions.

   j. Floor sinks shall be provided in all concessions and kitchens.

FIRE PROTECTION SYSTEMS

A. General:

1. A fully sprinklered building with in accordance with the Michigan Building Code, NFPA 101, NFPA 12, 13, the Owner's insurance company, and the Authority having jurisdiction will be provided. A 6” fire service will be provided for the building with required backflow prevention. A fire pump is not anticipated, but water pressure tests will be requested to verify that adequate pressure exists. A fire department connection will be provided outside the building.

ELECTRICAL NARRATIVE

PART 1 - GENERAL

1.1 GENERAL

A. Scope:

1. This electrical scope narrative is intended to provide general direction for the design and initial cost budgeting for the building electrical systems.

B. Work Included:

1. The electrical work shall comply with architectural, structural, and mechanical requirements and all documents referred to therein.

2. The work will be installed in compliance with all local, state and national codes as appropriate for work within the City of Detroit, Michigan.

C. System Scope:

The following list of systems and components are included within this narrative:

- Site Distribution
- Secondary Distribution
- Emergency Power System
- Mechanical Equipment & Connections
- Branch Power Receptacles & Connections
- Concession Power & Connections
- Lighting & Lighting Control
- Fire Alarm System
- Communication System (Reference Technology Narrative
- Security System (Reference Technology Narrative

PART 2 - DESCRIPTION

2.1 DESCRIPTION OF WORK

A. Site Distribution:

a. The main power service to the arena will consist of 1200amp, 277/480v, 3 phase secondary metered from a DTE pad mounted transformer.

b. Location of the DTE transformer will be coordinated with DTE planners and site plan.

c. Power service capacity is based on the following connected loads:

1. Lighting: 150 KVA
2. Receptacles and miscellaneous: 250 KVA
3. HVAC – 300 tons and ventilation: 500 KVA
4. Spare: 20% : 180 KVA

d. Estimated maximum demand of 750 KVA

e. Service conduits will need to be direct buried at 36” minimum below grade.

f. conduits located below roads will be concrete encased.

B. Secondary Distribution (600 volt and less)

1. The service switchboard shall be 1200amp, 480Y/277V, 3 phase indoor switchboard, front accessible, switch/fuse or circuit breaker type, feeding the electrical feeders. The feeders will distribute power to lighting, receptacles, mechanical equipment and concessionaire branch circuit panels located in dedicated electrical closets.

2. This scope of work will include all distribution, step-down transformers and panelboards as required to serve the loads in the arena.

3. Bus bars in all distribution panelboards and panelboards shall be copper. With a deduct option for aluminum.

4. Circuit breaker types and interrupting capacities will be selected based on the results of a short circuit study. Circuit breakers, panelboards, transformers and feeder load capacities will be selected based on the completion of the design and appropriate load calculations as well as a coordination and short circuit study. All overcurrent protection devices shall be coordinated and rated with the short circuit condition.

5. Switchboards and panelboards will include twenty percent spare capacity and space for future additional circuit breakers and switches. Circuit breakers will be provided for all base building branch circuits. All 15amp and 20amp breakers shall be UL listed as a “Switching Breaker” and carry the “SWD” marking.

6. Distribution and lighting panelboards shall utilize bolt-on circuit breakers.

7. Noise isolation K-13 rated transformers and local TVSS units shall be provided in areas where significant harmonic loads are present. Areas that contain these types of loads are the scoreboard, broadcast and sound rooms.

8. Dry Type 480-208/120 volt transformers will be provided for 120-volt and 208-volt loads.

9. Equipment will generally be supplied painted with the factory standard color i.e. ANSI 49 or 61 gray.

10. All electrical equipment that are floor mounted will be fastened/restrained on a 4" housekeeping pad.

11. All equipment shall be provided with engraved nameplates.

C. Emergency Power:

1. Emergency battery lighting units will be provided for all life safety and at electrical rooms, main telephone, and other critical areas as later determined or required by the user/owner.

2. Connections shall be provided to signs, advertisement boards.

D. Mechanical & Equipment Connections:

1. Mechanical:

a. Power wiring shall be provided for all equipment including starters, local disconnect switches and as required.

b. Starters for all packaged equipment, such as chillers, air-handling units, exhaust fans, etc., shall be provided by the mechanical contractor (MC).

2. Equipment Connections:

a. Power to all elevators including wiring to controllers. Power to passenger elevators shall be 480volt, 3 phase and have shunt trip breakers in the machine room. Sized breakers shall be based on manufacturer's shop drawings.

b. Power will be supplied to overhead doors, dock levelers, dock locks, power man doors, trash compactors, etc.

c. Handicapped and other powered entrance doors to be connected to the motor and controller. Provide pushbutton in mullion (120V, 1Ph, 20Amp).

d. All equipment supplied as part of the construction of the new arena will be provided with the appropriate electrical power connection.

E. Branch Power Receptacles & Connections:

1. Receptacles: In general receptacles shall be provided where needed, including the following:

a. The mechanical, electrical, and storage area receptacles to be 18"AFF, rated 20amps with stainless cover plates, generally one on each wall.

b. Provide receptacles in each corridor, hallway, etc.

c. Provide three duplex receptacles and one quad receptacle in each office including first aid and guest services.

d. Provide GFI type receptacles at counters in each washroom, within 6 feet of a sink, elevator pits and elevator machine rooms. All exterior receptacles shall be GFI type with weatherproof cover.

e. For cleaning (on 40' centers in corridors and concourses)

f. A 20Amp, 120volt receptacle mounted at every pay telephone and ATM machine. As required and requested by the user.

g. Within 25 feet of mechanical equipment.

h. Provide dedicated 120 volt, 20 amp, double duplex receptacles (48"on center) in telephone room. PBX Room shall have a dedicated 100 amp panelboard and dedicated 120 Volt, 20 amps, double duplex receptacle (48" on center) throughout the room and circuits for each rack.

2. Connections shall be provided to signs, advertisement boards, Video Walls, and graphics panels on the fascia pf the seaing bowl.

a. These individual connections include a junction box with an number of 120volt circuits and an appropriate number of en telephone room or cable tray

b. The location of the signage and advertisement boards will be coordinated with The architect and owner

3. Power connections to all, novelty carts, ATM machines, and other owner-related equipment.

4. Power for security screening and wireless ticketing at entries.

5. Power connections for electric water cooler for drinking fountains and electronic valve systems.

6. Power connections to office equipment (i.e. copiers, furniture partitions, printers, computers, etc.) and other owner related equipment.

7. Power connections to maintenance area equipment (i.e. welders, air compressors, table saws, hand tools, etc.).

8. Scoreboard Unit:

a. Main Scoreboard: Provide all conduit for power and control wiring to connect to scoreboard.

9. Graphics/Matrix Boards:

a. Provide all conduit, power wiring and control conduit to matrix boards

10. Sound and Miscellaneous Systems:

a. Provide all conduit, wiring and power as required for each system.

b. Provide branch wiring and outlets to amplifier racks and equipment.

F. Concession Power and Connections:

1. The building design shall include the following electrical services for concession spaces:

   a. A 200 amp 120/208-volt 2 section, panelboard at each concession location. Space and code required clearances for panelboards will be required in each concession stand.

   b. An empty raceway from the concession to the nearest telephone room for the low voltage cabling systems.

G. Lighting & Lighting Controls:

1. All interior areas of the arena will be provided with a lighting system to maintained illumination levels recommend by IES/ASHRAE.

2. All light fixtures will be commercial quality grade fixtures. The lighting system will be complete with panelboards, feeders, branch circuits, and controls all as specified herein. Circuiting will generally be 277 volts for HID and LED lighting and 120 volt for incandescent and quartz lighting.

3. LED fixtures will generally incorporate electronic energy efficient driver, color temperature of 3000K. Lenses/louvers where specified.

4. Provide LED exit signs along all paths of egress exits. An exit sign shall be no further than 100 feet apart in any egress corridor or path. An exit sign shall be provided at every egress door and stairway.

5. Lighting Controls:

   a. All lighting shall be controlled by a networkable lighting control system with a built-in time clock and local overrides. The lighting control system shall be a low voltage system, which is specifically design for controlling lighting and interfacing with building automation system to control certain zones

6. Provide separate lighting control system for the emergency fixtures.

7. The interior lighting concepts will be developed with the architectural team during the design development phase. The light fixture, in general will be LED type.

H. Fire Alarm System:

1. The fire alarm system shall be designed in accordance with the program requirements, latest industry standards and applicable codes. All equipment shall be U.L. approved or code equivalent.

2. The fire alarm system will be electronically supervised, microprocessor based, analog/digital addressable, multiplexed networked fire alarm system, fully integrated with an emergency voice communication system and the seating bowl non- supervised public address system. This shall also integrate with the Building Management System (BMS)

3. The fire alarm system will be comprised but not limited to the following key components:

   a. Fire Alarm Control Panel.

   b. Fire Alarm Audible, Visual and Initiating Devices.

   c. Interface with Mechanical/Sprinkler/HVAC Security System.

   d. Interface with Elevator Controllers including disconnect control wiring.

4. The fire alarm voice communication system shall interface with the public address system in an alarm conditions to make emergency voice announcements to the seating bowl.

5. The fire alarm wiring shall be Class B and be installed in an approved raceway where

I. Design will be coordinated with the audio–visual, security and production consultants and provided with the power and raceway systems as required.

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