SECTION T141
SETTLEMENT PLATE ASSEMBLIES

T141-1 Description.

The work under this Technical Special Provision (TSP) includes the installation of settlement plate assemblies and associated monitoring in the embankment pre-load areas shown in the Plans. The settlement plate assembly will be constructed in accordance with Standard Plans Index 141-T01.

T141-2 Materials.

Meet the following requirements:

Steel Plate	ASTM A36
Steel Casing and Marker Pipe	ASTM A53, Schedule 40
Iron Caps and Couplings	ASME B16.3, Class 150
PVC Casing	ASTM D1785, Schedule 40
PVC Caps and Couplings	ASTM D2466
PVC Solvent Cement	ASTM D2564
Treated Timber	Sections 951, 952, and 955
Bolts, Nuts and Washers	962-6
Non-shrink Grout	Section 934

For the oakum seal, use dry, twisted jute-fiber packing without a plastic or other synthetic mesh covering.

T141-3 Construction.

The settlement plates shall be installed at the locations shown in the Plans after clearing and grubbing and once a firm and unyielding surface has been established above the groundwater level. All elevations shall be determined by a Surveyor licensed in the State of Florida and provided to the Engineer within 24 hours.

An excavation slightly larger than the settlement plate shall be made at the locations indicated in the Plans. The excavation shall form a pit having a minimum depth of 12 inches with a flat and level bottom. Determine the elevation of the bottom of the excavation prior to installing the plate.

The plate shall be placed in the pit with one section of marker pipe attached. The plate shall have full bearing contact with the soil and the marker pipe plumb before proceeding with the stem assembly. When realignment of the plate and marker pipe is necessary, the plate and pipe shall be removed and the pit bottom reshaped for proper alignment. If timber plates are selected for installation, and the soil is dense enough to suspend the plate on the fabrication bolts, the plate should be seated by grooving the bottom of the pit under the lines of bolts.

With plate and marker pipe in place, wrap the lower 6 inches of marker pipe with oakum; slip one section of casing pipe over the marker pipe; and, lower the casing to uniformly encase the oakum seal while seating the casing on the plate as shown in Standard Plans Index 141-T01.

With marker pipe and casing centered with respect to each other and maintained in a vertical position, the pit shall be backfilled in layers by hand and thoroughly compacted by hand. Prior to backfilling the pit, the elevation of the top of the plate shall be determined. A maximum of 1 foot of soil cover can be placed to stabilize the settlement plate prior to measuring elevation.

Determine the elevation of the top of the marker pipe prior to placing any additional fill other than that required to backfill the pit and stabilize the plate as previously noted. No

embankment shall be placed until this elevation has been determined. The casing shall be capped immediately after the elevation is determined. The settlement plate stem shall be flagged and protected from construction vehicles and equipment.

The embankment material in the immediate vicinity of the settlement plate stem shall be placed and compacted in accordance with the requirements of Section 120. Embankment within 3 feet of the stem shall be placed and compacted by hand with non-impact, light vibratory plate compactors.

When the surface of the embankment reaches a level approximately 2 feet below the top of the stem section in place, the Engineer shall be notified in writing. Determine the elevation of the marker pipe in place within 24 hours before adding the next section of marker pipe. After the Engineer is provided with the elevation of the marker pipe in place, the next section of marker pipe and casing shall be installed in the presence of the Engineer. The elevation of the new section of marker pipe shall be determined within 24 hours of installation. Do not place additional embankment until the elevation of the new marker pipe section has been determined. The casing shall then be capped, and the stem flagged for protection.

As the height of the embankment increases, this procedure shall be repeated until embankment construction is complete.

T141-4 Monitoring Period.

Determine and record the elevation of the top of each marker pipe and the elevation of the embankment surface at each settlement plate once per day during embankment construction. Upon completion of embankment construction, determine and record these elevations twice per week for the duration of the settlement monitoring period. Provide these elevations to the Engineer within 24 hours of measurement.

The estimated preload and settlement monitoring period duration is noted on the Preload and Settlement Plate Location plan. Day one of the settlement monitoring time estimate is 24 hours following the completion of embankment fill placement within the preload area. The actual time required for settlement to occur may be more or less than shown in the Plans and will be based upon the monitoring data obtained from the settlement plates and the discretion of the Engineer.

Other than activities specified in this TSP, do not proceed with any other construction activity in the preload area, except for erosion control as needed, unless otherwise authorized in writing by the Engineer.

T141-5 Protection and Maintenance.

The settlement plate stem shall remain in a vertical position at all times until final acceptance. Operate equipment so that settlement plate assemblies are not damaged or displaced. The Engineer shall be notified in writing within 24 hours of any disturbance or damage that occurs to the settlement plates. Each assembly shall be clearly marked and flagged as approved by the Engineer, and protective barricades shall be erected around each assembly. Stems deviating from a vertical position, becoming uncoupled or broken shall be repaired or replaced by the Contractor, as directed by the Engineer, at the Contractor's sole expense. If the settlement plate assembly is disturbed, it shall be replaced in kind within 24 hours, unless otherwise directed in writing by the Engineer.

Maintain the preload embankment elevations and slopes during the settlement monitoring period. For the preload areas, if the embankment settles a total of 6 inches or more, replenish fill to the planned embankment elevation height in accordance with Section 120.

The Contractor will not be held responsible for repair or replacement of any settlement plate assembly which is made inoperable as a result of instability of the embankment caused by factors, which in the opinion of the Engineer, are beyond the control of the Contractor.

T141-6 Placed out of Service.

Settlement plate assemblies shall remain in place and become the property of the Department. All pipe extensions sticking above the permanent embankment ground level at the end of the monitoring period shall be cut off or removed to be at least 12 inches below the ground surface, or bottom of the roadway base course, and backfilled. The annular space between the 1-inch Iron Pipe (Marker) and the outer Casing shall be filled with an AASHTO Classification A-3 Soil containing not more than 5% passing the U.S. No. 200 sieve or a non-shrink grout meeting the requirements of Section 934. If grout is used, all water shall be removed from the annular space and the grout placed from the bottom to top via tremie tube.

T141-7 Method of Measurement.

Each settlement plate assembly acceptably installed, monitored, and maintained in a satisfactory operating condition until final acceptance of the project will be paid for at the unit price bid for each assembly.

T141-8 Basis of Payment.

The price and payment shall be full compensation for furnishing all material, labor and equipment for proper installation of the assembly, for protecting the assembly, for monitoring the assembly, for repair and replacement of damaged assemblies, and for all other work and incidentals necessary to complete the work.

Payment will be made under:

Item No. 141-70 Settlement Plate Assembly - per assembly.