

Appendix J

Standard Survey Monuments

Survey monuments used for project control typically consist of an aluminum rod driven to refusal and encased in concrete. Care should be taken when placing the concrete to insure each monument will remain stable. The stability of a monument refers to its horizontal and vertical position. A stable monument is one that has not shifted or settled and has remained in its original position. An aluminum cap stamped with project information to identify each monument is then driven onto the rod. Refer to Appendix K in this manual for standard naming conventions.

WYDOT generally utilizes two basic types of permanent project control monuments. Their construction is based on present and future survey requirements of the monument. The extensive use of each monument and long duration of a typical project has increased the need for stability and reliability.

The High Accuracy Reference Network (HARN) monuments are used with GPS network surveys to establish positions for other monuments. These monuments are constructed with a considerable amount of concrete in a deeper hole that is “belled out” at the bottom. Refer to Figure J-1 for a cross-section of the monument. Because these monuments are used repeatedly for projects in the vicinity, it is essential that they are constructed to remain stable for many decades.

The network of project control monuments provide the framework for collection and staking surveys. Although not constructed to the same depth as the HARN monuments, the stability of these monuments is still paramount. The project control monuments are used throughout the life of a project and should have a minimum life expectancy of up to ten years. Refer to Figure J-2 for a cross-section of the monument.

Extendible control monuments, as described in Section IV, shall be constructed in the same manner as the standard project control monuments. Monuments used for temporary control may be constructed without concrete. Refer to Figure J-3 for a cross-section of a temporary monument.

In urban areas, standard WYDOT aluminum caps are typically set in sidewalks. A hole is drilled into the sidewalk deep enough so that the top of the cap is flush with the sidewalk surface. The cap is then set in adhesive epoxy, hydraulic cement, or anchoring cement to adhere it within the sidewalk. In mountainous areas, an aluminum cap may be set into a stable rock outcropping in a similar fashion. Refer to Figure J-4 for an illustration of an aluminum cap set in a sidewalk.

Standard Control Monuments

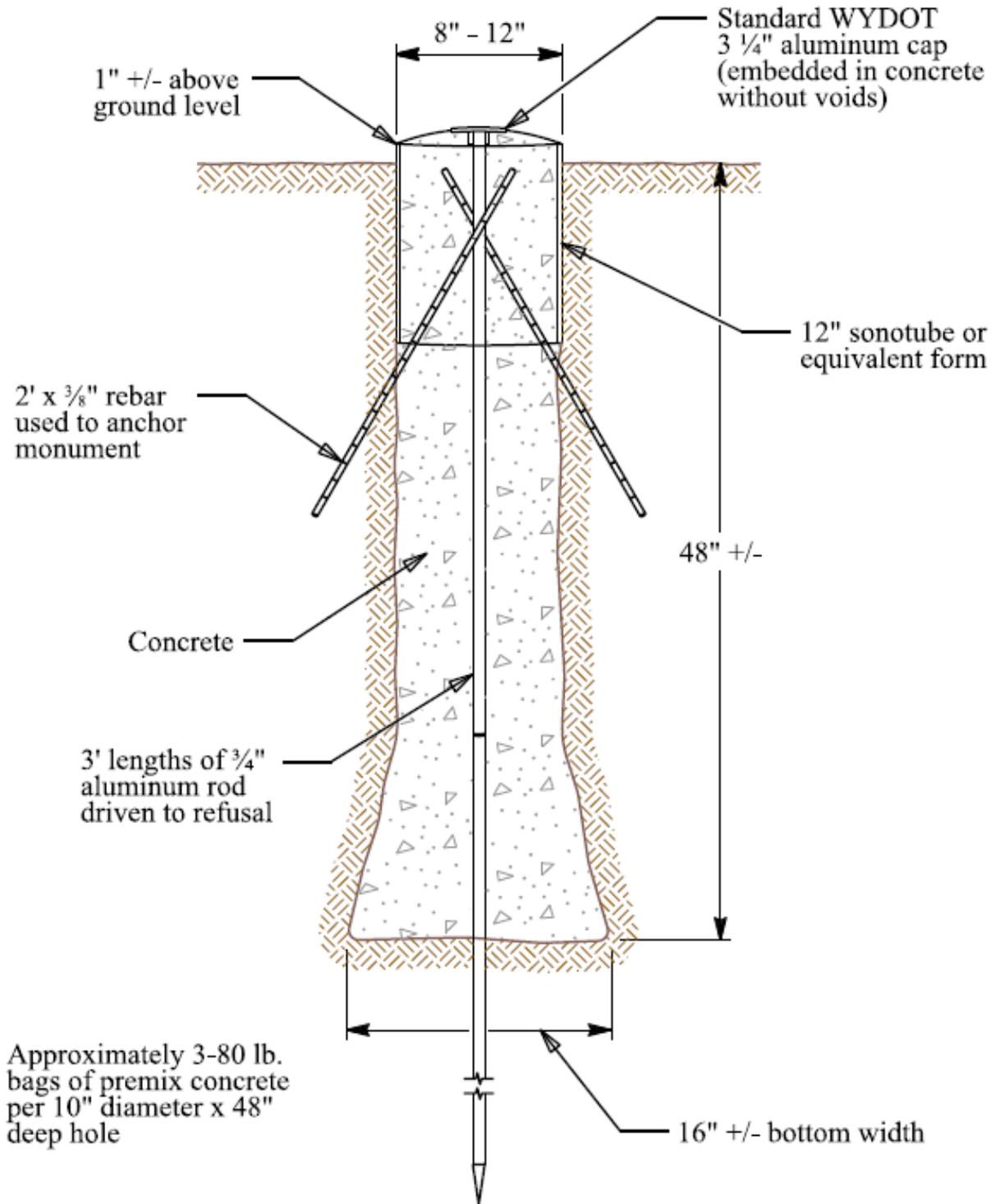


Figure J-1. WYDOT HARN Monument.

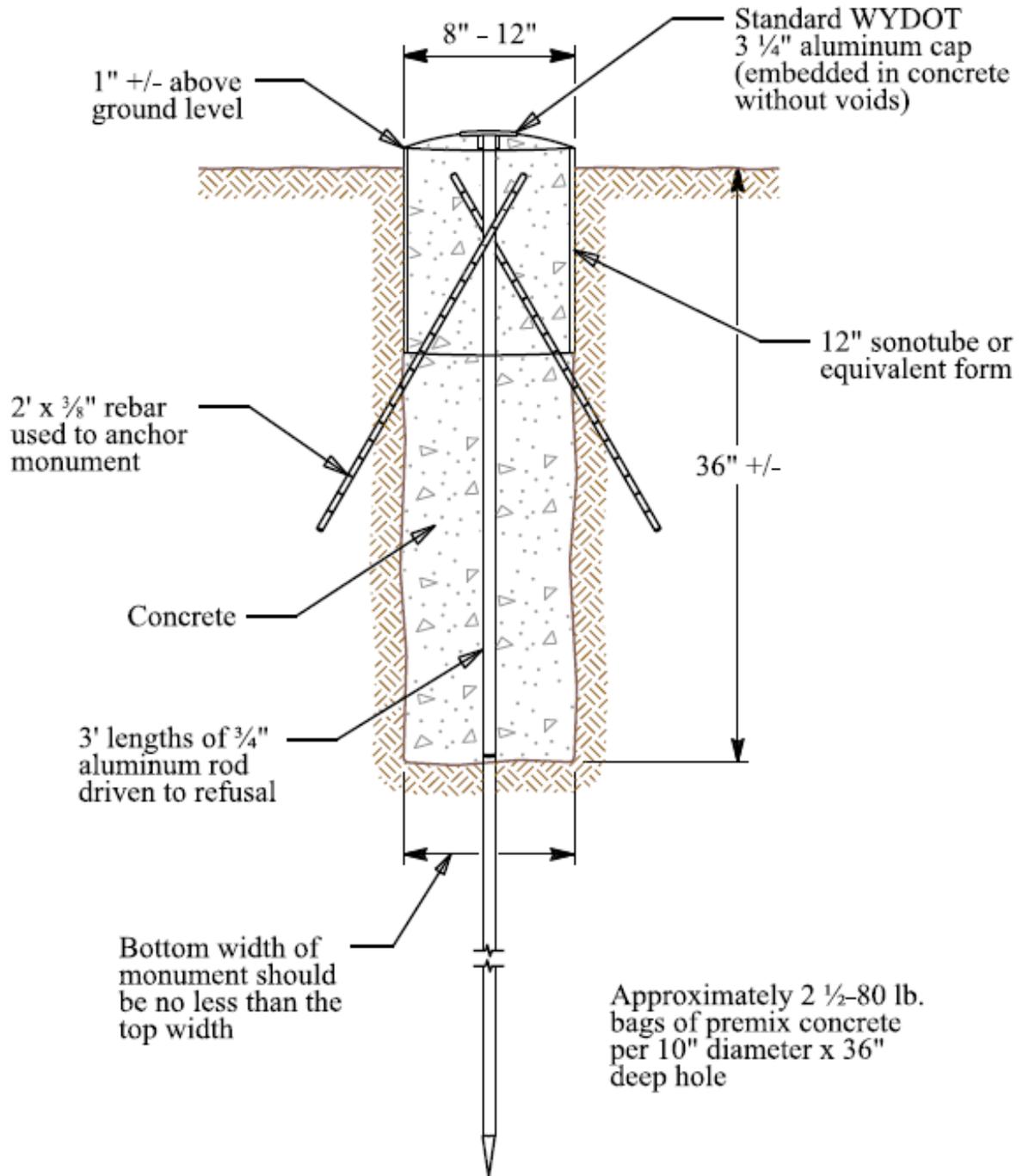


Figure J-2. WYDOT Project Control Monument.

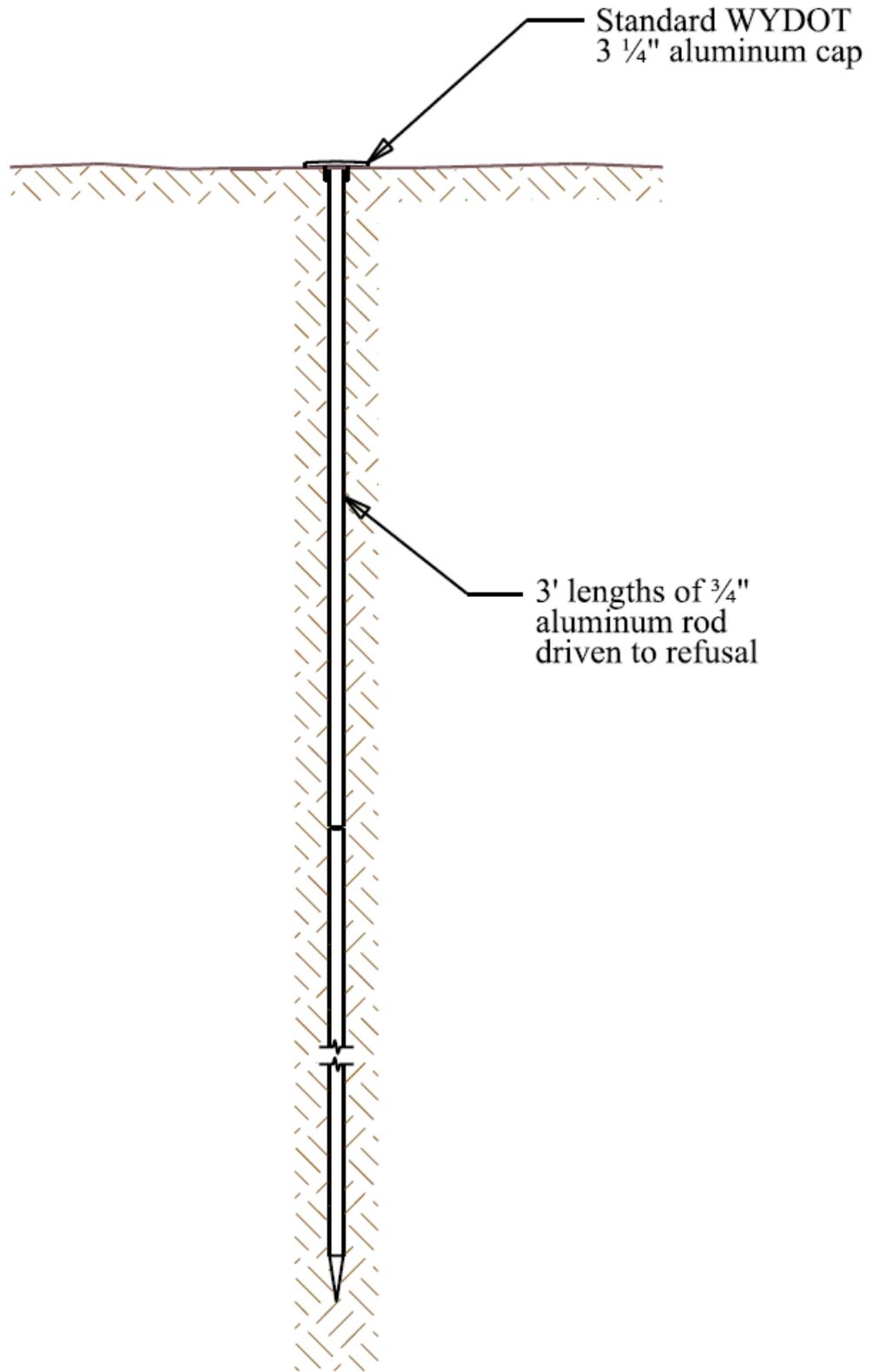


Figure J-3. WYDOT Temporary Monument.

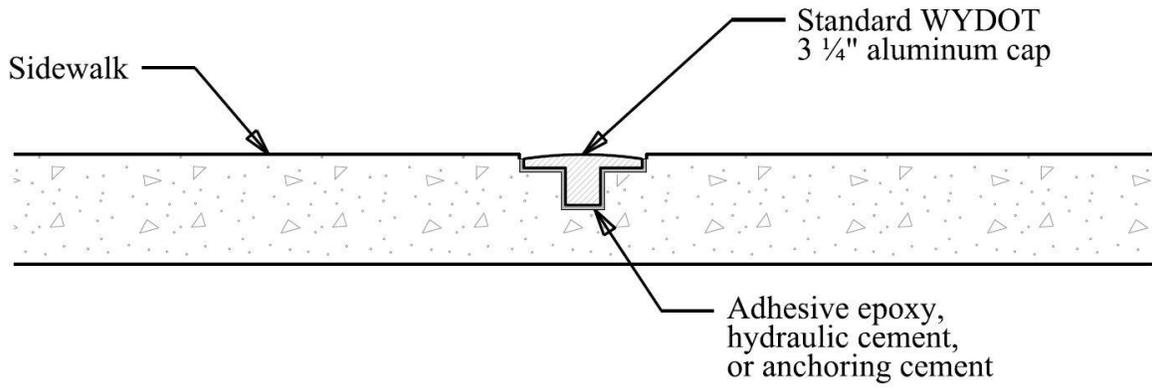


Figure J-4. Aluminum cap in sidewalk.