SECTION 13 34 00
FABRICATED PRE-ENGINEERED PRECAST CONCRETE STRUCTURES

CARSON VAULT TOILET -
GABLED STYLE ROOF

SECTION 1 – GENERAL

1.1 SUMMARY

Contractor shall furnish a precast concrete transportable restroom. Building to be delivered and placed on owner-prepared crushed stone foundation in accordance with manufacturer's recommendations. Precast building to be EASI-SET® brand Restroom Model Carson Vault Toilet-Gabled Style Roof (herein stated as Carson) as manufactured by a *licensed producer of Easi-Set Buildings.* Manufacturer to provide building with all necessary openings as specified by contractor in conformance with manufacturer's structural requirements.

1.2 REFERENCES

A. ACI-318 – Current Edition: Building Code Requirements for Structural Concrete and Commentary

B. ASCE/SEI – Current Edition: Minimum Design Loads for Buildings and Other Structures

C. IBC – Current Edition: International Building Code

D. PCI Design Handbook – Current Edition

E. Concrete Reinforcing Institute, Manual of Standard Practice

F. UL-752 (Test Method level 5) for bullet resistance certified by a military approved laboratory.

G. 2010 ADA Standards for Accessible Design

H. International Plumbing Code (IPC) and National Electrical Code (NEC)

I. USDA Forest Service Publication: In-depth Design and Maintenance Manual for Vault Toilets (Incorporating FAN™ Natural Ventilation System)

1.3 SYSTEM DESCRIPTION

DESIGN REQUIREMENTS

A. Building Dimensions:

Exterior: 11'-11" x 17'-6" x 9'-11" (tallest point)

Interior: 6'-10" x 17'-0" x height (varies)

Design case to be selected to correspond to the design criteria indicated in the aforementioned codes for the geographical location of the project or as specified.

CASE 1: Typical

B. Design Loads:

1. Seismic Design Category ‘C’, Risk Design Category II

2. Roof Live Load (Snow) – 30 PSF

3. Floor Live Load – 100 PSF

4. Wind Loading* – 115 MPH

*Design loads relate to precast components only, not accessories (i.e. doors, windows, vents, etc.)

CASE 2: Heavy

C. Design Loads:

1. Seismic Design Category ‘D’, Risk Design Category III

2. Roof Live Load (Snow) – 150 PSF

3. Floor Live Load – 150 PSF

4. Standard Wind Loading* – 165 MPH

*Design loads relate to precast components only, not accessories (i.e. doors, windows, vents, etc.)

D. Roof: Gabled style roof. Roof panels shall overhang on all sides to prevent water intrusion. The pitch of the roof shall be 3/12. The roof standard finish is a simulated cedar shake. Other finishes are available.

E. Roof panels, floor, and wall panels must each be produced as single component monolithic panels. No floor or vertical wall joints will be allowed, except at perimeter interfaces, corners and partitions. Wall panels shall be set on top of floor panel.

F. Wall-to-Floor interior surface joints along the perimeter of each restroom and partitions (if precast) must contain the locked-in, easy clean-out radius coving. The 3/8” (recessed) x 2” cove must be continuous around the interior of the restroom and along the sides of any precast partitions. Apply 5,000 PSI (minimum) non-shrink, non-metallic grout to the cove, finishing the grout to form a flush 1” minimum radius.

1.4 SUBMITTALS

A. Engineering calculations designed and sealed by a professional engineer, licensed to practice in the state where the project is located, shall be submitted for approval.

B. Manufacturers’ product literature shall be provided for all plumbing, electrical and miscellaneous installed fixtures demonstrating compliance with these specifications

1.5 QUALITY ASSURANCE

A. The precast concrete building producer shall be a plant-certified member of either the National Precast Concrete Association (NPCA), The Precast/Prestressed Concrete Institute (PCI), or equal.

B. The precast concrete building producer shall demonstrate product knowledge and must have a minimum of 5 years experience manufacturing and setting precast concrete.

C. The manufacturer must be a licensed producer of Easi-Set Buildings.

D. No alternate building designs to the pre-engineered EASI-SET® building will be allowed unless pre-approved by the owner 10 days prior to the bid date.

SECTION 2 – PRODUCTS

2.1 MATERIALS

A. Concrete: Steel-reinforced, 5000 PSI minimum 28-day compressive strength, air-entrained (ASTM C260).

B. Reinforcing Steel: ASTM A615, grade 60 unless otherwise specified.
Welded wire fabric: ASTM 185, Grade 65

C. Post-tensioning Strand: 41K Polystrand CP50, ½" 270 KSI Seven-Wire strand, enclosed within a greased plastic sheath (ASTM A416). Each Roof and floor shall be post-tensioned by a proprietary, second generation design using a single, continuous tendon. Said tendon is placed in the concrete slab to form a perimeter loop starting from one corner of the slab to a point where the cable entered the slab. The tendon then turns 90 degrees and follows the cable member(s) in the periphery to a point midway along the "X" axis of the concrete building panel and then turns 90 degrees along the "Y" axis of the concrete building panel. This bisects the concrete building panel and crosses the opposite parallel portion of the cable member and exits from an adjacent side of the concrete building panel. This creates a cable pattern with no less than 2.5 parallel cables in any direction. To ensure a watertight design, no alternate methods shall be substituted for the post-tensioning.

D. Sealant: All joints between panels shall be caulked along the exterior and interior surface of the joints. Exterior sealant shall be DOW CORNING 790 silicone sealant or equal. Interior sealant shall be SIKAFLEX-1A elastic sealant (paintable) or equal. Exterior caulk reveals to be 3/8"x 3/4" deep so that sides of the joint are parallel for proper caulk adhesion. Back of the joint to be taped with bond breaking tape to ensure adhesion of caulk to parallel sides of joint and not the back.

E. Panel Connections: All panels shall be securely fastened together utilizing cast-in stainless steel embeds and welding. All welding shall be done in conformance with AWS, Structural Welding Code latest revision. Steel is to be of structural quality, hot-rolled carbon complying with ASTM A304. No floating-in of connection plates shall be allowed.

F. Stain and Paint:

- ***a.*** Interior concrete surfaces (toilet rooms)
  - ***i.*** Interior floors will be a two component, water based polyamide epoxy floor coating (gray, unless otherwise specified). Approved manufacturers: Sherwin Williams (Floor-Plex 7100), Armorpoxy or equal.
  - ***ii.*** Interior walls and ceilings will be a pre-catalyzed water based epoxy. Approved manufacturers: Sherwin Williams or equal.
- ***b.*** Exterior concrete surfaces
  - ***i.*** Exterior slab top surface (if selected) will be a two component, polyamide epoxy floor coating (gray, unless otherwise specified). Approved manufacturers: Sherwin Williams, Armorpoxy or equal.
  - ***ii.*** Exterior walls and roof will be a water-based acrylic, water-repellent penetrating stain. Approved manufacturers: United Coatings (Canyon Tone Stain), Sherwin Williams (H&C Concrete stain) or equal
  - ***iii.*** Clear Acrylic anti-graffiti sealer (if selected)

2.2 ACCESSORIES AND FIXTURES

A. Doors and Frames: Shall comply with Steel Door Institute "Recommended Specifications for Standard Steel Doors and Frames" (SDI-100) and as herein specified. All door and frame galvanizing shall be in accordance with ASTM A924 and A653, minimum coating thickness shall be A60.

1. The buildings shall be equipped with 3'-0" x 6'-8" x 1-3/4" (restroom entry doors) & 2'-8" x 6'-8" x 1-3/4" (chase door) thick insulated, 18 gauge, metal doors with 16-gauge frames (to meet wall thickness). Doors shall have a flush top cap. Doors and frames shall be factory bonderized and painted with one coat of rust-inhibitive primer and one finish-coat of enamel paint; color to be BOLT BROWN unless otherwise specified.
2. Doors and frames shall meet SDI standard Level 2, 1¾" heavy duty.
   Approved manufacturers: Republic, Steelcraft, Ceco, Black Mountain, Pioneer, Curries, Mesker, MPI, Door components or equal
   Approved distributor: Integrated Entry Systems

B. Door Hardware:

1. Cylindrical Lock: Commercial grade, shall meet requirements of ANSI A156.2, series 4000, UL listed and ADA approved. Zinc dichromate chassis with cast solid zinc levers to resist corrosion. Furnish locks with 6-pin solid brass keyway. Exterior locks and unlocks by key, interior push button lock, released when lever is turned. Manufacturer shall provide a limited lifetime warranty on this product.
Approved manufacturers: Design Hardware, or equal

2. Hinges: Self-Closing (spring) Hinges. Shall comply with ANSI A156.17 Grade 1 self closing hinges (3 per door). Hinges shall be Stainless Steel Grade 304 (ANSI K81071F) US32D brushed satin finish. Manufacturer shall provide a lifetime limited warranty.
Approved manufacturers: Design Hardware, or equal

3. Door Sweep: Nylon brush door sweep, ANSI/BHMA certified. Sweeps shall have an integral drip edge to repel water from base of door. Sweeps shall be approved for UL 10C positive pressure and suitable for use with fire doors up to three hours.
Approved manufacturers: National Guard Products or equal

4. Drip Cap: Aluminum drip cap with minimum projection of 2 ½" shall be furnished.
Approved Manufacturers: Design Hardware, National Guard Products, or equal

5. Door Stop: ANSI 156.16 approved wall mounted door stop with keeper constructed of a corrosion resistant cast brass material. Finish US26D (626) brushed chrome finish.
Approved manufacturers: Don-Jo, Rockwood, or equal

C. Wall Vent: Wall vents will be extruded aluminum, minimum thickness of .125", 6063-T5 alloy. Vents to be supplied with aluminum mesh insect screen and 204-R1 clear anodized finish. Approved manufactures: Sunvent Industries or equal.

D. Signs: Signs to have braille, characters, and pictograms to meet ADA requirements.

E. Windows: Frames shall be constructed from stainless steel. Window glazing will be ¼" translucent Lexan.

F. Grab Bars: Stainless steel tubing, 18 gauge, type 304 stainless steel, mounted 1-1/2 inches from wall. Approved manufacturers: Bobrick or equal.

G. Toilet Paper Dispenser: Dispenser will be constructed of 3/16" to 1/4" thick 304 stainless steel. Dispenser will be capable of holding three (3) standard rolls of toilet paper. Approved manufacturers: Aslin Industries, Bobrick or equal.

H. Plumbing:

1. Waterless Toilet: ADA compliant, 18 gauge type 304 stainless steel riser with seat cover

I. Vault Cleanout Cover: Aluminum hatch, rated for a 300 psf pedestrian load. Cover to be hinged with a staple for padlock and a hold open arm to prevent closing. OR if required, cleanout cover frames will be constructed from steel. Plate for vault cleanout cover will be ¼" thick diamond plate steel. Lid will be hinged and configured so that it can be locked with a padlock. A gasket will be provided around the perimeter of the lid to provide an airtight seal.

J. Vent Stack: Vent stack(s) to be 12" (nominal) diameter High-Density Polyethylene Pipe.

K. Vault Liner: Inside of vault tank(s) to be lined with a water based acrylic coating (Conseal CS-55) or equal, applied per manufacturers specifications. Optional drop-in or cast-in high performance reinforced geomembrane liner is available.

2.3 Finishes

A. Interior of Building: Smooth form finish on all interior panel surfaces unless exterior finish is produced using a form liner, then smooth hand-troweled finish.

B. Exterior of Building (standard): Barn board finish on all exterior wall surfaces with a simulated cedar shake roof finish.

C. Exterior of Building (Option #1): Architectural precast concrete brick finish: Finish must be imprinted in top face of panel while in form using an open grid impression tool similar to EASI-BRICK®. Finished brick size shall be 2 3/8" x 7 5/8" with vertical steel float or light broom finish. Joints between each brick must be 3/8" wide x 3/8" deep. Back of joint shall be concave to simulate a hand-tooled joint.

D. Exterior of Building (Option #2): Additional finishes for walls and roof are available and will vary by local producer.

SECTION 3 – EXECUTION

3.1 SITE PREPARATION (MANUFACTURER'S RECOMMENDATION)

Work under this section relates to placement of the restroom building by the Easi-Set licensed producer on the vaults placed in a customer-prepared site.

A. All material, methods of construction, and testing & inspection shall conform to the applicable requirements of the codes and standards listed in the project specifications.

B. Stone shall be a minimum of 4" thick and down to firm subgrade. The vertical soil capacity under stone shall be compacted to have minimum bearing of 1,500 pounds per square foot. Stone shall be 3/8" or smaller followed by a course or topping of fines for final grading and compaction purposes as needed. Elevations and levelness of the prepared stone base shall be within ¼" in all directions.

C. Provide positive drainage around the building.

D. Provide Butyl Sealant between the vault and building floor.

3.2 SITE ACCESS

Contractor must provide a level, unobstructed area large enough for a crane and a tractor-trailer to park adjacent to the pad. Crane must be able to place outriggers within 5'-0" of edge of pad; truck and crane must be able to get side-by-side under their own power. No overhead lines may be within 75' radius of center of pad. Firm roadbed with turns that allow 65' lowbed tractor-trailer must be provided directly to site. No building shall be placed closer than 2'-0" to an existing structure unless specifically permitted.

3.3 EXCAVATION AND ELEVATION

A. Comply with all applicable OSHA standards for excavation.

B. No excavation will be left open without proper shielding of fencing.

C. Excavate for the placement and installation of the toilet vault tank(s) to a depth that will allow the structure site to be free draining. After installation is complete, the depth of the tank excavation should allow for the stone base and leveling course beneath the toilet vault.

D. Finish floor elevation will be 4-6 inches above natural grade measured at the front (entrance) of the exterior slab unless otherwise approved by the customer. If desired by Owner, the back of the building can be raised slightly higher to allow water to freely drain out of toilet room(s). The customer may specify a finish floor elevation for buildings at some sites. Final building floor elevation to be within ± 0.05 feet of specified floor elevation.

3.4 BACKFILL AND COMPACTION

A. Compact natural subgrade at the bottom of the vault excavation to a minimum vertical soil capacity of 1,500 PSF.

B. Install and compact stone base and leveling course to specified elevation ensuring levelness of the stone.

C. Set the vault(s) in place and check for proper alignment and levelness. Backfill around the structure(s). Use excavated material suitable for backfilling or stone fill. Rocks or stone larger than 6 inches in maximum dimension shall be discarded from excavated material if used for backfilling.

D. Lift thickness for backfill material – loose lifts of 8 inches and 6 inches for vibratory and static compaction respectively.

E. Use compaction equipment suited to achieve specified compaction for subgrade, stone base, and backfill (drum rollers – static and vibratory, rammer, plate tamper – static and vibratory, etc.). Vibrating equipment is used for compaction of course materials.

F. Intended final grade is flush with the top of the front floor slab. Allow for placement of topsoil to reach that grade (if required). Grade backfill away from structure for positive drainage.