

SECTION 31 60 00 PRECAST CONCRETE ELECTRIC VEHICLE CHARGER FOUNDATION UNITS

PART 1 GENERAL

1.1 SUMMARY

- A. This work pertains to furnishing and installing precast concrete electric vehicle (EV) charger foundation units, as special foundations supporting EV charger pedestals, in accordance with the Project Drawings and this Specification. Each precast foundation unit shall be installed at the elevation and location shown on the Project Drawings.
- B. Related Sections:
1. Section 31 23 33 Trenching, Backfilling and Compacting
 2. Section 31 23 00 Excavation and Fill

1.2 REFERENCES

- A. Design:
1. ACI 318-14 Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute
 2. ASCE/SEI 7-10 Minimum Design Loads for Building and Other Structures, American Society of Civil Engineers / Structural Engineering Institute
 3. IBC 2012 International Building Code, International Code Council, Inc.
- B. Reference Standards:
1. ANSI/SCTE 77 Specifications for Underground Enclosure Integrity
 2. ASTM C31 Practice for Make and Curing Concrete Test Specimens in the Field
 3. ASTM C33 Specification for Concrete Aggregates
 4. ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
 5. ASTM C94 Specification for Ready-Mixed Concrete
 6. ASTM C125 Standard Terminology Relating to Concrete and Concrete Aggregates
 7. ASTM C138 Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
 8. ASTM C143 Test Method for Slump of Hydraulic-Cement Concrete
 9. ASTM C150 Specification for Portland Cement
 10. ASTM C173 Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete
 11. ASTM C192 Practice for Making and Curing Concrete Test Specimens in the Laboratory
 12. ASTM C231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
 13. ASTM C260 Specification for Air-Entraining Admixtures for Concrete
 14. ASTM C494 Specification for Chemical Admixtures for Concrete
 15. ASTM C989 Specification for Slag Cement for Use in Concrete and Mortars
 16. ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Surfaces
 17. ASTM C1107 Packaged Dry, Hydraulic Cement Grout (Non-Shrink)
 18. ASTM C1610 Test Method for Static Segregation of Self-Consolidating Concrete Using Column Technique
 19. ASTM C1611 Test Method for Slump Flow of Self-Consolidating Concrete
 20. ASTM C1712 Test Method for Rapid Assessment of Static Segregation of Self-Consolidating Concrete Using Penetration Test
 21. ASTM C1758 Practice for Fabricating Test Specimens with Self-Consolidating Concrete
 22. ASTM D422 Standard Test Method for Particle-Size Analysis of Soils
 23. ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
 24. ASTM D1241 Standard Specification for Materials for Soil-Aggregate Subbase, Base and Surface Courses
 25. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort

26. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 27. ASTM D3080 Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
 28. ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
 29. ASTM D4767 Test Method for Consolidated-Undrained Triaxial Compression Test for Cohesive Soils
 30. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- C. Additional References:
1. EV Block Reference Manual – Installation – Current Version - www.evblock.com/us
 2. EV Block Standard Product Drawings – www.evblock.com/us

1.3 DEFINITIONS

- A. EV Block: A precast concrete unit that is at least twenty-four (24") inches tall consisting of four sides and an upper surface that is generally square or rectangular, where each of the four sides contain at least one opening leading to a hollow center, and the upper surface contains a recess that allows for at least one, flush mounted, adaptor plate to be secured to the concrete via embedded anchor points. Unit shall be manufactured by an authorized producer under license by Recon Wall Systems, Inc.
- B. Adaptor Plate: A composite plate, measuring eighteen inches (18") square, with holes near the four corners that allow it to be secured to the EV Block unit.
- C. Securing Hardware: Four, half-inch diameter by three-inch long, stainless steel, button head and tamper-resistant bolts used for securing the Adaptor Plate to the EV Block.
- D. Crushed Stone Foundation: Clean, crushed rock located directly beneath the EV Block unit to provide adequate drainage and leveling.

1.4 SUBMITTALS

- A. Contractor shall submit to the Owner the EV Block product data and installation instructions for approval.
- B. Contractor shall submit to the Owner the EV Block Producer's test reports certifying that the EV Block units manufactured at their production facility meet the requirements of this Specification and the requirements of the Project Drawings.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Contractor shall inspect all EV Block units at delivery to determine that the proper size and type have been delivered and are usable. Damaged material shall not be incorporated into the work.
- B. All EV Block units shall be stored in a location and manner that protects against excessive weathering and damage.
- C. During storage, Contractor shall prevent the EV Block units from coming in contact with substances which may stain or adhere to the finished visual surfaces of the unit. Provide proper dunnage between the EV Block units as well as the ground surface. EV Block units shall not be stacked in direct contact with other units.
- D. For the portions of the EV Block units which shall be exposed above grade, the finished surface shall be free of excessive chipping, cracking and stains.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. EV Block units furnished to the project shall be produced by a manufacturer that has been authorized and licensed, by the licensor listed below, to produce the EV Block units:
 1. Recon Wall Systems, Inc.
Coon Rapids, MN
(612) 474-0089
www.evblocks.com/us

2.2 DESCRIPTION

- A. The precast concrete EV charger foundation unit shall be manufactured:
1. As a single pour unit that is cast monolithically, containing no cold joints,
 2. With a recess in the upper surface that allows for the flush mounting of an adaptor plate that can be secured to the concrete,
 3. Containing at least four embedded threaded inserts, located within the recess in the upper surface,
 4. With at least four openings in the side surfaces of the unit, leading to a central hollow center, that allows for the installation of electrical wiring conduits,
 5. With a bullnose, round-over, or chamfer profile around the upper surface.

2.3 MATERIALS

- A. Concrete:
1. All concrete used shall be first-purpose. No returned or waste concrete shall be permitted for use in production.
 2. The EV charger foundation unit shall consist of concrete with the average 28-day compressive strength of no less than 4,000 psi.
 3. Concrete shall have air entrainment by volume (as measured in the plastic state in accordance with ASTM C173) of:
 - a. 5.5 – 8.5 percent, or
 - b. In conformance with ASTM C94, latest revision
 4. For conventional concrete, the water-to-cement ratio shall be no greater than 0.4 with a maximum slump of 5 inches +/- 1.5 inches per ASTM C143.
 5. For Self-Consolidating Concrete (SCC) mix designs, the slump flow shall be between 18 and 32 inches as tested per ASTM C1611
- B. Adaptor Plate:
1. The adaptor plate shall meet the requirements of the ANSI/SCTE-77 standard for Tier 15.
 2. The top surface of the adaptor plate shall have a static coefficient of friction of 0.5 or greater, as described in ASTM C1028, in both wet and dry conditions.
- C. Securing Hardware:
1. Securing hardware shall be stainless steel, meeting the requirements of ASTM F593, and contain tamper resistant button head such as hex-pin or torx-pin.
- D. Crushed Stone Foundation:
1. The foundation material shall consist of clean, 1-inch minus, crushed stone or crushed gravel meeting the following gradation tested in accordance with ASTM D422:

<u>Sieve Size</u>	<u>Percent Passing</u>
1-inch	100
3/4-inch	75 – 100
No. 4	0 – 10
No. 50	0 – 5

2.4 FINISH

- A. The exposed surfaces of the EV charger foundation unit shall have a smooth finish and the upper surface shall have a profiled edge that is either bullnose, a round-over, or chamfer.
- B. The exposed surfaces of the EV charger foundation unit shall be: **[specify choice as required]**
1. Left in natural (as-cast) color.
 2. Stained using **[define stain and color]**

2.5 UNIT BACKFILL

- A. Crushed Stone Backfill: A backfill material consisting of clean, 1-inch minus, crushed stone or crushed gravel, meeting the gradation shown in Section 2.3.E.a, may be used as unit backfill material.

- B. Granular Backfill: Granular soils meeting the following gradation, tested in accordance with ASTM D422, may be used as unit backfill:

<u>Sieve Size</u>	<u>Percent Passing</u>
1-inch	100
No. 4	20 – 100
No. 40	0 – 60
No. 200	0 – 10

The USCS soil types, per ASTM D2487, generally meeting the gradation shown are: well-graded and poorly graded gravels (GW and GP), well-graded and poorly graded sands (SW and SP), as well as poorly graded gravels and sands containing silt (GP-GM and SP-SM). On-site soils meeting the above requirements may be used as unit backfill.

2.6 QUALITY CONTROL

- A. Concrete Finish:
1. The upper portion of the unit shall have a smooth, hard, uniform texture on the concrete.
 2. Within the upper exposed portion of the unit, any air-voids greater than 3/4-inch and deeper than 1/4-inch shall be filled with patching mortar.
 3. Minor chips, form joint lines and typical concrete color variation are all acceptable.
- B. Cracks:
1. Cracks that are greater than 6-inches in length and 1/32-inch in width shall not be permitted.

2.7 DESIGN

- A. Prior to furnishing EV Block units to the project site, a Registered Professional Engineer shall review all applicable product data and shall consider the actual site soil and EV charger loading conditions that will be present to determine if the EV Block unit is suitable for the proposed application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify locations of utilities and existing structures prior to excavation.
- B. Examine the Project site and evaluate the condition of the locations in which the EV Block units will be installed. Notify the proper supervising authority in writing of any conditions that may interfere with the proper installation of the EV Block units or delay completion.
- C. Promptly notify the design engineer of site conditions which may affect performance, soil conditions observed other than those assumed, or other conditions that may require a reevaluation.

3.2 EXCAVATION

- A. Contractor shall excavate to the lines and grades shown on the construction drawings. Excavation may be completed using auger drilling or typical open-cut excavation. The contractor shall be careful to minimize over-excavation (unless required) or disturbance of the surrounding soils. Excavation limits around the units shall be 6 to 12-inches beyond the edges of the EV Block unit.
- B. The bottom limits of the excavation should extend at least 6-inches beyond the height of the EV Block unit or regional frost depth requirement, whichever is greater (over-excavation). The bottom limits should be well compacted and flat to allow for installation of at least a 6-inch-thick crushed stone foundation. Greater amounts of crushed stone will be needed in areas where over-excavation is required. The crushed stone foundation shall be compacted so as to provide a smooth, hard surface on which to place the EV Block unit.

3.3 EV BLOCK UNIT INSTALLATION

- A. The EV Block unit shall be lifted and placed into the excavated hole. Lifting can be achieved by using the double basket method with two nylon straps set 90 degrees opposite of each other and placed within the U-shaped openings in the sides. Nylon straps used shall be properly rated to adequately support the weight of the EV Block unit.
- B. Lower the EV Block unit into the excavated hole ensuring that the side openings are properly aligned for the site and installation requirements.
- C. Once the EV Block unit is in place, ensure that it level in both directions and that the upper surface elevation is set to the project requirements within +/- 1/2-inch.
- D. Brace the EV Block unit as required to maintain the location and level until the unit can be backfilled.
- E. Once all of the conduit is installed via the side openings by the Contractor or the site electrical contractor, backfill the EV Block unit using either crushed stone or granular backfill. Either backfill material used shall be placed in maximum 6-inch lifts. If granular backfill is used, the material shall be compacted to 95% Standard Proctor density determined in accordance with ASTM D698. Backfill material shall be placed to an elevation as shown in the Project Plans accounting for any paving or landscaping material that is to be installed around the unit.
- F. Install the required paving or landscaping material around the EV Block unit as shown in the Project Plans.
- G. For additional information on the EV Block unit installation process, refer to the EV Block Reference Manual – Installation.

3.4 MOUNTING THE EV CHARGER PEDESTAL AND INSTALLING THE ADAPTOR PLATE

- A. If not removed already, remove the adaptor plate from the top of the EV Block by removing the Securing Hardware in the corners. Note that the Securing Hardware requires specific driver bit that fits into the tamper-resistant head.
- B. Obtain a pedestal bolting diagram from the EV charger manufacturer. If a bolting diagram cannot be obtained, the actual pedestal may be used.
- C. Secure the bolting diagram to the bottom side of the Adaptor Plate ensuring that it is properly centered and aligned on the plate.
- D. Transfer the pedestal bolting locations to the Adaptor Plate using a center punch or other marking device.
- E. Remove the bolting diagram and drill holes through the Adaptor Plate at the marked locations. The diameter of the hole may vary but should be large enough to accommodate the required bolting hardware for securing the EV charger pedestal.
- F. Secure the EV charger pedestal to the Adaptor Plate using stainless steel bolts, nuts and washers. It is recommended that stainless steel lock nuts are used but are not required.
- G. Complete the required wiring for the EV charger. Refer to the EV charger manufacturer's instructions for any wiring requirements.
- H. Once the wiring is complete, place the Adaptor Plate and pedestal back onto the EV Block unit and secure the Adaptor Plate using the provided tamper-resistant hardware (Securing Hardware).

3.5 FIELD QUALITY CONTROL

- A. Contractor shall be responsible for proper installation and quality control of all EV Block units, the components, and materials.
- B. Owner shall, at their expense, retain a qualified professional to monitor and perform quality assurance checks of the Contractor's work.
- C. Quality Assurance should include soil inspection, frequent backfill compaction testing, verification of geotechnical design parameters and compliance with Project Plans.

3.6 CLEANING AND REPAIRING

- A. After completion of the install of the EV Block units, remove construction debris and restore any adjacent finished areas affected by the installation to their pre-construction state.

- B. Wash and remove any soiling and stains from the upper exposed portions of the EV Block units. Do not use acid or detergents that may "burn" or discolor face.
- C. Repair any bug holes or chips in the upper exposed portions of the EV Block units not meeting this Specification.

END OF SECTION